



## FDI-growth nexus and the moderating role of financial development in Nigeria: Fresh empirical insights

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### Abstract

This study examines how the nexus between foreign direct investment (FDI) and economic growth nexus is moderated by financial development in Nigeria. Efforts are also made to estimate the threshold level of financial development beyond which FDI can deliver desirable growth outcomes in Nigeria. The analysis is based on annual time-series data on relevant variables over the period 1986-2022 collected from secondary sources. The study specifies an interactive model based on the FDI Photosynthesis Model, and this is estimated using the Fully Modified Ordinary Least Squares (FMOLS), Canonical Cointegrating Regression (CCR), and Autoregressive Distributed Lag (ARDL) techniques. The results show that FDI does not exert any significant positive direct effect on economic growth in Nigeria. The study also finds that the effect of the interaction of FDI with financial development is positive but insignificant in the short run, while it is negative and significant in the long run. The threshold analysis reveals that the levels of financial development beyond which FDI can deliver desirable growth outcomes in Nigeria are 19.14 and 68.16 percent of GDP based on the FMOLS and CCR estimates, respectively. The study concludes that financial development limits the transformative effect of FDI on economic growth in Nigeria.

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### Contribution of this paper to the literature

This study contributes to the empirical growth literature by moving beyond the conventional direct-effect analysis, and integrating an interactive model as well as threshold analysis using FMOLS, CCR and ARDL techniques, offering new evidence on the role of financial development in shaping the growth effect of FDI in Nigeria.

## 1. Introduction

The aim of every country to achieve economic growth and development is possible only if there are adequate and sufficient financial resources, among other factors. In reality, no country is self-sufficient and as such, countries of the world require some level of foreign capital flows to complement the capacity of local investment to aid growth and development (Osabohien, Awolola, Matthew, Itua, & Elomien, 2020; Salan et al., 2025). Over the years, the global economy has witnessed a surge in foreign capital flows, which emphasises the increasing interconnectedness and interdependence across world economies (Sidiq, 2023). Governments of many countries have implemented policies targeted at encouraging and attracting these foreign flows into their economies due to the perceived benefits. For instance, the contributions of foreign investment tremendously assisted the growth trajectories of Japan and South Korea after World War II and the Korean War, respectively. This was by providing the two countries with a good source of foreign skill and technology, management expertise, as well as human resource development through international training and collaboration. Foreign capital flows come in several forms, including foreign direct investment (FDI), foreign portfolio investment, official development assistance, and remittances. However, FDI has received more attention than the other forms of foreign flows and investments because of its long-term and lasting operational framework. FDI stands out as a powerful driver of economic growth, ushering in capital, technological know-how, and employment opportunities. Todaro and Smith (2009) posited that FDI encourages the inflow of technology and skills as well as helps fill the gap between the domestic supplies of savings and government revenue.

Over the years, the Nigerian economy has emerged as one of the leading recipients of FDI in Africa due to its expansive economic prospects, abundant resources (Adekoya & Adeyanju, 2025; Ninyio, 2024), and a massive consumer market (Bisiriyu & Osinusi, 2020; Osabohien et al., 2020). More specifically, Nigeria's FDI (net) increased from -US\$542.3 million in 1981 to US\$119.7 million in 2022 (World Development Indicators, 2023). These investments have been directed to sectors ranging from oil and natural resources to telecommunications and manufacturing, painting a vivid picture of the country's potential as a hotspot for international capital (Lloyds Bank, 2024). Nigeria's substantial and rapidly expanding population presents an alluring market for foreign investors. Boasting over 200 million people, the country offers a considerable consumer base, presenting lucrative growth prospects for companies across various sectors (Smith, 2019). Furthermore, the demographic makeup, characterised by a growing youthful population, augments Nigeria's attractiveness as a profitable market for industries ranging from consumer goods to technology. Beyond sheer numbers, the demographic composition underscores the potential for sustained and scalable growth, attracting FDI with a focus on long-term returns in a vibrant market.

The surge in FDI into Nigeria is seen as a potentially transformative force, capable of fostering infrastructure development, and generating employment opportunities, thereby steering economic growth in the country (Orji, Nwagu, Ogbuabor, & Anthony-Orji, 2021). However, it has been argued that the positive effect of FDI on economic growth can be limited or hampered by certain factors, one of which is the level of development of the domestic financial system (Kong, Guo, Wang, Sui, & Zhou, 2020; Kwablah & Amoah, 2022; Makiela & Ouattara, 2018). This implies that the positive effect does not occur automatically but requires a sufficient degree of financial development for it to materialise in the recipient country. Financial development encompasses the efficiency, depth, and accessibility of a country's financial markets and institutions. On one side, the availability of finance in an economy has the potential of enhancing the productivity levels in the real sector, which can be translated to the other sectors of the economy via the associated multiplier effect (Agbo & Nwankwo, 2018; Oriavwote & Eshenake, 2014). However, the accessibility of this finance hinges on the efficacy of financial institutions, which are allotted the responsibility of mobilising and directing financial resources to the real sector (Adekunle & Tonia, 2024). A well-developed financial system is crucial in mobilising and allocating resources efficiently, facilitating investment, and promoting economic growth.

Financial development is seen as an important determinant of economic growth in Nigeria (Adekunle & Tonia, 2024; Judith & Chijindu, 2016; Ogwumike & Salisu, 2012). The Nigerian financial system has witnessed some reforms following the introduction of the Structural Adjustment Programme (SAP) in 1986. The entire financial system in Nigeria, like in other Sub-Saharan African (SSA) countries, is dominated mainly by the banking sector (Alade & Tule, 2017). Prior to the advent of the SAP, the financial system was based on the policy of financial repression – fixed exchange rates, interest rate ceilings, selective credit control, and government-owned financial institutions (Ndako, 2017). However, the introduction of the programme by the government paved the way for liberalisation measures, which included the privatisation of government-owned financial institutions and the deregulation of interest as well as exchange rates. This assisted in opening up the domestic economy, increasing the level of investment (domestic and foreign), and further deepening financial development, thereby enhancing growth.

It has also been argued that when FDI inflows are complemented by an efficient financial system, the allocation of resources becomes more effective. For example, this synergy allows for the optimal utilisation of foreign capital, leading to increased productivity, job creation, and overall economic expansion (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004). Financial development acts as a facilitator for technology transfer which is a key component of FDI's

potential impact on economic growth. Also, a well-developed financial sector provides the necessary infrastructure for the diffusion of technology and innovation. This enables domestic firms to adopt and adapt foreign technologies, contributing to increased productivity and competitiveness (De Mello Jr, 1997). As FDI brings in new technologies and management practices, a financially developed economy can absorb and apply these advancements more efficiently, resulting in sustained economic growth. Financial development also plays a critical role in maximising the spillover effects of FDI. These spillovers, such as knowledge transfer, skill enhancement, as well as the creation of backward and forward linkages with local industries, are crucial for the broader economic ecosystem (Dinh, Vo, The Vo, & Nguyen, 2019). A well-developed financial sector can facilitate the diffusion of these spillover effects. This is by supporting the integration of foreign and domestic firms, fostering collaboration, and enabling the effective dissemination of knowledge throughout the economy.

As vast as the empirical literature on the link among FDI, financial development and economic growth is, some grounds still need to be covered with respect to the moderating role of financial development in the FDI-economic growth nexus particularly in the context of Nigeria. These grounds include using appropriate indicators to capture the multidimensional nature of financial development, solving the problem of multicollinearity which arises when two or more measures of financial development are included in the same model, as well as using an appropriate technique that is capable of addressing potential endogeneity problem. Given these gaps, this study investigates the growth effect of the interaction of FDI and financial development in Nigeria using broad-based indicators of financial development as well as appropriate estimation techniques in Nigeria. It also examines the threshold level of financial development above which the positive spillover effects of FDI on economic growth are triggered.

