E-ISSN: 3046-7632
International Journal of Administration and Education (IJAE)
https://journal.ashapublishing.co.id/index.php/ijae/hm

Foreign Direct Investment, Portfolio Investment, Official Development Assistance and Labour Productivity in Nigeria

Uzoma Mirian Anyachebelu
Nwafor Orizu college of education, Nsugbe, Anambra State, Nigeria
Corresponding author's email: zommym@gmail.com

ABSTRACT

Despite increasing inflows of foreign capital into Nigeria, labour productivity has remained relatively low, raising concerns about the effectiveness of such inflows in enhancing real economic performance. The study adopts the Solow-Swan neoclassical growth model to explain the relationship between labour productivity, capital, labour, and technology. It employs the ARDL framework, suitable for analyzing both short- and long-run dynamics, supported by FMOLS for robustness. The model incorporates international capital inflows and institutional quality, including interaction effects. Pre- and post-estimation tests ensure reliability. Using annual data (1992–2024), the study measures key variables from credible sources and applies E-Views (10) for estimation, ensuring accurate and consistent empirical analysis. The correlation matrix results indicate that the variables used in the study do not exhibit serious multicollinearity problems. Labour productivity (LP) shows positive correlations with several variables such as FDI (0.770), GFCF (0.797), RGDP (0.735), SERR (0.697), PRER (0.720), and INSQ_IDX (0.728), while FPI (-0.466) shows a negative relationship. The long-run ARDL results reveal that FDI (0.0345), ODA (0.096), external debt (0.1176), and institutional quality (1.7015) positively and significantly influence labour productivity. However, FPI (-0.0000) shows a negative but negligible effect. Interaction results indicate that institutional quality reduces the positive effects of FDI and external debt, while strengthening the positive effect of ODA on labour productivity in Nigeria. Diagnostic tests confirm the model is stable and free from autocorrelation and heteroscedasticity. The study concludes that improving institutional quality and ensuring efficient allocation of foreign capital are critical for enhancing labour productivity and achieving sustainable economic growth in Nigeria.

Keywords: Foreign Direct Investment, Foreign Portfolio Investment, Official Development Assistance, Labour Productivity, Institutional Quality

INTRODUCTION

Foreign capital inflows specifically Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), and Official Development Assistance (ODA) which play a significant role in shaping labour productivity, particularly in developing economies (Emeka, 2024; Gál, 2025; Voumik et al., 2023). Labour productivity, defined as output per worker, remains relatively low in many countries despite increasing inflows of foreign capital (Blanco & Raurich, 2022; Damioli et al., 2021; Jiang et al., 2024). This creates a key policy problem: whether these inflows effectively translate into productivity gains or merely increase financial dependence without improving real economic efficiency.

Foreign Direct Investment (FDI) refers to cross-border investment where an investor acquires a lasting interest and significant control (usually at least 10% ownership) in a foreign enterprise. It involves not only capital flows but also the transfer of technology, managerial skills, and expertise (Amberger et al., 2025; Maula & Lukkarinen, 2022; Mingo et al., 2024). FDI is considered a key driver of economic growth, as it enhances productivity, promoes industrial development, and creates employment opportunities. Its long-term nature distinguishes it from other forms of international capital flows like portfolio investment. FDI is widely considered the most beneficial form of capital inflow due to its long-term nature and embedded benefits such as technology transfer, managerial expertise, and skill development. Recent studies show that FDI enhances labour productivity by improving firm-level efficiency

and facilitating knowledge spillovers. For example, Iamsiraroj (2021) finds that FDI significantly boosts productivity in host countries, particularly where human capital and institutional quality are strong. Similarly, Nguyen et al. (2022) report that FDI contributes to productivity growth through innovation and improved production techniques. However, the impact is conditional on the host economy's absorptive capacity, including education and governance structures.

