

# NEW INSIGHT FROM CROSS-SECTIONAL AUTOREGRESSIVE DISTRIBUTION LAG ON THE INTERCONNECTEDNESS AMONG FINANCIAL DEVELOPMENT, FINANCIAL INFLOWS AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA

***Soliu Bidemi Adegboyega***

*Olabisi Onabanjo University, Ago-Iwoye, Nigeria*

***Sunday Idowu Oladeji***

*Obafemi Awolowo University, Ile-Ife, Nigeria*

***Benjamin Ayodele Folorunso***

*Obafemi Awolowo University, Ile-Ife, Nigeria*

***Olabode Philip Olofin***

*Obafemi Awolowo University, Ile-Ife, Nigeria*

Received: October 8, 2023    Accepted: August 17, 2024    Online Published: October 10, 2024

## **Abstract**

*The paper explores the relatedness among financial inflows, financial development, and economic growth in sub-Saharan Africa (SSA) from 1990 to 2019. For the analysis, secondary data from the World Development Indicators (WDI) were used. To account for cross-sectional dependence, preliminary tests such as the slope homogeneity test, the cross-sectional dependence test, and the second-generation panel unit root tests (CADF and CIPS) were performed and these informed the use of cross sectional Autoregressive Distributed Lag (CS-ARDL). The findings from the CS-ARDL analysis revealed that financial development positively influences long-run economic growth but not in the short run. Additionally, remittances and foreign debt inflows had a positive and statistically significant impact on economic growth in the selected SSA countries. However, the influence of foreign direct investment and foreign portfolio investment on economic growth was found to be mixed and not statistically significant. In conclusion, the study establishes*

*an interconnectedness between financial inflows, financial development, and economic growth in SSA. Nonetheless, it highlights that not all types of financial inflows contribute as expected to the growth of the selected countries in the region.*

**Keywords:** Cross sectional, financial markets, financial inflows, Economic growth.

## 1. Introduction

Financial inflows and financial development are essential factors that can contribute significantly to economic growth (Levine, 2005; Rajan & Zingales, 2003). Foreign investment and remittances from overseas workers are examples of financial inflows that can positively impact financial development. They can increase the availability of credit, investment opportunities, and access to financial services, thereby fostering growth in the financial sector. However, it is crucial to manage these inflows carefully, as they can also have negative consequences if not handled properly. Large capital inflows may lead to the "Dutch disease" consequence, causing currency appreciation and potential adverse consequences on exports and economic growth. Additionally, misdirected foreign investment can lead to asset bubbles and financial instability (UNCTAD, 2017).

One significant way in which financial inflows can promote financial development is through the development of financial markets, as foreign investment can enhance the liquidity and depth of financial markets, making it easier for businesses to access capital for growth (Olaniyi & Oladeji, 2021; George et al., 2021). However, the financial inflows impact on economic growth varies over recipient countries and relies on the financial inflows and economic practices in those countries (Aizenman et al 2013).

In the literature, scholars have presented varying perspectives on the interconnectedness between financial inflows and economic growth. Some argue that financial inflows can augment domestic savings and improve economic growth in developing countries (Bailliu, 2000; Aizenman et al., 2013). Conversely, others contend that financial inflows have a negative impact on economic growth (Ferreira & Laux, 2009; Murshid & Mody, 2011). Furthermore, discussions on the mediating role of financial development in the financial inflows-economic growth nexus have also taken place, using different measures of financial development indicators (Adeniyi et al., 2015; Olagbaju & Akinlo, 2018; Anetor, 2020).

Against above claimed, the present paper aims to explore the combined impact of various financial inflows on economic growth in Sub-Saharan Africa (SSA) by considering multiple financial development indexes rather than relying on a single measure of financial development as emphasized by Adeniyi et al., (2015); Olagbaju & Akinlo, (2018); Anetor, (2020). The study also takes cognizance of interconnectedness among financial inflows, financial development, and economic growth, considering the spillover consequences that globalization can bring to the financial system (Xu, 2020). The paper adopts the CS-ARDL methodology to analyze this interconnectedness in the presence of cross-sectional dependence among financial inflows, financial development and economic growth in SSA from 1990 to 2019. This method offers several key advantages in panel data analysis. It explicitly addresses cross-sectional dependence, a common issue in macroeconomic and financial data, by incorporating common correlated effects. This makes it more robust than traditional methods that assume cross-sectional independence. CS-ARDL provides flexibility in lag structure, allowing different lag lengths for different variables, which

better captures complex dynamic connections. It can be applied to variables with mixed orders of integration ( $I(0)$  or  $I(1)$ ), eliminating the need for pre-testing for unit roots. Additionally, enables simultaneous estimation of both short-run and long-run associations, providing a more comprehensive understanding of variable dynamics. These features make CS-ARDL a versatile and powerful tool for analysing panel data with potential cross-sectional dependence and complex temporal nexus. Also, the choice of 1990s marked a watershed moment for financial sector development in Africa, with numerous countries implementing comprehensive reforms that reshaped their banking sectors and fostered capital market growth. This era of transformation aligned with an acceleration of global financial integration, creating a rich context for examining financial inflows to the continent. By concluding the study in 2019, gives room for nearly three decades of financial evolution and its association with economic growth, capturing both the immediate and long-term effects of these reforms. This endpoint also allows for a clear examination of pre-pandemic trends, establishing a valuable baseline unaffected by the exceptional economic disruptions brought about by the COVID-19 crisis, thus enabling more accurate insights into the structural dynamics at play during this pivotal period in sub-Saharan Africa economic development.

The rest of the study is order as follows: The next section provides a review of the relevant literature. Section 3 outlines the empirical methodology and data used in the study. Section 4 presents summary along with discussion of findings. Section 5 concludes with policy recommendations while section 6, finally subscribe to research limitations and future research.

## 2. Literature Review

Exploring the interconnectedness among financial inflows, financial development and economic growth. In the literature, various theory has been identified and discussed among which are: Endogenous Growth Theory, Financial Intermediation Theory, Financial Repression Theory, Dependency Theory and New Institutional Economics.

According to Endogenous Growth Theory, financial development and financial inflows play a crucial role in promoting long-term economic growth. Financial development enhances productivity by promoting technological innovation, entrepreneurship, and human capital accumulation. Financial inflows, particularly foreign direct investment, can contribute to economic growth by transferring technology, knowledge, and managerial expertise from developed to developing countries. Furthermore, financial intermediation theory suggests that financial development, such as the establishment of banks and other financial institutions, improves economic growth by facilitating the flow of funds from savers to borrowers. Financial inflows, such as foreign direct investment (FDI) and portfolio investments, can stimulate economic growth by providing additional financial resources for investment and production. However, financial repression theory suggests that excessive government control and regulation of the financial sector can hinder economic growth. Financial repression, which includes policies such as interest rate controls and directed credit programs, may discourage financial development and restrict financial inflows. These restrictions can impede efficient resource allocation and limit investment, thereby negatively affecting economic growth.