## **2. Empirical Review**

At the early stages of the empirical literature, attention was focused on the direct effect of FDI on economic growth with a view to making recommendations that will harness the full potential of FDI for economic growth. These early studies employed various empirical methodologies and arrived at inconclusive results, although most of the findings showed a significant positive effect of FDI on growth. Noteworthy studies which found a positive and significant growth effect of FDI in the context of Nigeria over the last five years include Flora, Tian, and Ezezie (2020), Awa (2021), Olubunmi, Sunday, and Okpachu (2021), Orji et al. (2021), Elrasheed and Abdullahi (2022), Olasehinde and Ajayi (2022), Akinola and Ohonba (2024), as well as Solomon and Mailamba (2024), among others. Conversely, studies such as Epor, Yua, and Iorember (2024), Agbailu (2025), as well as Ozili (2025) found negative, insignificant or mixed effects. The conflicting findings prompted some researchers to consider underlying factors in host countries that could be responsible for the lack of consensus in the existing evidence. These scholars hypothesised that the extent to which host countries enjoy the positive spillover benefits of FDI depends on some domestic factors prevailing in those economies. One of the domestic factors that have received significant attention in this regard is financial development. Hence, an important strand that emerged in the empirical literature consists of studies that are concerned with providing insight into how financial development moderates the FDI-growth link. This strand can be categorised into two parts, with the first part focusing on the growth effect of the interaction of FDI and financial development, as pioneered by the seminal works of Hermes and Lensink (2003) as well as Alfaro et al. (2004).

Following the two influential works, several other similar empirical studies have been conducted in other countries. However, one of the defects that have been observed in this first part of the strand is that many of the studies used traditional measures of financial development which, according to Sviryzdenka (2016), are too narrow to capture the multidimensional nature of the concept, thus leading to the financial system being undermined. Another defect concerns the failure of some of the studies to address the problem of endogeneity which may exist in any model that captures the three variables. Examples of studies that have found evidence in support of the existence of the endogeneity problem among the three variables include Iamsiraroj (2016), Acquah and Ibrahim (2020), Osei and Kim (2020) as well as Ibrahim and Acquah (2021). While attempts have been made to explore this relationship in Nigeria, the known studies that have done so, particularly in the last ten years, are limited, some of which used panel data. Despite the fact that most panel studies use estimation techniques that are capable of addressing endogeneity, their analyses may however oversimplify the results due to their inability to sufficiently capture unique features that each of the countries may possess (Ibhagui, 2017). The known country-specific studies on Nigeria in the last ten years are Amadi (2019) which used the Ordinary Least Squares (OLS) technique, and Anetor (2020) which used the structural vector autoregression (SVAR) model. These country-specific studies are not without their own defects. For instance, they used traditional measures of financial development. Furthermore, the methods of estimation they employed lack the capacity to address the potential endogeneity among the variables, which is a serious defect.

The second part of the strand on the moderating effect consists of studies that examined the threshold level of financial development that triggers the growth benefits of FDI. These studies challenge the assumption of a constant moderating effect that underlined the studies on the interactive effect of FDI and financial development on economic growth. For instance, Ibhagui (2020) criticised the assumption on the ground that it imposes linearity on a relationship that may be non-linear. The handful of works that extended the threshold analysis to Nigeria, particularly in the last ten years, such as Olagbaju and Akinlo (2018), Yeboua (2019) and Ibhagui (2020), are panel studies and hence, their outcomes may conceal some unique features of the Nigerian economy. This shows that adequate attempts have not been made to estimate the threshold level of financial development above which the growth benefits of FDI can be actualised in the context of Nigeria. This present study is, therefore, carried out to address all the identified gaps by using broad-based indicators of financial development, as well as methods of analysis that are able to address the endogeneity problem in the context of Nigeria. This is in line with the suggestion by Acquah and Ibrahim (2020) that future studies should consider examining whether the interactive and threshold effects are country-specific.

### 3. Methodology

This section presents the methodological approaches through which the objectives of the study are achieved. It comprises model specification, estimation techniques as well as measurement of variables and sources of data.

#### 3.1. Model Specification

In arriving at the model to be estimated in the study, the FDI Photosynthesis Model propounded by Nguyen, Duysters, Patterson, and Sander (2009) is used in the spirit of the work by Olagbaju and Akinlo (2018). The model draws inspiration from the natural world, where sunlight is a crucial factor in the growth as well as development of plants. Similarly, the model posits that financial development acts as the sunlight, playing a pivotal role in nurturing and facilitating the positive effects of FDI on economic growth. In this context, FDI represents the seed that has the potential to grow into a flourishing plant which symbolises economic growth. The seed, however, needs the right conditions to germinate and thrive, much like FDI requires a conducive environment to catalyse economic growth. Financial development, analogous to sunlight, becomes the nurturing force that allows the seed of FDI to sprout and flourish.

The starting point is the following Cobb-Douglas production function specification.

$$Y_t = A_t K_t^{\alpha_1} L_t^{\alpha_2} \quad (1)$$

Where  $Y$  represents output,  $A$  represents total factor productivity,  $K$  represents capital,  $L$  represents labour, and  $t$  denotes time-series observation. The production function in Equation 1 is assumed to exhibit constant returns to scale, implying that  $\alpha_1 + \alpha_2 = 1$ . Multiplying the equation by  $\frac{1}{L}$  gives:

$$y_t = A_t k_t^{\alpha_1} \quad (2)$$

Where  $y$  represents output per capita and  $k$  represents capital per capita. Log-linearising Equation 2 gives the following outcome.

$$\ln y_t = \ln A_t + \alpha_1 \ln k_t \quad (3)$$

Where  $\ln$  denotes natural logarithm. This study follows the methodology used in the work done by Dinh Su and Phuc Nguyen (2022) in modelling total factor productivity ( $A$ ). Dinh Su and Phuc Nguyen (2022) expressed  $A$ , which it referred to as augmented capturing of productivity growth, as a function of foreign financial flows, as shown below.

$$A_t = A_0 (Fcap)^\mu \quad (4)$$

Where  $A_0$  represents initial total factor productivity,  $Fcap$  represents foreign financial flows, and  $\mu$  denotes elasticity, which measures the effects of foreign financial flows on growth. While Dinh Su and Phuc Nguyen (2022) used FDI, official development and remittances to proxy foreign capital flows, this present study uses FDI only. Thus, total factor productivity is expressed as a function of FDI as shown:

$$A_t = A_0 (FDI_t)^\mu \quad (5)$$

Where  $A_0$  is as earlier defined,  $FDI$  denotes inflows of FDI, and  $\mu$  denotes elasticity, which measures the effect of FDI on growth.