In contrast, FPI is more volatile and short-term, often driven by financial returns rather than productive investment (Hussain & Goswami, 2022; Siska et al., 2024; Ysmailov, 2021). Foreign Portfolio Investment (FPI) refers to the acquisition of financial assets such as stocks, bonds, and other securities in a foreign country without obtaining controlling ownership. Unlike FDI, FPI is typically short-term and driven by returns on investment. It enhances liquidity in financial markets and supports capital market development. However, FPI is often volatile and sensitive to economic and political conditions, which can lead to capital flight (Abdelhady et al, 2026). Its impact on economic growth and productivity is generally indirect and depends on financial stability. While FPI can improve financial market efficiency and provide liquidity, its direct contribution to labour productivity is less clear. According to Dahmene et al. (2021), portfolio inflows may indirectly support productivity by easing capital constraints, but their instability can lead to economic fluctuations that hinder long-term productivity growth. Thus, the productivity effects of FPI depend heavily on macroeconomic stability and sound financial regulation.

Official Development Assistance (ODA) refers to financial aid provided by governments or international organizations to support the economic development and welfare of developing countries (Arman et al., 2020; OECD, 2021; Soelarso et al., 2024). It typically includes grants, concessional loans, and technical assistance aimed at improving infrastructure, education, health, and institutional capacity . ODA is primarily directed toward poverty reduction and sustainable development. Its effectiveness depends on proper allocation and governance, as well as alignment with national development priorities. When efficiently utilized, ODA can enhance human capital and indirectly improve labour productivity. ODA serves as a critical source of external financing for many developing countries, primarily targeting infrastructure, education, and health sectors (Rehman et al., 2023; Wang et al., 2022). These areas are essential for human capital development, which is a key determinant of labour productivity.

Recent evidence suggests that ODA can positively influence productivity when effectively utilized. For instance, Arndt et al. (2020) demonstrate that aid contributes to long-term growth and productivity improvements when aligned with strong policy environments. However, the effectiveness of ODA is often constrained by governance challenges, misallocation of resources, and weak institutional frameworks. The importance of studying Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Official Development Assistance (ODA), and labour productivity in Nigeria lies in addressing persistent productivity challenges despite rising external capital inflows. Nigeria has attracted significant foreign capital over the years, yet labour productivity remains relatively low, suggesting a disconnect between inflows and real sector performance. This study is therefore crucial in identifying whether these capital inflows translate into efficiency gains or merely increase financial dependency.

Existing literature often emphasizes the growth effects of FDI, with limited focus on its direct impact on labour productivity, particularly in Nigeria (Iamsiraroj, 2021). Similarly, while FPI is known to enhance financial markets, its contribution to productivity remains underexplored and inconclusive, especially in developing economies with weak financial systems (Heidland et al., 2025; Lopez et al., 2023). ODA studies also tend to focus on poverty reduction and growth, with insufficient attention to how aid influences worker efficiency and firm-level productivity (Arndt et al., 2020). Furthermore, many studies overlook the combined

and comparative effects of these inflows within a single framework. By examining their joint impact, this study fills an important gap and provides policy-relevant insights on how Nigeria can better harness external resources to improve labour productivity and achieve sustainable economic development.

The existing literature provides a broad understanding of how foreign capital inflows and domestic capacity factors influence labour productivity. Empirical evidence directly linking foreign capital to productivity is highlighted by Mirian et al. (2025), who found that foreign direct investment (FDI) significantly enhances labour productivity in Nigeria through technology transfer and capital deepening. Similarly, Ozigbo (2021) established that both FDI and portfolio flows contribute to economic growth, implying indirect productivity gains. In contrast, Ezeanyeji and Maureen (2019) observed that foreign portfolio investment (FPI) has a less stable and sometimes insignificant effect, reflecting its volatile nature and weaker linkage to real sector productivity. Beyond capital inflows, several studies emphasize the role of human capital and institutional capacity in translating investments into productivity gains. Onyiorah (2026) and Muogbo et al. (2025) highlight the importance of education and skill development in enhancing employability and efficiency, which are essential for maximizing the benefits of FDI and ODA. Similarly, Obikezie et al. (2023) and Ezeanyagu et al. (2023) show that learning outcomes and motivation significantly influence productivity-related competencies. These findings align with the argument that labour productivity improves when workers are equipped to utilize foreign technologies effectively.