In addition, dependency theory argues that financial inflows, particularly foreign capital, can have both positive and negative consequences on economic growth, depending on the structure of the economy and the nature of the inflows. According to this perspective, developing countries may become dependent on foreign capital, which can lead to vulnerability and instability. Additionally, foreign financial inflows may be driven by the pursuit of short-term profits, leading to speculative bubbles and financial crises that can hinder long-term economic growth. Again, New Institutional Economics emphasizes the importance of institutions in shaping the relationship between financial development, financial inflows, and economic growth. Strong legal and regulatory frameworks, secure property rights, and consequence contract enforcement are considered essential for fostering financial development and attracting financial inflows. These institutions provide stability and confidence, encouraging investment and productive economic activities, which ultimately lead to economic growth.

Empirically, using data from 1988 and 2002, Choong et. al., (2010) investigated the consequences of three different private capital flows on economic growth using 51 recipient countries among developed and developing nations. Foreign direct investments (FDI) have an upsurge consequence on growth, while a negative nexus is obtained among foreign debt, portfolio investment and growth. As a result, capital inflows might not be as beneficial to economic growth as they once were.

Using the traditional neoclassical growth framework and an unbalanced panel dataset covering 1980 and 2005 for 18 Latin American countries, Fayissa and Nsiah (2010) investigated the impact of remittances on economic growth and its impact in comparison to other international financial flows: foreign assistance and foreign direct investment in Latin American countries. Their outcomes revealed a substantial consequence of remittances on Latin American countries' development, especially for underdeveloped financial systems, by providing an alternative source of financing investment and assisting in resolving liquidity constraints. In another study, Cooray (2012) used pooled OLS and system GMM estimation tools to investigate the migrant remittances consequence on the scale and productivity of the financial sector while considering 94 non-OECD economies. His findings revealed that remittances by migrants aid expansion of the financial sector's scale and productivity.

Using 100 countries data between 1990 and 2010, Aizenman, Jinjark, and Park (2013) examined foreign capital inflows (such as FDI, portfolio investment, equity investment, and short-term debt) on growth. They further analyzed the relations among growth and capital flow lag (considering economic structure and global growth trends). They discovered a clear connection allying FDI (inflows and outflows) and economic development. Growth and equity flows have a minimum but less stable nexus, while growth and short-term debt had a zero prior nexus to the recession and a negatively correlated after that. Their findings suggested varying capital flows consequence during crisis and non-crisis periods.

Chee-Keong, Siew-Yong, and Zulkornain (2010) examined how foreign direct investment, portfolio investments, and foreign debt flows induced growth in developed and developing countries between 1988 and 2006. They analyzed their study using the generalized approach of moments (GMM). They found portfolio investment and foreign debt negatively impacted growth, while FDI had a beneficial impact, based on the GMM outcomes. Private capital flows promoted growth in low-income countries with a well-established financial sector while slowing growth in low-income countries with an

underdeveloped financial sector. As a result, healthy capital markets are essential to economic growth.

Kyriakos (2019) used GMM framework for a sample size of 78 countries from 1973 to 2013 and considered various financial capital flows and different banking regulation indicators to analyze the nexus between financial volatility and economic growth. Also, the study investigated the degree to which the nexus affected by regulatory rules. The study found that taking into account bank regulatory policies rules, disaggregated measures of net capital flows (FDI, equity and debt) reveal that the variations are beneficial to economic growth in the long run as against the short run. However, Swammy & Dharani (2020) employed data for G-7 economies with huge financial development levels spanning 1983 to 2013 and examine the dynamic nexus between financial development and economic growth. Their studies shows that domestic credit to the private sector and market capitalization were robust for the United States but insignificant among the Euro economies, suggesting excessive fund inhibited economic growth.

Considering studies from developing countries, Bailliu (2000) studied how capital inflows influenced the economic growth of 40 developing countries between 1975 and 1995 using a panel dataset. The estimates of the generalized method of moments (GMM) revealed that capital inflows promote economic growth independent of investment rates only in countries where the banking sector is well-developed. de Vita and Kyaw (2009) used the system GMM to assess the consequence of foreign direct investment, and portfolio investment flows on economic growth in 126 low, lower-middle, and upper-middle-income developing nations from 1985 to 2002. Their findings revealed that FDI had a beneficial impact on the economic growth of developed countries with lower- and upper-middle revenue levels but did not indicate any positive nexus in developing countries classified as low-income. Furthermore, portfolio flows in upper-middle-income countries have only had a beneficial influence on the economic growth of developing countries. Thus, only developing countries with low economic development and absorptive capacity would reap from the growth-improving consequence of investment flows.

Agbloyor et. al., (2014) used Generalized Method of Moments (GMM) estimator to analyze the association among private capital flows and economic growth in Africa from 1990 to 2007. Foreign direct investment, foreign equity fund investment, and private debt flow negatively affected economic development, especially in areas with strong domestic financial markets, which benefit the most from the ability to turn negative private capital flows into positive private capital flows. As a result, any country with poor financial markets could be more vulnerable to financial and exchange rate issues, leading to outflows of foreign capital and suppressing economic growth. Also, Adeniyi, Ajide and Salisu (2015) used an econometric panel method in selected Sub-Saharan Africa (SSA) countries to investigate how financial development influences the association between foreign direct investment (FDI) and economic growth. Their research looked at three varying financial development (FD) measures and their consequences on the FDI-growth relationship. They found that foreign direct investment has an upsurge consequence on economic growth, while inflation exhibits a negative impact, which is consistent with the macroeconomic volatility indicated by continuously rising domestic prices. Again, Olagbaju and Akinlo (2018) used panel data econometric methods to investigate financial development position as a means of absorptive ability in the FDI-economic growth nexus in selected Sub-Saharan African countries. Their findings revealed that the development of the financial system through the banking sector enhances FDI impact on regional economic growth.



Furthermore, Olayungbo and Quadri (2019) investigated the interconnectedness between remittances, financial development, and economic growth in SSA for twenty (20) nations between 2000 and 2015. The findings revealed that remittances and financial development were both short- and long-term drivers of economic progress.