Dinh Su and Phuc Nguyen (2022) also proposed that foreign financial inflows influence economic growth through both direct and indirect channels. According to them, the indirect impact hinges on the economy's ability to assimilate the advanced technology accompanying these inflows—an ability that is reflected in the level of human capital within the economy. Hence, they expressed  $\mu$  as partly dependent on the stock of human capital stock as shown below.

$$\mu = \mu_0 + \mu_1 f(sh) \quad (6)$$

where  $\mu_0$  denotes the direct effects of foreign financial flows on growth, and  $sh$  is human capital stock. However, this present study modifies the specification by replacing human capital with financial development in line with the work of Ogbaro, Sanni, Adeoye, Akintaro, and Eseyin (2023). This is because of the argument by some scholars that the contribution of FDI to the growth process through spillovers is contingent upon the availability of sufficient absorptive capacity in the form of financial development in the host country. For instance, Osei and Kim (2020) asserted that the level of financial development is a domestic factor in the host country upon which the positive growth effect of FDI depends. Also, Tsauroi (2023) contended that financial development is one of the two absorption capacities that are necessary for the significant positive influence of FDI on economic growth. In addition, Yahaya, Bakar, Mansor, and Ahamat (2024) maintained that financial development is what defines the capacity of the host country to absorb and utilise the technology spillovers offered by the inflows of FDI. Hence,  $\mu$  is used to measure both the direct and indirect effects of FDI on growth as follows:

$$\mu = \mu_0 + \mu_1 f(\ln FDV_t) \quad (7)$$

Where  $FDV$  represents financial development, while  $\ln$  is as earlier defined. Substituting Equation 7 into 5 yields the following:

$$A_t = A_0 (FDI_t)^{\mu_0 + \mu_1 (\ln FDV_t)} \quad (8)$$

Log-linearising Equation 8 yields.

$$\ln A_t = \ln A_0 + \mu_0 \ln FDI_t + \mu_1 (\ln FDI_t * \ln FDV_t) \quad (9)$$

Substituting Equation 9 into 3 gives.

$$\ln y_t = \ln A_0 + \mu_0 \ln FDI_t + \mu_1 (\ln FDI_t * \ln FDV_t) + \alpha_1 \ln k_t \quad (10)$$

Letting  $\ln A_0 = \alpha$ ,  $\mu_0 = \beta$ ,  $\mu_1 = \sigma$  and  $\alpha_1 = \gamma$  in Equation 10, yields:

$$\ln y_t = \alpha + \beta \ln FDI_t + \sigma (\ln FDI_t * \ln FDV_t) + \gamma \ln k_t \quad (11)$$

Adding the disturbance term,  $\varepsilon_t$ , to Equation 11 converts it from an economic model to the following econometric model.

$$\ln y_t = \alpha + \beta \ln FDI_t + \sigma (\ln FDI_t * \ln FDV_t) + \gamma \ln k_t + \varepsilon_t \quad (12)$$

In order to capture the direct effect of financial development in the regression model, the natural logarithmic form of the variable is introduced into Equation 12 as a separate independent variable as follows:

$$\ln y_t = \alpha + \beta \ln FDI_t + \tau \ln FDV_t + \sigma (\ln FDI_t * \ln FDV_t) + \gamma \ln k_t + \varepsilon_t \quad (13)$$

In order to minimise the omission of variable bias, the interaction of institutional quality with FDI ( $\ln FDI_t * \ln INS_t$ ) is introduced into Equation 13 in view of the recognition of the quality of institutions as another important transmission channel through which FDI affects economic growth (Aziz, 2022; Guenichi & Omri, 2025; Labidi, Ochi, & Saidi, 2024; Ochi, Nouaili, Saidi, Haouas, & Saidi, 2026; Saidi, Ochi, & Maktouf, 2023). Thus, the equation is modified as follows:

$$\ln y_t = \alpha + \beta \ln FDI_t + \tau \ln FDV_t + \sigma (\ln FDI_t * \ln FDV_t) + \gamma \ln k_t + \delta (\ln FDI_t * \ln INS_t) + \varepsilon_t \quad (14)$$

From Equation 14,  $\ln FDI_t * \ln FDV_t$  enables an assessment of how financial development moderates the effect of FDI on economic growth. Understanding this moderating role based on the equation depends on the values of  $\beta$  and  $\sigma$ . In addition, it has been argued that the existence of a threshold value of financial development beyond which FDI positively contributes to the growth process is contingent upon the statistical significance of  $\beta$  and  $\sigma$  as well as the two coefficients having different signs. Once these two conditions have been confirmed, the threshold value will be estimated by following two steps in line with Olaniyi and Oladeji (2022) as well as Ogbaro et al. (2023). First, the marginal effect of FDI on economic growth is derived by differentiating Equation 14 partially with respect to  $\ln FDI_t$  which will yield the following:

$$\frac{\partial \ln y_t}{\partial \ln FDI_t} = \beta + \sigma \ln FDV_t \quad (15)$$

Second, the marginal effect of FDI captured in Equation 15 is set equal to zero after which  $\ln FDV_t$  is expressed as the subject of the formula, resulting in the threshold value as shown below.

$$\ln FDV_t = \left( \frac{-\beta}{\sigma} \right) \quad (16)$$

Since financial development is expressed in its natural logarithmic form in Equation 16, it is necessary to transform the variable into its level or raw form in order to maintain its original unit of measurement. This is done by applying the exponential function to both sides of the equation as follows:

$$e^{\ln FDV_t} = e^{\left( \frac{-\beta}{\sigma} \right)}$$

Thus,

$$FDV_t = e^{\left( \frac{-\beta}{\sigma} \right)} \quad (17)$$

The implication of Equation 17 is that the threshold value of financial development is  $e^{\left( \frac{-\beta}{\sigma} \right)}$ .

### 3.2. Techniques of Analysis

This study adopts the Fully Modified OLS (FMOLS) technique as the main method of estimating Equation 14. This is in view of the possible existence of the problem of endogeneity among FDI, financial development and economic growth as confirmed by studies such as Shinwari, Zakeria, Usman, and Sadiq (2024), Singh, Arya, Yadav, and Power (2023), Tosunoğlu (2023), Kumar (2024), Raphael (2024) as well as Tang and Jiang (2024). According to Pattak et al. (2023) and Zimon et al. (2023), the technique has the capability of addressing and managing the endogeneity problem. In addition to the FMOLS, the study also employs the Canonical Cointegrating Regression (CCR) method, which can be compared to the FMOLS technique in several ways, particularly on the basis of their theoretical underpinnings (Zimon et al., 2023). Since the two techniques capture the long run only, the Autoregressive Distributed Lag (ARDL) technique is employed to capture short-run dynamics in addition to the long run. To estimate the threshold level of financial development beyond which the positive spillover effects of FDI on economic growth are triggered, the study applies the formula stated in Equation 17 based on the FMOLS and CCR estimates.

### 3.3. Measurements of Variables and Data Sources

The empirical analysis is based on annual time series data for Nigeria spanning the period from 1986 to 2022. The time frame is chosen because the reforms which the country's financial system has witnessed started with the introduction of the SAP in 1986. Since then, the Nigerian financial sector has experienced intensive restructuring and rapid market-oriented transformations (Ogwumike & Salisu, 2012). Economic growth, being the dependent variable, is measured using real GDP per capita expressed in constant 2015 US dollars and data are sourced from World Development Indicators (2023). FDI is measured in terms of net inflows as a percentage of GDP and data are also sourced from World Development Indicators (2023). Financial development is measured using data on several of its indicators as provided in the Global Financial Development Database proposed by Čihák, Demirgüç-Kunt, Feyen, and Levine (2012). This is in line with the position of Svirydzhenka (2016) on the need to consider multiple indicators when measuring financial development in order to capture the diversity of financial systems across countries. It is also consistent with the argument of Alawadhi, Alshamali, and Alshamali (2021) that the indicators provide a good representation of an economy's financial system. Table 1 presents the financial development indicators used for this study, which are chosen on the basis of data availability. The selected indicators are combined to obtain a composite index and this is informed by the need to avoid the problem of multicollinearity, which may arise as a result of using two or more measures of financial development in the same model (Lenka, 2015). The averaging approach is followed in line with Olaniyi and Oladeji (2022) in computing the composite index since all the indicators are measured in terms of percentage of GDP.