In a related dimension, infrastructure and investment conditions also play a vital role. Anyakora et al. (2021) and Ikeotuonye and Efobi (2022) emphasize that improvements in infrastructure and real estate investment enhance economic activities, thereby supporting productivity. Environmental and urban development factors, as noted by Okafor et al. (2022a) and Okafor et al. (2022b), further shape the efficiency of labour and resource utilization. Additionally, social intervention programmes such as the N-Power initiative (Okoye et al., 2026) demonstrate that targeted government support can improve human capital and indirectly boost productivity. Enem et al. (2025) also show that technological adoption in education enhances skills, reinforcing the importance of innovation in productivity growth. Despite these contributions, a key gap remains. Most studies examine FDI, FPI, or human capital factors in isolation, with limited integration of ODA and institutional quality within a unified framework. In addition, the moderating role of institutions in shaping the productivity effects of different capital inflows is largely underexplored in the Nigerian context.

METHOD

The Solow-Swan version of the Neo-Classical Model is more suitable for this study due to its dynamism in linking output per labour and capital accumulation. The Solow model focuses on four variables: real output (Y), capital (K), labour (L), and knowledge (A). These are combined to produce output. The Neoclassical growth theory is of the view that an increment in labour or capital leads to diminishing returns. By this, they mean that increasing capital has only a short-term impact on economic growth. The steady state of the economy is therefore maintained by the increase in capital. This conclusion is entrenched in the Solow growth model, which is known to be a model of capital acquisition in a pure production economy. The model implies that technological coefficients are presumed to change during the production process, and the ratio of capital to labour (K/L) may correct itself to an equilibrium ratio over time. The production function in the Solow neoclassical growth model is mathematically represented thus;

$$Y = K^{\alpha}(AL)^{1-\alpha} \quad (1)$$

Y=GDP or output,K=capital stock,L=labour,and A=labour effectivenes. A is assumed to grow exogenously. This theory presumes that output grows from one or more of the three factors: labour, capital, or the improvement in technology. However, the principal supposition of the Solow growth model is that the acquisition of physical capital is incapable of explaining the tremendous growth over time in terms of per unit labour output (Salim et al., 2024; Tri Nugraha et al., 2023; Villanueva, 2023).

Several scholars have empirically conducted research using the ARDL model around labour productivity (or general output growth) and international capital inflows, such as Ahmad et al. (2025); Asada (2020), Djalab and Said (2023), Hailat and Baniata (2018), and Onwuteaka et al. (2023). However, the model of Hailat and Baniata (2018), who did a study on the effects of foreign capital inflow on labour productivity in Jordan, is adopted because it is closely related to the current study, given that the ARDL model is a single-equation model that is simple to implement and interpret, where different lag lengths can be assigned to variables.

As the baseline model, the model of Hailat and Baniata (2018) is stated in a compact econometric form of ARDL:

$$\left(Y/L\right)_t = \beta_0 + \sum_{i=1}^{p} \beta_i \left(Y/L\right)_{t-i} + \sum_{j=0}^{q} \gamma_j X_{t-j} + \varepsilon_t \quad (2)$$

Where Y/L represents the real average productivity of labour, and X is a 4x1 vector of variables of international capital inflows. Optimal lags p and q that may differ across variables are determined by minimizing the Bayesian information criterion (BIC). Equation (3) has a parameterization in Conditional Error Correction form according to:

$$\Delta\left(Y/L\right)_t = \emptyset_0 + \sum_{i=1}^{p-1} \emptyset_i \, \Delta\left(Y/L\right)_{t-i} + \sum_{j=0}^{q-1} \alpha_j \Delta X_{t-j} \, \delta \left[\left(Y/L\right)_{t-1} - \boldsymbol{\theta X}_{t-1}\right] + \mu_t \quad (3)$$

In this equation, $\left[\left(Y/L\right)_{t-1} - \theta X_{t-1}\right]$ Represents one lag residual from the regression of the dependent variable (Y/L) on the set of independent variables X, and δ measures the speed of adjustment toward equilibrium. Long-run parameters are measured by θ _i, whereas α_i and ∅_i Capture the short-run coefficients.

Empirical Model Specification

The model of this research work is specified in a linear form and would range from general to specific modelling, in line with theory. Model specification is a statement of maintained hypothesis (Koutsoyiannis, 1997). This involves expressing the models in a mathematical form that is used to ascertain the economic phenomenon empirically. Moreover, this study introduced control variables. The autoregressive distributed lag (ARDL) Bound technique was applied in estimating the model. For a robustness check, the study employed the FMOLS to validate the estimations.