Amna and Riadh (2019) investigated financial flows' consequence on economic growth in developing countries for a global sample of 33 countries ranked by income level. The estimates from the Pooled Mean Group (PMG) confirmed the presence of a long-term nexus because the adjusted coefficient (error correction parameter) was negative. Foreign direct investment was found to hurt economic growth in the short term but not in the long run. Similarly, remittances had a short-term negative consequence on economic growth but not in the long run. Furthermore, the outcomes indicated that ODA has a negligible consequence on both short and long-term economic development.

Gnangnon (2020) examined three main external flows (aid, remittances, and FDI inflows) from 1970 to 2017, using a two-step GMM to examine trade access consequence on diversification of major external financial flows for development in 116 countries. Findings from the study revealed that trade openness was positively associated with financial flow diversification for growth. Similarly, Amna and Faouzi (2020) investigated financial flows consequence on economic growth. Specifically, they estimated financial flows using foreign direct investment, remittances and official development for 41 developing countries comprises of both low, lower and upper-middle income group. The GMM estimation technique was used and result revealed that, for low income countries the FDI consequence and remittances on economic growth are found to be positive. The official development assistance consequence on growth is also adverse. Similar to this, FDI has a negative consequence on economic growth in lower-middle-income countries, whereas remittances have a favourable consequence. On the other side, government development assistance has a small but detrimental consequence on growth. While government support and gross fixed capital formation have a notable and negative consequence on growth, FDI has a favourable consequence on economic growth for upper-middle-income nations. Adegboyega, Akinbobola and Ajayi (2021) investigated the extent to which trade liberalization influence the link between capital inflows (both private and public capital inflows) and economic growth; and their interactive nexus in Nigeria between 1985 and 2018. The result from Autoregressive Distributed Lag (ARDL) technique revealed the degree to which the variables had been co-integrated, as well as the use of both private and public equity inflows. In addition, the study reported that the error correction coefficient was negative and very high, indicating that long-term cointegration had been created.

The interconnectedness among financial inflows, financial development and economic growth have produced mixed outcome, even before and after the globalization era while diverse methodological analysis had been used among which are GMM, FMOLS, PMG among other which failed to consider the degree of interconnectedness among countries, which this present study intends to capture using CS-ARDL method of analysis, since it accommodate and address the plight of cross-sectional dependence and this method would also established whether long run and short run interconnectedness exist between financial inflows and economic growth in SSA.

### 3. Methodology

The present paper relies on the endogenous growth models framework of Romer's (1986; 1990) which was equally employed by Pagano (1993) that relied on the AK model and viewed as a linear function of total capital stock:

$$Y_t = A_t K_t \quad (1)$$

In order to determine the interconnectedness among financial inflows, financial development and economic growth equation (1) is expanded and becomes:

$$\ln \text{GDPI}_{i,t} = \varphi_0 + \varphi_1 \ln \text{GDPI}_{i,t-1} + \varphi_2 \ln \text{REMI}_{i,t} + \varphi_3 \ln \text{GFCI}_{i,t} + \varphi_4 \ln \text{FDI}_{i,t} + \varphi_5 \ln \text{FDI}_{i,t} + \varphi_6 \ln \text{FPI}_{i,t} + \varphi_7 \ln \text{FDI}_{i,t} + \varphi_8 \text{POPI}_{i,t} + \varphi_9 \ln \text{TOI}_{i,t} + \varphi_{10} \ln \text{INSI}_{i,t} + \varphi_{11} \text{EXCI}_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

where: Gross Domestic Product (GDP) lagged coefficient is predicted to be negative ( $\varphi_1 < 0$ ).

Remittances may also affect the level of economic growth and this depends on how they are used ( $\varphi_2 > 0$ ). Iqbal & Satter (2008); Vargas-Silva, Jha & Sugiyarto (2009) supported a positive relationship, while Barajas, Gapen, Chami, Montieland & Fullenkamp (2009) reported the existence of a negative nexus. Furthermore, the coefficients of  $\varphi_3$ ,  $\varphi_4$ ,  $\varphi_5$ ,  $\varphi_6$ ,  $\varphi_7$ ,  $\varphi_{12} > 0$  suggesting that are predicted to be positive because they are growth-enhancing (Barro, 2000; Haider, Khan & Abdulahi 2016). Furthermore, the consequence of population growth cannot be predicted in a priori ( $\varphi_8 > 0$ ), as population growth may lead to new inventions and ideas, causing GDP to rise faster. And, if population growth outpaces GDP (i.e., income per capita falls), this may harm economic growth (See Table 1). Sequel to the submission above, the Cross Section -ARDL model is:

$$\Delta y_{it} = \mu_i + \alpha_i (y_{i,t-1} - i' x_{i,t-1} + \alpha_i - 1 i' \bar{y}_t + \alpha_i - 1 i' \bar{x}_t) \quad (3)$$

Where:  $y_{it}$  is the country  $i$ 's dependent variable at time  $t$   
 $x_{it}$  is a vector of explanatory variables  
 $\bar{y}_t$  and  $\bar{x}_t$  are the cross-section averages of  $y_{i,t}$  and  $x_{i,t}$

Equation 3 is therefore used to determine the cross-sectional correlation's long-run and short-run characteristics of financial inflows, financial development and economics growth in SSA.

In addition,  $\phi_{ij}$  and  $\delta_{ij}$  encapsulate the short-term dynamics allying variables, and  $\alpha_i$  indicates the pace of convergence to long-term equilibrium,  $\theta_i$ , represents long-term equilibrium connection linking  $x_{it}$  and  $y_{it}$ . Meanwhile, the cointegrating interrelated between  $x_{it}$  and  $y_{it}$  is represented by the words in parenthesis, as the words in the parentheses only includes the level portions of cross-sectional averages in the long-term.

The CS-ARDL may be estimated by applying mean group (MG) and pooled mean group (PMG) estimators. The PMG estimator proposed by Pesaran et al. (1999) serves as an alternative approach since it is a middle procedure between the averaging and pooling techniques of estimation. Similar to the MG estimator, the PMG estimator permits the short-run coefficients, intercepts, error correction terms, and error variances to fluctuate

freely throughout the whole cross-section, but places a homogeneity restriction on the long-run coefficients. It worth noted that the PMG estimator cannot be used without fulfilling a number of conditions. A significant and negative error correction term coefficient can be used to confirm a long-term relationship between the variables of interest. Second, in order to support the weak exogenous treatment of the independent variables, the dynamic specification of the model must be substantially improved. Furthermore, error correction model of the residuals must be serially uncorrelated. Therefore, MG or PMG, should be applied depends on whether uniform slopes can be imposed for the expected long-term parameters.