**Table 1.** Financial development indicators.

Private credit by deposit money banks to GDP (%)
Deposit money banks' assets to GDP (%)
Liquid liabilities to GDP (%)
Central bank assets to GDP (%)
Financial system deposits to GDP (%)
Private credit by deposit money banks and other financial institutions to GDP (%)
Domestic credit to private sector (% of GDP)
Credit to government and state-owned enterprises to GDP (%)

Source: Global Financial Development Database developed by Čihák et al. (2012)

The measurement of capital is limited to human capital in view of the attention the variable has received in the literature on the FDI-growth nexus, particularly in the last five years (Ansari & Sensarma, 2022; Kariuki & Kabaru, 2022; Tsaourai & Danquah, 2025). In view of this, the variable is measured as the sum of government expenditures on education and health with both measured in naira and collected from the Statistical Bulletin of the Central Bank of Nigeria (CBN). For the sake of consistency, the sum of the two expenditures is converted into dollar terms by dividing it with the exchange rate of the naira vis-à-vis the United States (U.S.) dollar, measured as average naira official cross exchange rate (selling) and collected from the same source as the expenditure data. Since institutional quality is a multidimensional variable just like financial development, it is measured using eleven indicators sourced from the International Country Risk Guide (ICRG) published by the Political Risk Services (PRS) Group. The indicators are government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption control, military in politics, religious tensions, law and order, ethnic tensions as well as democratic accountability. The eleven indicators are rescaled to range between 0-10 for the sake of consistency and then combined into a composite index using the averaging approach just like financial development.

## 4. Empirical Analysis

This section presents the details of data analysis, interpretation of the results obtained, as well as the discussion of findings. Data analysis comprises preliminary analysis or tests such as descriptive or summary statistics, correlation analysis and unit root tests, as well as econometric analysis.

### 4.1. Descriptive Statistics

Table 2, which presents the statistical characteristics of the variables that are used for empirical analysis, show that the median of real GDP per capita is slightly lower than the mean which suggests a right-skewed distribution. A skewness value of 0.20 suggests a slight positive skew. A kurtosis value of 1.35 indicates that the distribution is platykurtic (flatter than a normal distribution), meaning that it has lighter tails and a less pronounced peak. A Jarque-Bera statistic of 4.46 with a p-value of 0.11 means that the null hypothesis of a normal distribution cannot be rejected at 5 percent significance level.

The results also show that the median of net FDI is less than the mean which suggests a right-skewed distribution. A skewness value of 0.77 indicates moderate positive skewness. A kurtosis of 3.59 is above 3, indicating that the distribution is slightly more peaked and heavy-tailed than a normal distribution (leptokurtic). A Jarque-Bera statistic of 4.14 with a p-value of 0.13 indicates that the null hypothesis cannot be rejected at the 5 percent significance level. This means the distribution of net FDI inflows does not deviate significantly from normality.

For the composite index of financial development obtained from the averaging approach, the results show that the median is slightly lower than the mean. This suggests that the distribution of the index might be positively skewed. A skewness value of 0.34 is close to 0, indicating that the data distribution of financial development is approximately symmetrical, indicating only a slight rightward tilt. A kurtosis value of 1.84 for the variable indicates that the distribution has flatter tails and is less peaked than a normal distribution (platykurtic). A Jarque-Bera statistic of 2.79 with a p-value of 0.25 indicates that the null hypothesis of normality cannot be rejected at 5 percent significance level.

**Table 2.** Descriptive statistics.

Statistic	GDP	FDI	FDV	HCP	INS
Mean	1954.57	1.35	10.61	1497.54	4.26
Median	1882.18	1.20	9.69	1001.51	4.22
Maximum	2679.55	4.28	16.99	3689.03	4.92
Minimum	1414.70	-0.04	5.98	25.520	3.49
SD	471.86	0.96	3.19	1157.36	0.31
Skewness	0.20	0.77	0.34	0.55	0.19
Kurtosis	1.35	3.59	1.84	1.90	3.40
Jarque-Bera	4.46	4.14	2.79	3.71	0.46
P-value	0.11	0.13	0.25	0.16	0.79
Observations	37	37	37	37	37

**Note:** GDP denotes real GDP per capita in dollars, FDI denotes net inflows of FDI as percentage of GDP, FDV denotes financial development index from the averaging method, HCP denotes human capital in million dollars, INS denotes institutional quality index from the averaging method, SD denotes standard deviation, while P-value is the probability value of the Jarque-Bera statistic.

The outcomes on human capital reveal that the median is lower than the mean, which suggests that the data distribution is right-skewed. A skewness value of 0.55 indicates moderate positive skewness. A kurtosis value of 1.90 suggests a flatter distribution (platykurtic), implying that it is flatter than a normal distribution with lighter tails. The Jarque-Bera statistic of 3.71 and p-value of 0.16 indicate that the null hypothesis that the data follow a normal distribution cannot be rejected.

The findings on the composite index of institutional quality obtained from the averaging method show that on a scale of 0-10, the mean (4.26) and the median (4.22) are close, which suggests that the data distribution is relatively symmetric. A skewness value of 0.19 indicates that the distribution is approximately symmetrical but with a slight rightward tilt (a marginally longer right tail). A kurtosis of 3.40 indicates a leptokurtic distribution, that is, one that is slightly more peaked and heavy-tailed than a normal distribution. The Jarque-Bera statistic of 0.46 has a p-value of 0.79 and this implies that the distribution is approximately normal.

### 4.2. Correlation Analysis

Table 3 presents the results of the correlation analysis of the variables. The results show the existence of a positive correlation between real GDP per capita and each of financial development as well as human capital, while FDI and institutional quality are negatively correlated with real GDP per capita. In terms of probability values, only correlations have coefficients that are statistically significant. The first one is the correlation between GDP per capita

and financial development. The second one is the correlation between GDP per capita and human capital. The last one is the correlation between human capital and financial development.

**Table 3. Correlation matrix.**

Variables	GDP	FDI	FDV	HCP	INS
GDP	1.000				
FDI	-0.162 (0.339)	1.000			
FDV	0.825*** (0.000)	-0.050 (0.768)	1.000		
HCP	0.922*** (0.000)	-0.202 (0.230)	0.757*** (0.000)	1.000	
INS	-0.100 (0.556)	0.011 (0.950)	0.020 (0.908)	-0.065 (0.703)	1.000

**Note:** The variables are as earlier defined. \*\*\* denote 1% level of significance.

In order to ensure that the interaction model, which is the basis of the empirical analysis of the study does not suffer from the problem of multicollinearity, the Variance Inflation Factors (VIF) test is conducted prior to any formal analysis. It is imperative to ensure the absence of multicollinearity because the problem is capable of inflating the estimated standard errors of the fitted coefficients (Olaniyi, Al-Faryan, & Ogbaro, 2025) or rendering estimated coefficients statistically insignificant even though a statistical relation exists between the dependent and independent variables. The study relies on the works of Studenmund (2011) in pegging the threshold point for the VIF value for each independent variable below 5, while the mean of all the VIFs must not be considerably larger than 1 in line with Chatterjee and Hadi (2015). This implies that there is evidence of multicollinearity if the largest VIF is greater than 5 and the mean of all the VIFs is considerably larger than 1. Table 4 presents the results of the VIF test and they indicate the absence of the problem of severe multicollinearity among the independent variables in the specified model since all the VIF values are 5 and the mean of all the values is not considerably larger than 1.