To investigate the moderating effect of institutional quality in the impact of selected components of international capital inflows on labour productivity in Nigeria, The model is stated in a functional form:

DOI: https://doi.org/10.70188/zfr5xf96

LP = f(FDI, FPI, EDS, ODA, INSQIDX, FDI*INSQIDX, FPI*INSQIDX, EDS*INSQIDX, ODA*INSQIDX) (4)

Where INSQIDX represents an institutional quality index computed using the principal component analysis (PCA) that comprises all six indicators of institutional quality. The moderating effect of the institutional quality index is shown by interacting it with the components of international capital inflows in the equation. Equation (4) shows that labour productivity (LP) is a function of the components of international capital inflows, the interacting effect of institutional quality, and the components of international capital inflows (eg, FDI*INSQIDX), and the inflation rate.

The mathematical form of Equation 4 is given as:

$$LP_t = \alpha_0 + \varphi_j LP_{t-i} + \varphi_j FDI_{t-i} + \varphi_j FPI_{t-i} + \varphi_j EDS_{t-i} + \varphi_j ODA_{t-i} + \varphi_j INSQIDX_{t-i} + \varphi_j FDI * INSQIDX_{t-i_{t-i}} + \varphi_j FPI * INSQIDX_{t-i_{t-i}} + \varphi_j EDS * INSQIDX_{t-i} + \varphi_j ODA * INSQIDX_{t-i} \quad (5)$$

The ARDL model of this study is specified in econometric form as follows:

$$logLP_t = \alpha_0 + \sum_{j=1}^{p} \beta_1 logLP_{t-j} + \sum_{j=0}^{q} \beta_2 FDI_{t-j} + \sum_{j=0}^{q} \beta_3 FPI_{t-j} + \sum_{j=0}^{q} \beta_4 logEDS_{t-j} + \sum_{j=0}^{q} \beta_5 logODA_{t-j} + \sum_{j=0}^{q} \beta_6 INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_7 FDI * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_8 FPI * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_9 EDS * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_{10} ODA * INSQIDX_{t-j} + +\mu_t \quad (6)$$

To perform the bounds test for cointegration, the conditional ARDL (p, q) model is specified:

$$\Delta logP_t = \alpha_0 + \varphi_j logLP_{t-i} + \varphi_j FDI_{t-i} + \varphi_j FPI_{t-i} + \varphi_j logEDS_{t-i} + \varphi_j logODA_{t-i} + \varphi_j INSQIDX_{t-i} + \varphi_j FDI * INSQIDX_{t-i} + \varphi_j FPI * INSQIDX_{t-i} + +\varphi_j logEDS * INSQIDX_{t-i} + \varphi_j logODA * INSQIDX_{t-i} + \sum_{j=1}^{p} \beta_1 \Delta logLP_{t-j} + \sum_{j=0}^{q} \beta_2 \Delta FDI_{t-j} + \sum_{j=0}^{q} \beta_3 \Delta FPI_{t-j} + \sum_{j=0}^{q} \beta_4 \Delta logEDS_{t-j} + \sum_{j=0}^{q} \beta_5 \Delta logODA_{t-j} + \sum_{j=0}^{q} \beta_6 \Delta INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_7 \Delta FDI * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_8 \Delta FPI * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_9 \Delta logEDS * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_{10} \Delta logODA * INSQIDX_{t-j} + \mu_t \quad (7)$$

We can specify both the short-run and long-run models, which is the error correction model (ECM), if we can reject the null hypothesis (that is, there is cointegration). The error correction model (ECM) representation is specified as;

$$\Delta \log LP_t = \alpha_0 + \sum_{j=1}^{p} \beta_1 \Delta log LP_{t-j} + \sum_{j=0}^{q} \beta_2 \, \Delta FDI_{t-j} + \sum_{j=0}^{q} \beta_3 \, \Delta FPI_{t-j} + \sum_{j=0}^{q} \beta_4 \, \Delta log EDS_{t-j} + \sum_{j=0}^{q} \beta_5 \, \Delta \log ODA_{t-j} + \sum_{j=0}^{q} \beta_6 \, \Delta INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_7 \, \Delta FDI * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_8 \, \Delta FPI * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_9 \, \Delta log EDS * INSQIDX_{t-j} + \sum_{j=0}^{q} \beta_{10} \, \Delta log ODA * INSQIDX_{t-j} + \gamma ECT_{t-i} + \mu_t \quad (8)$$

Note that every other item remains as already defined.