As a result, consistency and efficiency are effectively compromised. If the long-term portions aren't identical across countries, the MG outcomes of the average are consistent but the PMG results are inconsistent. However, if the homogeneity limits are exact, cross-country estimators perform more efficiently than heterogeneous ones. As a result, when the long-run portions for particular nations are the same, both the MG and PMG results are consistent, but only the latter is efficient. The homogeneity assumption is supported by failure to reject the null, giving the PMG estimator has an edge over its MG equivalent. So, under the null (alternative) hypothesis, the PMG (MG) estimator is used. In reality, the PMG technique is frequently viewed as the best attainable compromise for consistency and efficiency assuming the homogeneity assumption is true. (Erülgén et al., 2020).

The main disadvantage of computing long-run coefficients from CS-ARDL specifications is that a relatively large time dimension is required for satisfactory small sample performance due to the inclusion of lagged dependent variables in the regressions, especially if the sum of the AR coefficients in the ARDL model is close to 1. According to Chudik et al. (2015), outlier estimates of the long-run repercussions for certain cross-section units may impact the behaviour of the CS-ARDL estimates of the long-run coefficients for the heterogeneous slope specification scenario. Chudik et al. (2015) established a novel technique for big heterogeneous panel data called cross-sectional augmented distributed lag (CS-DL) to estimate the long-run connection in the presence of cross-sectionally correlated errors. Because the distributed lag representation utilized in this method does not cover lags of the dependent variable, residual factor error structure as well as weak cross-section dependency of idiosyncratic mistakes are permitted.

Table 1 - Data description, measurement, and sources

Variables	Symbol	Description	Sources and Measurement
Economic Growth	GDP	Gross domestic product per capita	World Development Indicator US\$ million
Foreign Portfolio Equity	FPI	This includes net inflows that cover transactions in equity securities and debt securities as a share of GDP.	IMF and World Bank, Global Development Finance/Index
Foreign Portfolio Debt flows	FDF	This is the sum of portfolio debt and other investment stock and shares as a ratio of GDP.	IMF and World Bank, Global Development Finance/Index



Foreign Direct Investment	FDI	FDI is calculated as a ratio of GDP	IMF and World Bank, Global Development Finance/Index
Remittances	REM	Remittances to GDP ratio	IMF and World Bank, Global Development Finance/Index
Gross Capital Formation	GFC	Gross capital formation to GDP ratio	OECD and World Bank/Index
Trade Openness	TO	Share of exports to GDP ratio	World Development Indicator Index
Population	POP	The growth rate of the labour force	World Development Indicators
Institution	INS	i. Control of corruption ii. Government consequenceiveness iii. Political stability iv. Rule of Law v. Regulatory Quality	The Worldwide Governance Indicators & International Country Risk Guide (ICRG)/Index
Exchange Rate	EXC	Nominal Exchange rate	World Bank National Accounts Data, and OECD National Accounts Data Files
Financial Development	FD	i. Domestic credit to the private sector ii. Liquid liabilities to GDP iii. Private credit as a percentage of GDP iv. Bank lending deposit spread	World Bank Global Development Finance/Index

Source: Author's Compilation

## 4. Results and Discussion

### 4.1 Preliminary Tests

In general, typical shocks across countries and regions are a relevant reason for the presence of cross-section dependence in any macroeconomic analysis (Mao & Shen, 2019), because ignoring typical shocks would result in an arbitrary correlation degree within and across economies in the context of globalization (Eberhardt & Teal, 2010). In addition, while assessing the effect of repressor variables on the regressor variable across different economies, the possibility of heterogeneity must be recognized.

As a result, before considering panel data regression estimates, it is preferable to study the cross-sectional dependency and slope heterogeneity characteristics among the nations in the SSA panel settings. According to Dong et al. (2018a and b) and Grossman & Krueger (1995), ignoring cross-sectional dependence and slope homogeneity would result in

inconsistent estimates and misrepresentations of outcomes, producing a big gap in policymaking.

Following the submission, Table 2 presents the outcomes of the slope homogeneity, in which the  $\Delta$  and  $\Delta$  adj. tests of Pesaran & Yamagata (2008) show that the outcomes of slope homogeneity were significant at the 5% significance level. However, for the robustness of the research study, the slope homogeneity test proposed by Blomquist & Westerlund (2013) as the adj. test was also significant at the 5% significance level, thereby confidently rejecting the null hypothesis of homogeneous slope coefficients. The heterogeneity of the slope portions hence leads to the determination of a long-run co-movement among the variables of the model for which various country groups were chosen

Table 2 – Slope homogeneity test

Tests	Stat. Value	p-value
Pesaran & Yamagata (2008): $\Delta$ (delta) test	3.519	0.000 *
$\Delta$ (delta) adj. test	4.596	0.000 *
Blomquist & Westerlund (2013): $\Delta_{HAC}$	6.028	0.000 *
$(\Delta_{HAC})$ adj.	8.235	0.000 *

Source: Authors' Compilation.

Note: \*  $P < 0.01$ , \*\*  $P < 0.05$  respectively.

$\Delta$  (delta) test: simple slope homogeneity test;

$\Delta$  (delta) adj. test: mean variance biased adjusted slope homogeneity test;

$\Delta_{HAC}$ : heteroscedasticity and autocorrelation consistent version of simple slope homogeneity test;

$(\Delta_{HAC})$  adj.: heteroscedasticity and autocorrelation consistent version of mean variance biased adjusted slope homogeneity test.

The existence of a long-run co-movement among the variables was demonstrated in Table 2 while this gives room to ran Cross Sectional Dependence (CSD) tests, and the purpose of this CSD test is to determine the ideal unit root test. However, various CSD tests identified in the existing literature include Breusch and Pagan's (1980) Lagrange multiplier (LM) test; Pesaran's (2004) scaled LM test; Pesaran's (2004) cross-section dependence test; and Baltagi et al. (2012) bias corrected scaled LM test, each with different conditions (Swamy & Dharani, 2020). Individual cross-sectional dependence (CSD) tests for fifteen SSA countries between 1990 and 2019 are shown in Table 3. This means that there is enough cross-sectional dependency across variables and panels. Furthermore, the findings contradict the null hypothesis, demonstrating that not only do the explanatory variables influence the economic growth variable in each nation, but so do the error terms in the regression among countries. It is suggested that when a shock occurs in one of these countries, it affects them all equally.

Table 4 responds to the above submission by presenting a second-generation panel unit root test that accounts for cross-sectional dependence, which is supported by the research of Swamy and Dharni (2020) and Hussain et al. (2021), who argued that in the presence of cross-sectional dependence, stationarity should be determined using a second-generation unit root test such as Pesaran's (2007) cross-sectional augmented IPS (CIPS) and cross-section augmented Dickey Fuller (CADF) unit root tests.