**Table 4. VIF test results.**

Variables	VIF	1/VIF
FDI	1.07	0.934
FDV	2.43	0.412
HCP	2.53	0.395
INS	1.02	0.984
Mean VIF		1.76

**4.3. Unit Root Tests**

This sub-section presents the results of the unit root tests conducted to ensure that the dataset for the study allows for the robustness of conclusions as well as the prevention of spurious results. Spurious results can arise if at least one of the variables in the dataset is stationary only after the second difference, i.e., if at least one is I(2). In order to ensure robust analysis for this study, the exercise is carried out by using the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests which are two of the most widely used traditional tests for detecting unit roots in time-series data. The two traditional tests are premised on the null hypothesis that the series under consideration possesses a unit root. The results of the ADF test, which are reported in Table 5, show that when only intercept is included in test equation, net FDI inflows and institutional quality are integrated at level while others are integrated at first difference, at 5 percent significant level. When both intercept and trend are included in test equation, the results reveal that real GDP per capita and human capital are integrated at level, while others are integrated at first difference.

**Table 5. Results of the ADF unit root test.**

Variables	Intercept only		Intercept and trend	
	Test Statistic	5% Critical Value	Test Statistic	5% Critical Value
lnGDP	-0.859	-2.948	-3.578**	-3.558
lnFDI	-3.330**	-2.946	-3.365*	-3.540
lnFDV	-1.937	-2.948	-4.473**	-3.544
lnHCP	-2.271	-2.946	-4.695**	-3.540
lnINS	-3.244**	-2.946	-3.229*	-3.540
ΔlnGDP	-3.940**	-2.948	-3.898**	-3.544
ΔlnFDI	-7.935***	-2.948	-7.798***	-3.544
ΔlnFDV	-5.991***	-2.954	-5.881**	-3.553
ΔlnHCP	-8.923***	-2.948	-8.910***	-3.544
ΔlnINS	-7.265***	-2.948	-7.177***	-3.544

**Note:** Test includes an intercept only as well as intercept and trend, while the Schwarz information criterion is used for optimal lag selection from a maximum of 9 lags. ln denotes natural logarithm. while Δ denotes first difference. \*\*\*, \*\*, and \* denote 1%, 5%, and 10% significant levels, respectively.

The results of the PP test, which are presented in Table 6, indicate that when only intercept is included in test equation, net FDI inflows and institutional quality are integrated at level while others are integrated at first difference at 5 percent significance level. When both intercept and trend are included in test equation, the results reveal that only human capital is integrated at level while others are integrated at first difference.

**Table 6.** Results of the Phillips-Perron unit root test.

Variables	Intercept only		Intercept and trend	
	Test Statistic	5% Critical Value	Test Statistic	5% Critical Value
lnGDP	-0.783	-2.946	-1.434	-3.540
lnFDI	-3.460**	-2.946	-3.479*	-3.540
lnFDV	-0.982	-2.946	-2.401	-3.540
lnHCP	-1.982	-2.946	-4.599**	-3.540
lnINS	-3.380**	-2.946	-3.301*	-3.540
$\Delta$ lnGDP	-3.842**	-2.948	-3.799**	-3.544
$\Delta$ lnFDI	-8.043***	-2.948	-7.899***	-3.544
$\Delta$ lnFDV	-6.284***	-2.948	-6.148**	-3.544
$\Delta$ lnHCP	-15.871***	-2.948	-27.470***	-3.544
$\Delta$ lnINS	-8.602***	-2.948	-8.340***	-3.544

Note: Test include an intercept only as well as intercept and trend.  $\Delta$  denotes first difference. \*\*\*, \*\* and \* denote 1%, 5% and 10% significant levels, respectively.

#### 4.4. Presentation and Interpretation of Estimation Results

This sub-section focuses on the presentation and interpretation of the results obtained from estimating Equation 14 using the appropriate techniques based on the composite index of financial development from the averaging approach.

##### 4.4.1. Results of the FMOLS and CCR Estimations

Table 7 presents the results obtained from estimating Equation 14 using the FMOLS as well as CCR techniques. The results show that the coefficients of FDI obtained from the two techniques are positive but statistically insignificant ( $P > 0.05$ ). This suggests that FDI alone does not robustly promote growth in Nigeria in the long run. On the other hand, both estimators found positive and statistically significant effects of financial development on economic growth ( $P < 0.05$ ). Thus, financial development appears to independently drive long-run growth in Nigeria. The coefficient of the interaction term between FDI and financial development is negative and statistically significant ( $p < 0.05$ ) in the two models. This suggests that financial development does not stimulate the contribution of FDI to economic growth in Nigeria. Additionally, human capital is found to have a negative but insignificant effect in the two regressions at the 5 percent level of significance. Furthermore, the results indicate that the coefficient of the interaction term between FDI and institutional quality is negative and statistically insignificant ( $p > 0.05$ ) in the two models. This implies that institutions do not appear to significantly moderate FDI's growth effect in Nigeria.

The validity of the findings of the FMOLS and CCR regressions are adjudged on the basis of the explanatory power or goodness-of-fit of the two models as well as the Jarque-Bera Normality test which is a diagnostic test with the results also presented in Table 7. The results show that the coefficients of determination ( $R^2$ ) and Adjusted  $R^2$ , as measures of goodness-of-fit, are 0.73 and 0.67 for the FMOLS model, while they are 0.76 and 0.70 for the CCR model. These outcomes validate the results of the two models because they indicate that more than 50 percent variation in economic growth is explained by the regressors, which is considered a good fit. Results of the Jarque-Bera Normality test, which assumes that the residuals from the regressions are normally distributed for its null hypothesis, show a test statistic of 1.2876 with a P-value of 0.53 for the FMOLS model, while it shows a test statistic of 1.5758 with P-value of 0.43 for the CCR model. Since the P-values are greater than the 5 percent significance level, the null hypothesis cannot be rejected, meaning that there is no evidence of non-normality in the residuals. This also validates the results obtained from the two models.

**Table 7.** FMOLS and CCR regression results.

Dependent Variable: Natural logarithm of Real GDP per Capita (lnGDP)		
Variable	FMOLS	CCR
c	5.9593*** (6.7184)	6.5750*** (5.7031)
@trend	-0.0012 (-0.1647)	0.0039 (0.4534)
lnFDI	0.9295 (1.5785)	1.2818 (1.5594)
lnFDV	0.7582*** (4.3107)	0.6359*** (3.4782)
lnFDI * lnFDV	-0.3149*** (-3.0577)	-0.3036** (-2.6635)
lnHCP	-0.0053 (-0.1372)	-0.0259 (-0.5034)
lnFDI * lnINS	-0.1739 (-0.4963)	-0.4286 (-0.8927)
$R^2$	0.7290	0.7551
Adjusted $R^2$	0.6730	0.7044
F – Statistic (Wald Test)	4.6781	3.5706
(Wald Test, p – value)	0.0173	0.0411
Threshold Value	19.1402	68.1581
JB (Probability Value)	1.2876 (0.5253)	1.5758 (0.4326)

Note: Regressions are based on linear trend specification.  $\ln FDI * \ln FDV$  denotes the interaction of the natural logarithm of FDI and natural logarithm of financial development, while  $\ln FDI * \ln INS$  denotes the interaction of the natural logarithm of FDI and natural logarithm of institutional quality. t-statistics are enclosed in parenthesis. \*\*\*, \*\* and \* denote 1%, 5% and 10% significant levels, respectively. JB denotes Jarque-Bera Normality test.

#### 4.4.2. Results of the Estimation of ARDL Model

Equation 14 is also estimated using the ARDL technique in order to capture short-run dynamics since the FMOLS and CCR capture the long run only. In order to ascertain whether the estimation should involve the long run or not, the study performs the F-Bounds test of cointegration. Table 8 presents the results of the test and they reveal that the value of the F-statistic is 15.80, which exceeds the upper bound critical value of 4.25 at the conventional 5% significance level, implying a stable long-run relationship among the variables.

**Table 8.** Bounds cointegration test results.

Significance Level	Lower Bound	Upper Bound
1%	3.93	5.23
5%	3.12	4.25
10%	2.75	3.79
F-Statistic	15.80***	

**Note:** \*\*\* denotes significance at 1% significance level. Critical Values are quoted from Pesaran, Shin, and Smith (2001) Table.