Definition of Variables of the Model / Justification of the Model

Labour productivity measures how efficiently labour inputs such as hours worked or number of workers which are used to produce goods and services, expressed as output per unit of labour. It is a key indicator of economic efficiency and is closely linked to international capital inflows, which can enhance productivity by increasing capital intensity, transferring technology, and improving skills. Foreign Direct Investment (FDI) involves long-term ownership and control in foreign enterprises and contributes to productivity through capital deepening, innovation, and better management practices. Foreign Portfolio Investment (FPI), which includes investments in stocks and bonds, provides financial inflows that support markets and diversification, though often with shorter-term motives. Personal remittances supply stable foreign income to households, enabling investments in education, health, and small businesses, thereby improving labour productivity.

External debt reflects a country's foreign financial obligations, which can either support productive investment or limit growth if debt servicing dominates. Official Development Assistance (ODA) supports public investment in infrastructure and social services but may have limited impact if used for consumption. Real GDP controls for inflation and economic size, ensuring accurate productivity analysis. Gross Fixed Capital Formation (GFCF) captures investment in physical assets, while secondary school enrollment reflects human capital development. Finally, institutional quality influences how effectively these factors translate into sustainable productivity growth.

This study uses the Autoregressive Distributed Lag (ARDL) model to examine both short- and long-run effects of international capital inflows on labour productivity. ARDL is flexible, capturing dynamic relationships by including lagged variables and accommodating both I(0) and I(1) data, making it suitable for small samples. It distinguishes between short-run fluctuations and long-run equilibrium while allowing optimal lag selection. To ensure robustness, the Fully Modified Ordinary Least Squares (FMOLS) method is also applied. FMOLS corrects for endogeneity and serial correlation, providing reliable long-run estimates. Consistent results from both methods enhance confidence in findings and policy relevance.

Estimation Techniques and Procedures

This study employs the Autoregressive Distributed Lag (ARDL) model and follows a rigorous estimation procedure to ensure valid, reliable, and robust results. The evaluation process is divided into pre-estimation and post-estimation stages. The pre-estimation phase

examines the statistical properties of the data through descriptive analysis, unit root tests, multicollinearity checks, and co-integration tests. Descriptive statistics such as mean, median, and standard deviation help in understanding the distribution and characteristics of the data.

The post-estimation phase focuses on validating the model's adequacy and stability. Diagnostic tests include checks for autocorrelation using the Breusch-Godfrey (LM) test, which is preferred over the Durbin-Watson test due to its flexibility. If autocorrelation is detected, Newey-West HAC standard errors are applied for correction. Heteroscedasticity is tested using the Breusch-Pagan-Godfrey method, and similar corrections are applied if necessary. Additionally, model stability is assessed using CUSUM and CUSUMSQ tests. Together, these procedures ensure accurate estimation and strengthen the reliability of the study's findings.

Nature and Source of Data

The study uses annual time-series data covering (1992–2024), representing (33 years), sourced from the CBN Statistical Bulletin (2023), World Development Indicators (2024), and World Governance Indicators (2024). Labour productivity is measured as GDP per person employed, while FDI, FPI, remittances, and ODA are captured as net inflows. External debt is measured in current US dollars, and gross fixed capital formation in billions of dollars. Real GDP is expressed in constant (2015) US dollars, while secondary school enrollment is measured in percentage. Institutional quality ranges between (−2.5 to 2.5). Data analysis is conducted using E-Views (10).

RESULT AND DISCUSSION

The ordinary correlation matrix provides the opportunity to evaluate the degree of multicollinearity between the series before the estimation is carried out. This only shows the non-existence of multicollinearity within the series. Table 1 shows the correlation matrix for the various models estimated in this research.