Table 3 - Cross sectional dependence test

Methods	Breusch-Pagan LM	Pesaran scaled LM	Bias-corrected scaled LM	Pesaran CD
Variable	Statistic	Statistic	Statistic	Statistic
GDP	2726.26**	179.849**	179.590**	52.004**
FDI	333.966**	14.765**	14.506**	8.9864**
PDF	1070.61**	65.598**	65.340**	11.343**
FPI	714.860**	41.049**	40.790**	14.950**
TO	2022.01**	131.251**	130.99**	41.811**
REM	578.191**	31.618**	31.359**	7.0003**
POP	1278.61**	79.951**	79.693**	5.834**
INS	812.369**	47.778**	47.519**	18.076**
GFC	571.539**	31.159**	30.900**	8.7206**
FD	727.688**	41.934**	41.675**	14.676**
EXC	1678.92**	107.576**	107.317**	37.370**

Note: \*\*  $P < 0.05$ , \*  $P < 0.10$  respectively.

Source: Authors Compilation.

Table 4 - Outcomes of second generation panel unit root tests

Methods	CIPS			CADF		
Variable	I(0)	I(1)	Integration order	I(0)	I(1)	Integration order
GDP	-1.233	-4.082**	$I_1$	-1.577	-3.193**	$I_1$
FDI	-3.028**	-5.340**	$I_1$	-2.769**	-4.537**	$I_1$
PDF	-0.843	-4.673**	$I_1$	-1.150	-3.150**	$I_1$
FPI	-2.141	-4.353**	$I_1$	-2.160***	-3.306**	$I_1$
TO	-2.203***	-5.252**	$I_1$	-2.060	-3.762**	$I_1$
REM	-2.609**	-5.373**	$I_1$	-2.236**	-3.843**	$I_1$
POP	0.151	-2.241**	$I_1$	-1.053	-1.793	$I_{(d)}$
INS	-2.715**	-5.369**	$I_1$	-2.625**	-4.787**	$I_1$
GFC	-2.588**	-5.100**	$I_1$	-2.413**	-4.336**	$I_0$
FD	-2.498**	-5.524**	$I_1$	-2.415**	-4.035**	$I_1$
EXC	-1.579	-4.175**	$I_1$	-1.923	-2.800**	$I_1$

Source: Authors Compilation.

Note: \*\*\*  $P < 0.01$ , \*\*  $P < 0.05$  and  $P < 0.1$  respectively.

The outcome of the unit root, for both CIPS and CADF unit root tests, with both intercept and time trends, had critical values for both tests of -2.45, -2.25, and -2.14 at 0.01, 0.05, and 0.1 levels of significance, respectively. The outcome revealed the unit root of order one  $I(1)$ , especially Pesaran's (2007) cross-sectional augmented IPS. Again, three different panel co-integration techniques were employed, among which are the Pedroni (1999, 2004) and Kao (1999) cointegration tests and the Westerlund (2008) bootstrap panel co-integration test. The result of the test is shown in Table 4, affirming that the three co-integrating tests were statistically significant at the 5% level of significance, rejecting the null hypothesis of no co-integration. Hence, there is a co-integrating association among the variables of interest.

## 4.2 Discussion of Finding

Column 1 of Table 5 presents the estimated findings of the models on the impact of financial inflows and financial development on economic growth in the country without the inclusion of control variables such as the exchange rate and population. Column 2 displays the results of the growth model, which incorporate all variables of relevance as justified by theory. The estimation of the economic growth model in column 1 shows a positive but negligible association between foreign direct investment and economic growth, with a 0.003 percent rise in foreign direct investment due to economic growth. This shows that increased foreign direct investment tends to boost economic growth. This finding challenges the conventional wisdom that FDI is a key driver of economic growth. Policymakers may need to reassess strategies focused on attracting FDI and instead focus on the quality and sector-specificity of foreign investments rather than just the quantity. It may be necessary to implement complementary policies to help realize the potential benefits of FDI.

Similarly, the portfolio equity investment (FPI) coefficient has a negative and insignificant relationship with economic growth, with a 0.021 percent decrease in foreign portfolio equity investment attributable to economic growth, contradicting the theoretical proposition's prior expectation. Like FDI, the lack of significant impact from FPI suggests that policymakers should be cautious about relying too heavily on portfolio investments to drive economic growth. It may be more beneficial to focus on developing domestic financial markets and improving the overall investment climate as the discovery supports the findings of Anetor's (2020). Remittances show a positive and statistically significant effect on economic growth in both model variations. The coefficients (0.031) indicate that a 1% increase in remittances is associated with a 0.031% increase in GDP, *ceteris paribus* ( $P = 0.01$ ,  $t = 1.89$ ). This is in line with the study conducted by Fayissa and Nsiah (2010); Olayungbo and Quadri (2019). This shows that in SSA countries remittances appear to play a crucial role in driving long-term economic growth. This suggests that policies facilitating remittance inflows, reducing transfer costs, and promoting the productive use of remittances could significantly contribute to economic development. Countries may benefit from creating channels to better leverage remittances for investment and development projects.

Furthermore, the foreign debt inflows (FDF) coefficient is positive and statistically significant in terms of its link with economic growth, with a 1% increase in FDF translating into a 0.079% increase in economic growth ( $P < 0.05$ ,  $t = 3.18$ ). The outcome contradicts the results observed by Chee-Keong et al (2010) and Choong et al (2010). This indicates that foreign debt, when managed properly, can contribute to long-term economic growth.

However, policymakers must ensure that borrowed funds are invested in productive sectors that enhance long-term growth potential rather than being used for short-term consumption. Sustainable debt management policies are crucial to harness the positive effects while avoiding debt crises. The gross fixed capital formation (GFC) coefficient is positive and statistically significant at 5 percent, with 1 percent increase in capital resulting into about 0.001 percent increase in economic growth ( $P < 0.05$ ,  $t = 2.36$ ). The outcome contravenes the results documented by Amna and Faouzi (2020), as this underscores the importance of domestic investment in driving long-term economic growth. Policies that encourage capital formation, improve the business environment, and facilitate access to finance for domestic firms could significantly contribute to sustainable economic development.