In view of the confirmation of a stable long-run relationship among the variables, both the short-run and long-run dynamics are estimated. Table 9 presents the short-run and long-run results. The short-run results of the ARDL estimation show that the coefficient of the current value of FDI ( $\Delta \ln FDI$ ) is positive but insignificant, while those of its first two lags ( $\Delta(\ln FDI(-1))$  and  $\Delta(\ln FDI(-2))$ ) are significant but negative. The sum of the coefficients of the current value and the first two lags is -0.3395, and it is statistically significant, as can be inferred from an F-statistic value of 18.0374 and a probability value of 0.0008 obtained from the Wald test. This shows that FDI has a strong negative effect on economic growth in Nigeria in the short run. Furthermore, results of financial development reveal that the coefficient of the current value ( $\Delta \ln FDV$ ) is positive but insignificant in the short run, while those of its first two lags ( $\Delta(\ln FDV(-1))$  and  $\Delta(\ln FDV(-2))$ ) are not relevant. The coefficient of the current value of the interaction of FDI and financial development ( $\Delta(\ln FDI * \ln FDV)$ ) is negative, just like that of its first lag ( $\Delta(\ln FDI * \ln FDV(-1))$ ), although only the former is statistically significant, while that of its second lag ( $\Delta(\ln FDI * \ln FDV(-2))$ ) is positive and statistically significant. The sum of the coefficients of the current value and the first two lags is 0.0062, and it is statistically insignificant, as can be inferred from an F-statistic value of 1.2140 and a probability value of 0.2891 obtained from the Wald test. The coefficient of the current value of human capital ( $\Delta \ln HCP$ ) is positive and statistically significant, while those of its first two lags ( $\Delta(\ln HCP(-1))$  and  $\Delta(\ln HCP(-2))$ ) are negative and significant. The sum of the coefficients of the current value and the first two lags is -0.0531, and it is statistically insignificant, as can be inferred from a statistic value of 1.2273 and a probability value of 0.2866 obtained from the Wald test. The coefficients of the current value of the interaction of FDI and institutional quality ( $\Delta(\ln FDI * \ln INS)$ ) and its first lag ( $\Delta(\ln FDI * \ln INS(-1))$ ) are positive, although only the latter is statistically significant. The sum of the two coefficients is 0.1974 and it is statistically significant, as can be inferred from an F-statistic value of 13.3636 and a probability value of 0.0026 obtained from the Wald test. The one-period lagged error correction term,  $CointEq(-1)$ , passes the three basic criteria of validity since it is negative, less than one and statistically significant. Its coefficient value of 0.3727 in absolute terms implies that the system takes an average speed of 37.27 percent to adjust from the short run to the long run if there is any disequilibrium.

The long-run results of the ARDL estimation show that the coefficient of FDI ( $\ln FDI$ ) is positive but weakly significant ( $P \approx 0.10$ ). This suggests that FDI alone does not robustly promote growth in Nigeria in the long run which corroborates the FMOLS and CCR findings. The results on the direct effect of financial development ( $\ln FDV$ ) also corroborate the FMOLS and CCR findings as the coefficient on the variable is shown to be positive and statistically significant ( $P < 0.05$ ), supporting the claim that financial development appears to independently drive long-run growth in Nigeria. In the same vein, the coefficient of the interaction term between FDI and financial development ( $\ln FDI * \ln FDV$ ) is negative and statistically significant ( $p < 0.05$ ) just like in the FMOLS and CCR models. This also suggests that financial development does not trigger the contribution of FDI to economic growth in Nigeria in the long run. Human capital ( $\ln HCP$ ) is shown to have a positive and significant effect on economic growth at 5 percent significant level. This finding, which contrasts with the ones obtained from the FMOLS and CCR models, implies that human capital contributes to economic growth in Nigeria in the long run. Furthermore, the results indicate that the coefficient of the interaction term between FDI and institutional quality ( $\ln FDI * \ln INS$ ) is negative and statistically insignificant ( $p > 0.05$ ), which aligns with the outcomes of the FMOLS and CCR regressions.

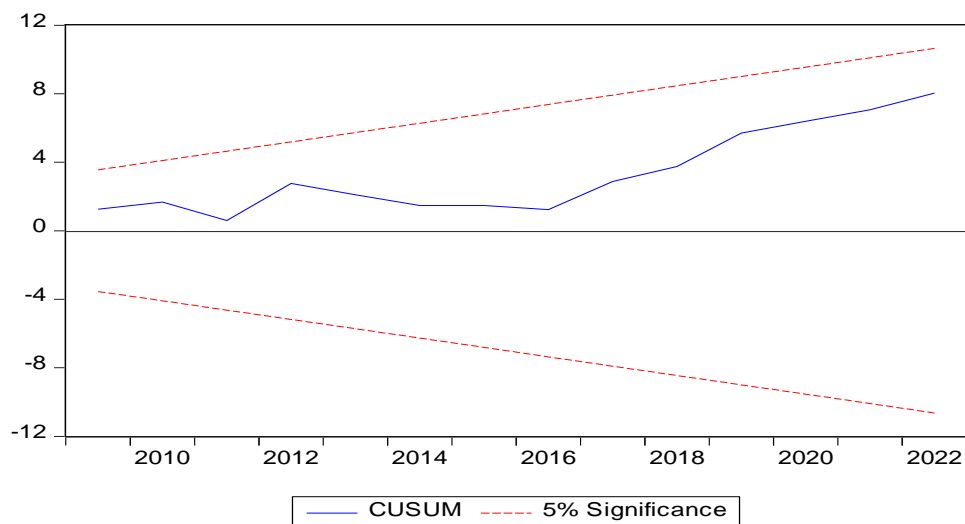
The validity of the results obtained from the ARDL regression are examined using some diagnostic tests in order to verify whether the model assumptions hold for this study as well as detect potential issues like autocorrelation or heteroskedasticity. The tests will also help in confirming that the regression results are not sensitive to specific model specifications which is critical for valid inferences. The residual diagnostic tests, whose outcomes are presented at the bottom of Table 9, are the serial correlation, heteroscedasticity, normality as well as stability tests. The results of the Breusch-Godfrey serial correlation test reveal a test statistic value of 0.4350 with a probability value of 0.6571. Since the  $P$ -value is greater than the 5 percent significance level, the null hypothesis of no serial correlation cannot be rejected. This suggests no significant evidence of serial correlation in the residuals at the 5 percent level. Results of the Breusch-Pagan Heteroscedasticity test reveal test statistic and probability values of 0.3282 and 0.9873, respectively. The null hypothesis that the residuals have constant variance is accepted because the  $P$ -value is well above 0.05. This suggests no significant evidence of heteroskedasticity, meaning that the residuals exhibit constant variance (homoskedasticity).