Table 1: Correlation Matrix of the Variables *(LP)*

Variables	LP	FDI	FPI	ODA	EDS	GFCF	RGDP	SERR	PRER	INSQ_IDX
LP	1.000000									
FDI	0.770299	1.000000								
FPI	-0.466018	-0.498035	1.000000							
ODA	0.474882	0.214045	-0.201900	1.000000						
EDS	0.481619	0.288374	-0.305633	0.322749	1.000000					
GFCF	0.796893	0.529312	-0.371675	0.507215	0.885518	1.000000				
RGDP	0.735485	0.697635	-0.458053	0.508515	0.740681	0.753459	1.000000			
SERR	0.696677	0.729106	-0.534012	0.521875	0.666313	0.778969	0.745380	1.000000		
PRER	0.719720	0.535929	-0.246785	0.727657	0.266694	0.596831	0.687158	0.707440	1.000000	
INSQ_IDX	0.727933	0.666861	-0.341055	0.510830	0.436760	0.763490	0.743252	0.712365	0.714971	1.000000

Source**:** Computed using E-view 10

The correlation matrix examines the degree of multicollinearity between the series before the estimation. The result of the correlation matrix of all the variables of interest is shown in Table 1. The result shows no signs of correlation, as some variables possess weak or no correlations in the matrix. This shows that the variables are free of multicollinearity issues.

Long Run Estimation and Interpretation for the Model with the ARDL (Baseline) and FMOLS (Robustness Check) Models

Table 2: The Long Run Estimated Coefficient for the model

Variables	Coef.	Std. Error	Prob.	Variables	Coef.	Std. Error	Prob.
	ARDL					FMOLS	
FDI	0.0345**	0.0074	0.0187	FDI	0.0144	0.0112	0.2131
FPI	-0.0000**	0.0000	0.0244	FPI	-0.0000	0.0000	0.4028
LOGODA	0.096*	0.0073	0.0010	LOGODA	0.0891*	0.0164	0.0000
LOGEDS	0.1176**	0.0289	0.0267	LOGEDS	0.1775*	0.0556	0.0044
INSQIDX	1.7015**	0.5744	0.0544	INSQIDX	3.2715*	1.0600	0.0054
INSQIDX*FDI	-0.0322**	0.0069	0.0185	INSQ*FDI	0.0027	0.0087	0.7593
INSQIDX*FPI	0.0000**	0.0000	0.0368	INSQ*FPI	0.0000	0.0000	0.5406
INSQIDX*LOGODA	0.1376	0.011	0.0011	INSQ*LOGODA	0.0433**	0.0185	0.0288
INSQIDX*LOGEDS	-0.1807*	0.0216	0.0036	INSQ*LOGEDS	-0.169*	0.0477	0.0018
C	4.1464*	0.6087	0.0065	C	2.944**	1.3151	0.0356

Source: Computed using E-views 10
Note: * denotes significance at 1%, ** denotes significance at 5%; FMOLS denotes Fully Modified Least Squares. See the appendix for the robustness results.

Table 2 disclosed a long-run coefficient of the institutional quality index at 1.7015, significant at the 5 percent level with a probability value of 0.05. This implies that an improvement of one unit in the institutional quality index reflecting better governance, rule of law, regulatory quality, voice and accountability, political stability, and control of corruption correlates with a 17. 02 percent increase in labour productivity, all things equal. The large elasticity underscores the central role institutions play in facilitating productive economic activity.

To examine the moderating role or effect of the institutional quality index on the impact of selected international capital inflows on labour productivity in Nigeria, the following long-run outcomes were obtained: The estimated coefficient of moderating the effect of foreign direct investment net inflows using the institutional quality index on labour productivity reveals a value of negative 0.0322 which is statistically significant at 5% with a probability value of 0.01. This negative coefficient implies that the marginal effect of FDI on labour productivity (0.0039) is weakened as institutional quality improves; formally, $\partial LP/\partial FDI = 0.0345 - 0.0322 \times 1.7015$.

The long-run coefficient of moderating the effect of foreign portfolio investment net inflows using the institutional quality index on labour productivity, as in Table 2, is 0.0000 and significant at the 5 percent level with a probability value less than 0.05, effectively indicating that improvements in institutional quality slightly amplify the (already negligible) effect of foreign portfolio investment net inflows on labour productivity. The positive coefficient value implies that the marginal effect of foreign portfolio investment net inflows on labour productivity becomes stronger as institutional quality improves. Though the magnitude is near zero, the positive sign implies that in countries with stronger institutions, foreign portfolio inflows become marginally more beneficial for LP.