In addition, trade balance coefficient positively influences economic growth and was found to be statistically significant at 5 percent significance level, with 1 percent rise in trade balance resulting to 0.228 increase in economic growth ( $P < 0.05$ ,  $t = 3.68$ ). This is however conformed with the submission of Gnanngnon (2020). The positive association highlights the crucial role of international trade in fostering economic growth and policies promoting trade liberalization, reducing trade barriers, and improving trade infrastructure could significantly boost long-term economic performance. However, policymakers should also consider measures to help domestic industries adapt to increased international competition. Another prominent determinant of growth in the literature is institutional quality and the institutional quality (INS) coefficient is positive and statistically significant in terms of its relationship with economic growth, with a 1 percent increase in institutional quality translating into about a 0.048 percent increase in economic growth in the economy ( $P < 0.01$ ,  $t = 1.70$ ). This suggests that good institutions may contribute to long-term economic growth, albeit with some uncertainty. Efforts to improve governance, reduce corruption, and enhance the rule of law could have positive long-term effects on economic performance. However, the mixed results imply that institutional improvements should be part of a broader development strategy rather than being seen as a standalone solution. Although financial development index (FD) is positive but insignificant with economic growth, with 0.398 percent increase in financial development attributable to economic growth. This implies that well developed financial development is needed to increase economic growth in the economy. The outcome is supported by the remarks by Swammy and Dharani (2020)

The value of the coefficient of gross fixed capital creation (GFC) is positive and statistically significant at 5%, with a 1% increase in capital resulting in a 0.001% rise in economic growth ( $P < 0.05$ ,  $t = 2.36$ ). The outcome contradicts the results observed by Amna and Faourzi (2020). However, the positive association underscores the crucial role of domestic investment in driving both immediate and long-term economic growth. This suggests that policies encouraging capital formation and improving the investment climate could be highly beneficial for sustained economic development in SSA. Furthermore, the trade balance coefficient was found to be statistically significant at the 5% significance level, with a 1% increase in trade balance leading to a 0.228 increase in economic growth ( $P < 0.05$ ,  $t = 3.68$ ). The outcome is supported by the study undertaken by Gnanngnon (2020). The positive impact emphasizes the importance of international trade for economic growth. The economic implication is that policies promoting trade liberalization and international economic integration could significantly contribute to both immediate and long-term economic growth. Another prominent determinant of growth in the literature is



institutional quality, and the institutional quality (INS) coefficient is positive and statistically significant in terms of its relationship with economic growth, with a one-percentage-point increase in institutional quality translating into about a 0.048-percentage-point increase in economic growth ( $P < 0.01$ ,  $t = 1.70$ ). This suggests that while good institutions may contribute to long-term economic growth, their impact is not immediate and may be subtle. The implication is that improving institutional quality should be viewed as a long-term strategy for economic development, rather than a quick fix for immediate growth challenges.

However, the result from column 2 was a bit different for which all variables of interest were used in the analysis. Table 5, column 2 reveals that the remittances coefficient is beneficial and statistically significant in terms of its nexus with economic growth, with a 1 percent improvement in remittances (REM) translating into about 0.786 percent increase in economic growth ( $P < 0.05$ ,  $t = 2.26$ ). This, however, aligned with the study undertaken by Fayissa and Nsiah (2010)

Also, the foreign debt inflows (FDF) coefficient is positive and statistically significant in terms of its relationship with economic growth, with a 1 percent rise in foreign debt inflows translating into about 0.362 percent rise in economic growth in the economy ( $P < 0.05$ ,  $t = 4.78$ ). The finding corroborates the study examined by Anetor (2020). Both remittances and foreign debt inflows show positive and significant effects on economic growth in the long run. This finding implies that these international financial flows contribute substantially to economic development. Remittances likely provide additional income to households, potentially boosting consumption and investment. Foreign debt, when used productively, can finance crucial development projects and infrastructure, leading to long-term growth.

Table 5 - Long run outcome on the interconnectedness among financial inflows, Financial Development and Economic Growth using Dynamic CS-ARDL

Independent Variable	Dependent Variable: GDP (Economic Growth)		Dependent Variable: GDP (Economic Growth)	
	Coefficient	t-stat	Coefficient	t-stat
FDI	0.003	0.85	-0.003	-0.09
REM	0.031*	1.89	0.786**	2.26
PDF	0.079**	3.18	0.362**	4.78
FPI	-0.021	-0.28	0.163	0.37
GFC	0.001**	2.36	0.036**	3.54
TO	0.228**	3.68	0.413**	3.29
FD	0.398	0.68	2.903**	3.41
INS	0.048*	1.7	-0.312	-0.99
POP			-0.026	-0.48
EXC			0.005	1.56
Observation	435		420	
F-stat & Prob	3.47 (0.000)		8.35 (0.000)	
CD stat & Prob	-0.66 (0.509)		-2.18 (0.029)	

Source: Authors Compilation.

Note: \*\* (\*) represents 5% (10%) significant level.

The gross fixed capital formation (GFC) coefficient is beneficial and statistically significant at 5 percent, with a 1 percent increase in capital resulting in about 0.0036 percent increase in economic growth ( $P < 0.05$ ,  $t = 3.54$ ). In addition, trade balance coefficient positively influences economic growth and was found to be statistically significant at a 5 percent significance level, with a 1 percent rise in trade balance resulting in a 0.413 increase in economic growth ( $P < 0.05$ ,  $t = 3.29$ ). This is in line with the study investigated by Ho et al (2021) and Gnanngnon (2020) affirming how gross fixed capital formation influences economic growth. Furthermore, the financial development index (FD) is found to be beneficial and statistically significant at 5 percent, with a 1 percent increase in financial development resulting in about 2.903 percent increase in economic growth ( $P < 0.05$ ,  $t = 3.41$ ). This suggests that well-developed financial development tends to increase economic growth in the economy. This means that the financial system in the sub-region of SSA facilitates and improves resource allocation to improve investment and growth. Hence, this corroborates findings conducted by Adeniyi et. al., (2015) and Olayungbo and Quadri (2019). Contrary to the outcome in column 1, the institutional quality (INS) coefficient is negative and statistically not significant to economic growth, with a 1 percent decrease in institutional quality translating into about 0.312 percent reduction in economic growth in the economy, even human capital development proxied by population growth is negative and statistically insignificant. However, the coefficient of the exchange rate is positive but statistically insignificant under the studied era. foreign direct investment has an inverse and insignificant nexus with economic growth, as against what happens in column 1. This suggests that higher foreign direct investment tends to reduce economic growth in the economy. And that the coefficient of portfolio equity investment (FPI) has a positive and insignificant relationship with economic growth, with a 0.163 percent decrease in foreign portfolio equity investment attributable to economic growth. Again, foreign direct investment and portfolio equity investment were found not to be significant.

table 6 - short run outcome on the connection between financial inflows and economic growth using dynamic CS-ARDL

Independent Variable	Dependent Variable: GDP (Economic Growth)		Dependent Variable: GDP (Economic Growth)	
	Coefficient	t-stat	Coefficient	t-stat
GDP(-1)	0.457**	5.18	0.634**	8.24
FDI	0	0.36	0	0.24
REM	0.020**	2.52	-0.033	-1.14
PDF	0.024	0.86	0.025	1.06
FPI	-0.019	-0.51	-0.013	-1.14
GFC	0.002**	2.71	0.003	1.36
TO	0.068**	2.66	0.13**	3.95
FD	0.357	1.45	-0.11	-0.38
INS	0.017	1.58	-0.012	-0.84
POP			-0.026	-0.48
EXC			0.005	1.56
ECM(-1)	-0.542**	-6.14	-0.365**	-4.76

Source: Authors Compilation.