**Table 9.** Results of short-run and long-run dynamics based on ARDL (1, 3, 1, 3, 3, 2).

Dependent variable: Natural logarithm of Real GDP per capita (lnGDP)				
Variable	Coefficient	Standard Error	t-statistic	Probability
$\Delta(\ln\text{FDI})$	0.0832	0.0731	1.1388	0.2739
$\Delta(\ln\text{FDI}(-1))$	-0.2907***	0.0814	-3.5721	0.0031
$\Delta(\ln\text{FDI}(-2))$	-0.1320***	0.0283	-4.6704	0.0004
$\Delta(\ln\text{FDV})$	0.0171	0.0292	0.5852	0.5677
$\Delta(\ln\text{FDI} * \ln\text{FDV})$	-0.0415**	0.0190	-2.1859	0.0463
$\Delta(\ln\text{FDI} * \ln\text{FDV}(-1))$	-0.0043	0.0129	-0.3342	0.7432
$\Delta(\ln\text{FDI} * \ln\text{FDV}(-2))$	0.0520***	0.0131	3.9631	0.0014
$\Delta(\ln\text{HCP})$	0.0209****	0.0051	4.0882	0.0011
$\Delta(\text{HCP}(-1))$	-0.0521***	0.0064	-8.0813	0.0000
$\Delta(\text{HCP}(-2))$	-0.0219***	0.0071	-3.0801	0.0081
$\Delta(\ln\text{FDI} * \text{INS})$	0.0115	0.0434	0.2639	0.7957
$\Delta(\ln\text{FDI} * \text{INS}(-1))$	0.1859***	0.0497	3.7415	0.0022
c	0.6530***	0.0568	11.4896	0.0000
@trend	-0.0036***	0.0004	-8.5380	0.0000
ect(-1)	-0.3727***	0.0329	-11.3411	0.0000
Long-Run Coefficients				
lnFDI	1.7565*	0.9961	1.7634	0.0996
lnFDV	0.2581**	0.0811	3.1839	0.0066
lnFDI * lnFDV	-0.3387***	0.0835	-4.0548	0.0012
lnHCP	0.2623**	0.0971	2.7011	0.0172
lnFDI * lnINS	-0.6021	0.6428	-0.9367	0.3648
R <sup>2</sup>			0.9043	
Adjusted R <sup>2</sup>			0.8337	
F – Statistic, Wald Test (Probability Value)			36.3231 0.0000	
Threshold Value			178.8537	
Diagnostic Tests				
BG (Probability Value)			0.4350 (0.6571)	
BP (Probability Value)			0.3282 (0.9873)	
JB (Probability Value)			1.6635 (0.4353)	

**Note:** Selection of the optimal lag length for estimating the coefficients of short-run and long-run dynamics are based on the Akaike Information Criterion (AIC). \*\*\*, \*\* and \* denote 1%, 5% and 10% significant levels, respectively. *BG*, *BP* and *JB* denote Breusch-Godfrey serial correlation, Breusch-Pagan Heteroscedasticity and Jarque-Bera Normality tests, respectively.

From the bottom of Table 9, results of the Jarque-Bera Normality test, which assumes that the residuals are normally distributed for its null hypothesis, show a test statistic of 1.6635, P-value of 0.4353, which is much greater than the 5 percent significance level. Since the P-value is high, the null hypothesis cannot be rejected, meaning that there is no evidence of non-normality in the residuals. This suggests that the residuals from the ARDL regression are normally distributed. The stability tests check whether the ARDL model’s coefficients are stable over time, which is essential in time-series analysis. They ensure that the estimated relationship remains consistent over time, which strengthens the credibility of the findings. Hence, the study conducts the recursive cumulative sum (CUSUM) test to assess the presence of structural breaks in the estimated model, as well as the CUSUM of squares (CUSUMSQ) test to assess the long-term stability of variance in regression residuals. According to Figure 1, the graph of the CUSUM test indicates that the CUSUM line remains within the 5 percent critical boundaries, suggesting that the model’s coefficients are stable over time. Therefore, there is no evidence of structural instability in the regression model.



**Figure 1.** CUSUM Graph.

According to Figure 2, the results of the CUSUMSQ test indicate that the CUSUMSQ line remains within the 5 percent critical boundaries, suggesting that the model's variance is stable and that there are no significant structural breaks in the regression model. In conclusion, both the CUSUM and CUSUMSQ tests confirm that the estimated model is structurally stable, meaning that the regression coefficients and variance are consistent over time.

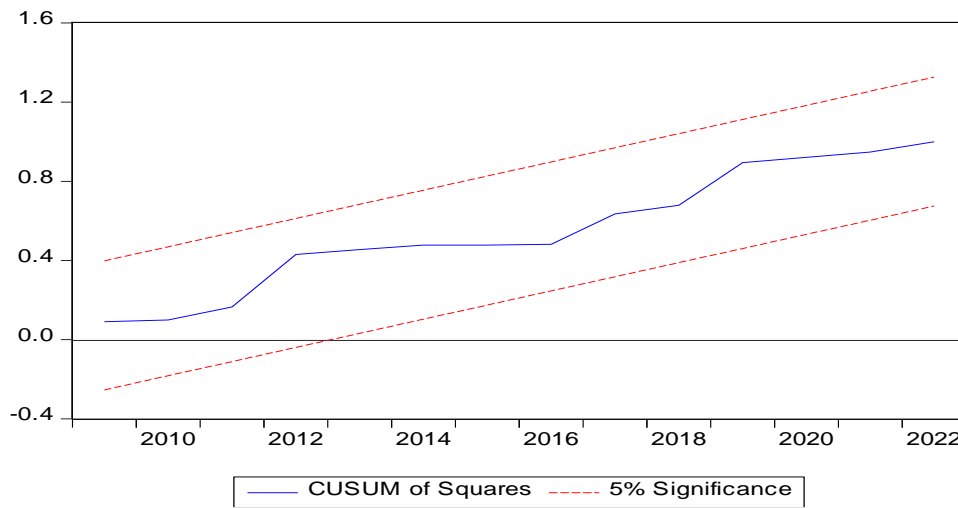


Figure 2. CUSUMSQ Graph.

#### 4.4.3. Analysis of the Threshold Effect of Financial Development

This sub-section presents the results obtained from the estimation of the threshold value beyond which financial development facilitates the positive spillover effects of FDI in the growth process. The estimation is carried out using the outcomes of the FMOLS and CCR models based on the formula stated in Equation 17. Before the estimation, however, it is necessary to confirm the statistical significance of the coefficients of FDI as well as its interaction with financial development, i.e.,  $\beta$  and  $\sigma$ . A formal test of the joint significance of the two coefficients is conducted using the Wald test. The null hypothesis upon which the test is based is that both coefficients are simultaneously equal to zero, that is, they are not statistically significant. Table 10 presents the outcomes of the test and they reveal that the Wald statistic values for the two models are 4.6781 and 3.5706 while the probability values are 0.0173 and 0.0411, respectively. Since the probability values are less than the 5 percent significance level, the null hypothesis that the two coefficients are jointly equal to zero is rejected for both models. This means that FDI and its interaction with financial development significantly influence economic growth, thereby confirming the existence of the threshold value of financial development.

Table 10. Wald test results.

Model	Wald Statistic	Probability Value	Decision
FMOLS	4.6781	0.0173	Reject null hypothesis
CCR	3.5706	0.0411	Reject null hypothesis

Following the confirmation of the pre-condition for the existence of a threshold, the threshold value is estimated by substituting the values of  $\beta$  and  $\sigma$  obtained from the FMOLS and CCR regression models into Equation 17. Using the FMOLS estimates yields the following:

$$FDV_t = e^{\left(\frac{-\beta}{\sigma}\right)} = e^{\left(\frac{-0.9295}{-0.3149}\right)}$$

Hence,  $FDV_t = 19.14$

Using the CCR estimates yields the following:

$$FDV_t = e^{\left(\frac{-\beta}{\sigma}\right)} = e^{\left(\frac{-1.2818}{-0.3036}\right)}$$

Hence,  $FDV_t = 68.16$

The implication of the threshold values estimated from the FMOLS and CCR models is that financial development must be above 19.14 and 68.16 percent of GDP, respectively, in order for it to facilitate the positive spillover effects of FDI in the growth process of Nigeria.