In Table 2, the estimated coefficient of moderating the effect of net inflows of official development assistance using the institutional quality index on labour productivity is 0.1376, significant at the 1 percent level with a probability value of less than 0.01. This positive interaction suggests that the beneficial effect of net inflows of official development assistance

on labour productivity (0.0960) is amplified as institutional quality rises, with ∂LP/∂LOGODA = 0.0960 + 0.1376 × INSQIDX. For a one-unit improvement in institutional quality, the marginal return of net inflows of official development assistance on labour productivity increases by 0.14 points.

In the long run, the coefficient value for the moderating effect of external debt flow using the institutional quality index on labour productivity is -0.1807, significant at the 1 percent level with a probability value less than 0.01. This negative interaction term implies that the positive effect of external debt on labour productivity (0.1176) diminishes as institutional quality improves, following the relationship ∂LP/∂LOGEDS = 0.1176 – 0.1807 × INSQIDX. For instance, if the institutional quality index is greater than approximately 0.65 units, the net long-run marginal effect of external debt on labour productivity could be zero or negative. Taken together, the model's ARDL results reveal that FDI net inflows, net inflows of ODA, external debt flow, and the institutional quality index all contribute positively to Nigeria's labour productivity in the long run, albeit with varying magnitudes. However, the interaction terms show that institutional quality moderates these effects: it diminishes the productivity gains from FDI net inflows and external debt flow while reinforcing the gains from ODA net inflows and, to a negligible extent, from FPI net inflows.

Test for Autocorrelation (Breusch-Godfrey).

Table 3: The model (Objective Five) Moderating Effect of Institutional Quality

	Test Statistic	P-Value
F- Statistic	2.948766	0.2281
Observed R^2	18.47162	0.05040
Durbin-Watson test statistic	2.276480	

Source: Computed using E-view 10

The Breusch-Godfrey autocorrelation test results in Table 3 indicate that the model does not suffer from serial correlation problems. The F-statistic (2.948766) with a probability value of (0.2281) is greater than the conventional significance level of (0.05), suggesting that the null hypothesis of no autocorrelation cannot be rejected. Although the observed R^2 probability (0.05040) is marginally close to (0.05), it is still slightly above the threshold, reinforcing the absence of serious autocorrelation. Furthermore, the Durbin-Watson statistic (2.276480), which is close to (2), indicates no first-order autocorrelation. Overall, the model is considered reliable for inference.

Test for Heteroscedasticity (Breusch-Pagan-Godfrey)

Table 4: The Model Moderating Effect of Institutional Quality

	Test Statistic	P-Value
F- Statistic	0.959856	0.6100
Observed R^2	27.78380	0.4222

Source: Computed using E-Views 10

The Breusch-Pagan-Godfrey heteroscedasticity test results in Table 4 indicate that the model is free from heteroscedasticity problems. The F-statistic (0.959856) with a probability value of (0.6100) is far above the conventional significance level of (0.05), implying that the null hypothesis of homoscedasticity cannot be rejected. Similarly, the Observed R^2 probability (0.4222) also exceeds (0.05), further confirming constant variance of the error terms. This suggests that the model's residuals are stable and reliable. Therefore, the estimates are

efficient, and the results obtained from the model can be considered robust and suitable for policy inference.

Stability test

The CUSUM stability test in Figure 1 indicates that the model is stable over the study period. The blue CUSUM line remains within the red dashed critical bounds at the 5% significance level throughout the sample period. This implies that there are no structural breaks or parameter instability in the model.

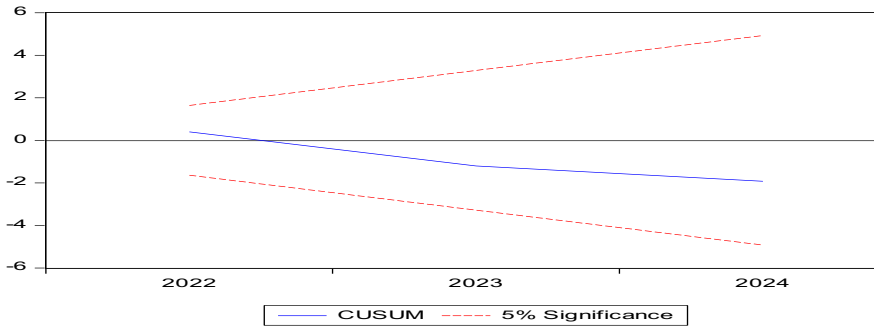

Figure 1: The model Moderating Effect of Institutional Quality
Source: Computed using E-Views 10

Although the CUSUM line shows a gradual downward trend, it does not cross the critical limits, confirming that the estimated coefficients are stable. Therefore, the model is reliable for forecasting and policy analysis, and the results can be considered consistent and robust over time.