Note: \*\* (\*) represents 5% (10%) significant level.

Furthermore, Table 6 presents short-run outcomes on the interconnectedness among financial inflows, financial development, and economic growth. As documented for the long-run analysis, so also column 1 of Table 6 contains the outcomes from the estimation of the models without the involvement of control variables like exchange rate and population. Column 2 provides results from the growth model that includes all variables of interest.

As presented in Table 6, the error correction term coefficient in columns 1 and 2 are negative and statistically significant at 5 a percent significant level. This demonstrates the short-run interconnection of the model, which shows that the short-run change velocities are 0.542 percent and 0.365 percent. Also, a relatively short transition period has led to relatively little change, and even in cases where there have been imbalances, the return to equilibrium has been relatively rapid, with 54.2% and 36.5% occurring in the first year. Given these findings, it is imperative that for the financial inflows and financial development to have any consequence on economic growth in SSA, policymakers need to come up with much better policies that are aimed at addressing economic growth level through the activities of the financial inflows, in solving the economic plight affecting the country.

These findings have several important economic implications. First, they highlight the potential benefits of policies that facilitate remittance inflows and manage foreign debt effectively. Second, they underscore the crucial role of domestic investment and trade openness in driving both short and long-term economic growth, suggesting that policies promoting capital formation and trade liberalization could be beneficial. Third, the results indicate that financial sector development may have long-term benefits, even if short-term impacts are not evident. Fourth, the lack of significant impact from FDI and FPI suggests that policymakers should carefully evaluate the effectiveness of policies aimed at attracting these forms of investment. Finally, the presence of error correction in the short-run model implies that economies have a tendency to return to their long-run equilibrium, but the speed of adjustment may vary. Overall, these findings provide valuable insights for developing economic strategies aimed at promoting sustainable long-term growth.

## 5. Summary of findings and conclusion

The advent of globalization has reveals an interconnectedness among countries, as no nations or countries are independent of her own. In view of this, present study investigates if there is any interconnectedness among financial inflows, financial development and economic growth in selected sub-Saharan Africa countries between 1990 and 2019. The study employed and tested for cross sectional dependency (CSD), Second generation unit root test of CIPS and CADF, along with cointegration test of Kao, Pedroni and Westerlund to affirm that there is a co-integrating association among the variables. Again, cross section autoregressive distributed lag was used to affirm that there is both long run and short run interconnectedness among financial inflows, financial development and economic growth in the selected SSA countries.

The results of the CS-ARDL reveals that financial development positive influence economic growth in the long run while not in the short run. In addition, the coefficient of remittances and foreign debt inflows positively and statistically enhanced economic growth in the selected SSA countries. However, the consequence of foreign direct investment and foreign portfolio investment were found to be positively/negatively influence economic

growth and not significant. Again, the consequence of trade openness and gross fixed capital formation were found to be positive and statistically significant. By and large, the coefficient of the ECM is inversely related and reveals that the short-run change velocities are 0.542 percent and 0.365 percent respectively.

Therefore, we submit that financial inflows, financial development, and economic growth are interrelated, although not all the financial inflows contribute as expected to the growth of the selected countries in SSA, hence the policymakers and government should do more to ensure policy(ies) that would attract more foreign direct investment into the region as a consequence of foreign direct investment could assist in wealth creation as against foreign debt that requires debt servicing and remittances that sent home mostly altruism reasons. The implications of these findings are far-reaching for policymakers in Sub-Saharan Africa. They further suggest a need for a demanding approach to economic development that goes beyond simply attracting foreign investment. Instead, policies should focus on creating an environment that maximizes the benefits of remittances, manages foreign debt effectively, promotes domestic investment, and fosters international trade. Additionally, the development of robust financial sectors and improvement of institutional quality should be prioritized as part of long-term growth strategies.

## References

1. Adegboyega, S. B., Akinbobola, T. O., & Ajayi, F. O. (2021). Capital Flows and Economic Growth: What Role Does Trade Liberalisation Play? *Izvestiya Journal of University of Economics-Varna, Bulgaria* 65(1), 26-44; doi: 10.36997/IJUEV2021.65.1.26
2. Adeniyi O, Ajide, B., & Salisu A (2015). Foreign Capital Flows, Financial Development and Growth in Sub-Saharan Africa. *Journal of Economic Development*. 40(3), 85 - 103
3. Agbloyor, E. K., Abor, J. Y., Adjasi, C. K. D., & Yawson, A. (2014). Private Capital Flows and Economic Growth in Africa: The Role of Domestic Financial Markets. *Journal of International Financial Markets, Institutions and Money*, 30, 137-152.
4. Aizenman, J., Jinjark, Y., & Park, D. (2013). Capital Flows and Economic Growth in the Era of Financial Integration and Crisis, 1990–2010. *Open Economies Review*, 24(3), 371-396.
5. Amna Z., & Riadh E. (2019). Short-Term and Long-Term Consequences of Financial Flows on Economic Growth. *Journal of Economic Integration*, 34(4):705-724.
6. Amna Z., & Faouzi S. (2020). Impact of foreign direct investment, remittances and official development assistance on economic growth: panel data approach, *PSU Research Review*. 2399-1747 doi 10.1108/PRR-04-2020-0012
7. Anetor, F. (2020). Financial development threshold, private capital inflows and economic growth: Evidence from sub-Saharan African countries, *International Journal of Development Issue*, 19(1), 77-92, doi 10.1108/IJDI-06-2019-0099.
8. Bailliu, N.J. (2000). Private Capital Inflows, Financial Development and Economic Growth in Developing Countries, *Working paper 2000-15*, Bank of Canada.
9. Barajas, A., M.T. Gapen, R. Chami, P. Montieland & Fullenkamp, C. (2009). Do workers remittances promote economic growth? *IMF Working Paper* WP/09/153. Washington, DC: IMF: 1-22