#### 4.5. Discussion of Findings

The results of this study provide insight into the relationship among FDI, financial development and economic growth in Nigeria based on the FMOLS, CCR and ARDL techniques. The finding on the long-run direct effect of FDI on economic growth is robust across the three techniques as they all found it to be positive but statistically insignificant. This outcome suggests that FDI flows do not have any direct significant effect on economic growth in Nigeria, which is in line with the hypothesis of this study. The evidence aligns with existing studies on Nigeria such as Osuji (2015), Odubola and Desalu (2017), Ehigiamusoe and Lean (2019), as well as Epor et al. (2024). It is, however, inconsistent with the findings of Flora et al. (2020), Oyegoke and Aras (2021), Orji et al. (2021), Elrasheed and Abdullahi (2022), as well as Olasehinde and Ajayi (2022). Factors that have generally been touted to be responsible for why FDI may not promote growth in Nigeria include the high level of profit repatriation by foreign firms (Asiedu, 2013; Epor et al., 2024), since it may reduce the potential multiplier effects of FDI on the economy. Also, much of Nigeria's FDI is concentrated in the primary sector in general, and the oil and gas sector in particular (Ari, 2021; Emeka, 2024; Obi, Agu, & Felicia, 2020; Ojobo, 2021) which is capital-intensive and poorly integrated with the rest of the economy (Aremo & Aiyegbusi, 2011).

As regards the short-run evidence on the effect of FDI, the ARDL results revealed that the variable displayed mixed effects, with only the coefficient of the current value aligning with the long-run results. Overall, the study found that the variable has a strong negative effect on economic growth in Nigeria in the short run which is in tandem

with the short-run results of Dinh et al. (2019), Ogbuabor, Orji, Eigbiremolen, Manasseh, and Onuigbo (2020), Nwakarama and Awogbemi (2024) as well as Agbailu (2025). The three estimators also showed consistent results of positive and significant direct long-run effect of financial development on economic growth which aligns with a priori expectation. The evidence on the long-run direct effect of financial development also resonates with the results obtained by Akintola, Oji-Okoro, and Itodo (2020) as well as Sennuga, Adenaike, Adedayo, and Sennuga (2021). The short-run result on financial development is consistent with the long-run result in terms of sign but lacks its statistical significance. This evidence resonates with the findings of Imoagwu and Ezeanyejí (2019) as well as Ayeni, Alexander, Alfa, Saheed, and Ikubor (2024) on Nigeria when domestic credit to private sector was used as a proxy for financial development. This short-run finding may be a reflection of the structural and institutional weaknesses that characterise the Nigerian economy.

In the same vein, the outcome of the study on the long-run effect of the interaction of FDI and financial development is robust as the three estimators showed negative and significant coefficients. This outcome does not align with a priori expectations as well as the findings of Anetor (2020). The reason may be that the absorptive capacity of Nigeria's financial system is insufficient to effectively integrate FDI into productive sectors as argued by Acquah and Ibrahim (2020) for African countries. While supporting this position, Oladapo and Oyaromade (2025) argued that the contribution of FDI remains constrained, probably because of insufficient absorptive capacity or mismatched investment preferences. However, the evidence aligns with the results of Acquah and Ibrahim (2020). The short-run results on the interaction of FDI and financial development revealed mixed effects, with only the coefficient of the current value aligning with the long-run results. Overall, the study found that the interaction term has an insignificant positive effect on economic growth in Nigeria in the short run. This suggests that, although improvements in financial development may temporarily enhance the productivity of FDI flows, these effects are weak and do not exert sufficient force to influence growth contemporaneously.

As regards the long-run direct effect of human capital, the study found that this is dependent on the technique used. This is because, while the FMOLS and CCR estimators showed that it is negative and insignificant, it turned out to be positive and significant for the ARDL estimator. This shows that it is only the ARDL outcome that aligns with a priori expectation since human capital is regarded as an important driver of economic growth. As for the long-run effect of the interaction between FDI and institutional quality, the three techniques provided consistent evidence of negative and insignificant coefficients. This outcome suggests that institutions do not support or enhance the translation of FDI flows into productivity gains. This is not surprising for a developing country like Nigeria that has an institutional framework that is characterised by regulatory weaknesses, governance challenges and enforcement gaps. In the short run, this interaction term exerted mixed effects in terms of statistical significance. Overall, the study found that the interaction has a positive and significant short-run effect on economic growth in Nigeria which resonates with the short-run results of Ogbuabor et al. (2020) for Nigeria.

Based on the FMOLS and CCR estimates, the threshold values of financial development beyond which the inflows of FDI deliver desirable growth outcomes in Nigeria were found to be 19.14 and 68.16 percent of GDP, respectively. A comparison of these threshold values with the variable's mean value of 10.61 percent of GDP obtained from the descriptive statistics shows that on average, financial development in Nigeria is below the threshold value. This implies that, on average, the country operated below the threshold over the study period. The threshold estimates, therefore, reinforce the argument that the negative long-run effect is not inherent to FDI itself, but rather reflects systemic financial underdevelopment. This evidence corroborates the argument by Acquah and Ibrahim (2020) that the absorptive capacity of the financial system in African countries is insufficient to effectively absorb and integrate FDI into productive sectors. Taken together, the results imply that Nigeria has not yet reached the financial development conditions under which FDI can reliably promote economic growth. The threshold value obtained from the FMOLS coefficients is closer to some of the existing evidence on Nigeria than the one obtained from the CCR estimates, such as 21.33 percent and 36.53 percent by Olagbaju and Akinlo (2018), 15.6 percent and 25.6 percent by Yeboua (2019), as well as 14.58 percent by Ibhagui (2020).

## 5. Conclusion and Recommendations

This study examined how the interaction of FDI with financial development affects economic growth in Nigeria and estimated the financial development threshold required for FDI to have a positive long-term growth impact using the FMOLS, CCR and ARDL techniques. The results revealed some important dynamics. First, FDI does not exert any significant positive direct effect on economic growth in Nigeria, while financial development has a strong growth-enhancing effect in the long run. Second, the short-run effect of the interaction of FDI with financial development is positive and insignificant, while the long-run effect is negative and significant. Third, the threshold values of financial development beyond which the inflows of FDI deliver desirable growth outcomes in Nigeria based on the FMOLS and CCR models, are 19.14 and 68.16 percent of GDP, respectively, which are higher than the variable's mean value of 10.61 percent obtained from the descriptive statistics. Based on the findings, the study concludes that FDI alone does not robustly promote growth in Nigeria, while financial development acts as a shading factor that impedes the efficient allocation of foreign capital, thereby limiting the transformative effect of FDI on economic growth in Nigeria. Another general implication of the study is that the level of financial development in Nigeria is, on average, below the level that is required for FDI to deliver desirable growth outcomes in the country.

In view of the results obtained from the empirical analysis, the study makes the following recommendations.

- i. The government of Nigeria needs to embark on policies that will attract inflows of FDI into high-productivity sectors with strong domestic linkages, such as manufacturing, Information and Communication Technology (ICT), as well as agriculture value-chains.
- ii. Policymakers need to give priority to developing a robust financial system that can channel as well as integrate foreign investments more efficiently.
- iii. There is a need to embark on deep institutional reforms that will promote transparency, governance and regulatory stability in order to sustain productivity spillovers from FDI

Despite providing valuable insights into how FDI, financial development, and economic growth are related in Nigeria, this study has some limitations that should be acknowledged. These limitations, which do not invalidate the results of the study, are as follows:

- i. The study treated FDI as an aggregate variable, without distinguishing among different sectors (e.g., oil & gas, manufacturing, services, agriculture). However, the effect of FDI may vary by sector, and financial development might moderate its effect differently across industries.
- ii. The study established associations between the variables under consideration, but it did not determine causality. Hence, a key question that was not answered is whether it is FDI that drives growth, or it is economic growth that attracts more FDI.

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