10. Barro, R.J. (2000). Inequality and growth in panel countries. *Journal of Economic Growth*, 5,5-32.
11. Cheng, Y., & Yao, X. (2021). Carbon intensity reduction assessment of renewable energy technology innovation in China: A panel data model with cross-section dependence and slope heterogeneity, *Renewable and Sustainable Energy Reviews* 135 (2021) 110157
12. Chudik, A., K. Mohaddes, M. H. Pesaran, and M. Raissi (2015). Long-Run Effects in Large Heterogeneous Panel Data Models with Cross-Sectionally Correlated Errors. Federal Bank of Dallas, Globalization and Monetary Policy Institute Working Paper No. 223.
13. Chee-Keong C., Siew-Yong L., & Zulkornain Y. (2010). Private capital flows to low-income: The role of domestic financial sector. *Journal of Business Economics and Management*, 11(4): 598–612.
14. Choong, C., Baharumshah, A. Z., Yusop, Z., & Habibullah, M. S. (2010). Private capital flows, stock market and economic growth in developed and developing countries: A comparative analysis, *Japan and the World Economy* 22:107-117.
15. Cooray, A. (2012). Migrant remittances, financial sector development and the government ownership of banks: Evidence from a group of non-OECD economies. *Journal of International Financial Markets, Institutions and Money*. 22(4). 936-957 <https://doi.org/10.1016/j.intfin.2012.05.006>.
16. De Vita, G.K. & Kyaw, S. (2009). Growth Consequences of FDI and Portfolio Investment Flows to Developing Countries: A Disaggregated Analysis by Income Levels”, *Applied Economic Letters*, 16(3), 277-283.
17. Eberhardt M, Teal F. (2010). Productivity analysis in global manufacturing production. *Economics series working papers* 515. University of Oxford
18. Erülgen, Ahmet; Rjoub, Husam; Adalier, Ahmet (2020) : Bank characteristics effect on capital structure: Evidence from PMG and CS-ARDL, *Journal of Risk and Financial Management*, MDPI, Basel, 13(12), 1-13, <https://doi.org/10.3390/jrfm13120310>
19. Fayissa, B., & Nsiah, C. (2010). The Impact of Remittances on Economic Growth and Development in Africa. *The American Economist*, 55(2), 92–103. <https://doi.org/10.1177/056943451005500210>
20. Ferreira, M. A., & Laux P. A. (2009). Portfolio flows, volatility and growth. *Journal of International Money and Finance*, 28. 271-292
21. George, E.O, Aberu, F, & Adegboyega, S.B. (2021). Institutional quality, Investors Objectives and FDI inflow in African Regions. *Acta Universitatis Danubius (Economica)*, 17(3), 193 – 208.
22. Gnanngnon, S.K. (2020). Trade Openness and Diversification of External Financial Flows for Development: An Empirical Analysis. *South Asian Journal of Macroeconomics and Public Finance*, 9(1), 22–57
23. Grossman, G.M., & Krueger, A. B. (1995). Economic Growth and the Environment. *The Quarterly Journal of Economics*, 110(2):353-377.
24. Haider, M.A., Khan, M.A., & Abdulahi, E. (2016). Determinants of Foreign Portfolio Investment and Its Consequences on China. *International Journal of Economics and Finance*. 8(12). doi:10.5539/ijef.v8n12p143.
25. Iqbal, Z. and A. Satter, (2008). The contribution of workers remittance to economic growth in Pakistan. *Pakistani Institute of Development Economics, Research Report No. 187*, 1-25.



26. Kyriakos, C.N (2019). Volatile capital flows and economic growth: The role of banking supervision. *Journal of Financial Stability* . 40: 77-93.
27. Levine, R. (2005). Finance and growth: theory and evidence. *Handbook of Economic Growth*, 1, 865-934.
28. Lucas R. (1988). On the mechanics of economic development, *Journal of Monetary Economics*, 22:33-42
29. Murshid, A.P. & Mody, A. (2011). *Growth from international capital flows: The role of volatility regimes*. International Monetary Fund
30. Olaniyi, C. O., & Oladeji, S. I. (2021). Moderating the effect of institutional quality on the finance–growth nexus: Insights from West African countries. *Economic Change and Restructuring*. <https://doi.org/10.1007/s10644-020-09275-8>.
31. Olagbaju, I. O. & Akinlo, A. E. (2018). FDI and Economic Growth Relationship in Sub Saharan Africa: Is the domestic financial system a significant intermediary? *Archives of Business Research*, 6(5), 90-112.
32. Olayungbo, D.O., & Quadri, A. (2019). Remittances, financial development and economic growth in sub Saharan African countries: evidence from a PMGARDL approach. *Financial Innovation*, 5(9), 1-25. <https://doi.org/10.1186/s40854-019-0122-8>.
33. Pagano, M. (1993). Financial markets and growth An verview. *European Economic Review* 37, 613 - 622. North-Holland.
34. Pesaran, M. H., Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, 94(446), 621–634. <https://doi.org/10.1080/01621459.1999.10474156>.
35. Pesaran, M. H., Shin, Y., & Smith, R. P. (2006). Pooled Mean Group Estimation of Dynamic Heterogeneous Panels. *Journal of the American Statistical Association*, 94(446), 621. <https://doi.org/10.2307/2670182>
36. Pesaran, M. Hashem, Aman Ullah & Takashi Yamagata. (2008). A bias adjusted LM test of error cross-section independence. *Econometrics Journal* 11: 105–27.
37. Pesaran, M. H., & Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68(1), 79–113. [https://doi.org/10.1016/0304-4076\(94\)01644-F](https://doi.org/10.1016/0304-4076(94)01644-F)
38. Pesaran, M. H., L. V. Smith, & T. Yamagata. (2013). Panel unit root tests in the presence of a multifactor error structure. *Journal of Econometrics* 175: 94–115.
39. Pesaran, M. H., & Yamagata, T. (2008). Testing slope homogeneity in large panels, *Journal of Econometrics*, 142,50-93.
40. Romer P.M. (1990), Endogenous Technological Change, *Journal of Political Economy*, 98 (5)
41. Swamy V & Dharani M. (2020). Thresholds in finance–growth nexus: Evidence from G-7 economies. *Aust Econ Pap.* 2020;e12192. <https://doi.org/10.1111/1467-8454.12192>
42. United Nations Conference on Trade and Development (UNCTAD) (2017). World Investment Report 2017: Investment and the Digital Economy. United Nations.
43. Vargas-Silva, C., S. Jha & Sugiyarto, G. (2009). Remittances in Asia: Implications for the fight against poverty and the pursuit of economic growth. *ADB Working Paper Series*, No.182
44. WDI (2021). *World Development Indicators 2021*, World Bank Publications.

45. Xu, Z. (2020). Economic policy uncertainty, cost of capital and corporate innovation. *Journal of Banking & Finance*, 111, Article 105698.