This study's findings offer a refined comprehension of the interaction between various types of foreign capital inflows and institutional quality in affecting labor productivity in Nigeria. Instead of producing uniform effects, each category of capital influx exhibits unique transmission mechanisms and conditional implications, underscoring the significance of structural and institutional circumstances. The favorable long-term impact of FDI on labor productivity validates its function as a conduit for knowledge transfer, capital enhancement, and managerial spillovers. The adverse moderating influence of institutional quality indicates a contradictory dynamic. This suggests that when institutional quality rises, the marginal productivity benefits from FDI diminish. A probable argument is that robust institutions may enforce harsher regulatory frameworks, compliance fees, or market discipline, which mitigate inefficiencies but also constrain the short-term benefits usually linked to foreign investment. This discovery enhances current literature by proposing that institutional enhancements may transform the nature of FDI advantages from quick productivity increases to more lasting yet less flexible results. The minimal and adverse baseline effect of FPI strengthens the assertion that portfolio flows are predominantly detached from real sector productivity. Their ephemeral and speculative characteristics constrain their capacity to enhance productive potential. Nonetheless, the favorable correlation with institutional quality suggests that enhanced governance frameworks can somewhat alleviate this constraint by augmenting financial market efficiency and stability. This indicates that institutions function as a facilitating environment capable of converting otherwise unstable capital into slightly productive resources.

Third, the findings underscore Official Development Assistance (ODA) as the most institutionally sensitive type of capital inflow. The positive and substantial impact, further

enhanced by institutional quality, highlights the importance of governance in facilitating the successful allocation and usage of aid. In contrast to FDI and external debt, which are frequently motivated by private or financial interests, ODA is generally allocated for public investment in infrastructure, education, and healthcare. Robust institutions improve accountability and diminish misallocation, ultimately enhancing production outcomes. This discovery enhances the current discourse on aid efficacy by illustrating that institutional quality is not simply a control variable but a vital transmission channel. The beneficial impact of foreign debt on labor productivity, along with its adverse relationship with institutional quality, indicates the presence of a threshold effect. Although debt might initially facilitate investment and enhance production, enhanced institutional frameworks may reveal inefficiencies in debt utilization or intensify scrutiny over borrowing practices. This diminishes the incremental advantages of further debt. The result is that institutional strengthening may shift economic strategies from debt-dependent growth to more sustainable financing methods.

Collectively, these findings indicate that institutional quality does not consistently augment the productivity impacts of all capital inflows. Rather, it distinguishes their efficacy by modifying incentive frameworks, allocation efficiency, and economic governance. This undermines the traditional belief that superior institutions invariably enhance the advantages of external capital. In Nigeria, institutional quality seems to promote more organized and development-focused inflows, such as Official Development Assistance (ODA), while limiting or even hindering the benefits derived from market-driven inflows like Foreign Direct Investment (FDI) and foreign debt. This study theoretically expands the Solow-Swan framework by including institutional quality as an interacting element that influences capital productivity, rather than seeing it as an exogenous background condition. This study empirically enhances the literature by concurrently examining several types of capital inflows inside a cohesive model, while explicitly considering their interplay with institutional dynamics, a subject that has been inadequately addressed in previous research.

The findings indicate that enhancing institutional quality alone is inadequate for policy consequences. Policymakers must link the nature of capital inflows with institutional capacities. Priority must be given to enhancing ODA efficiency, fortifying regulatory structures for FPI, and directing FDI and external loans towards sectors with substantial productivity spillovers. In the absence of such alignment, the prospective advantages of institutional improvements may not completely convert into enhanced labor efficiency.

CONCLUSION

This study examined the impact of Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Official Development Assistance (ODA), and other capital inflows on labour productivity in Nigeria, with particular emphasis on the moderating role of institutional quality. The findings reveal that FDI, ODA, external debt, and institutional quality have significant positive effects on labour productivity in the long run, indicating that foreign capital inflows can enhance productive efficiency when effectively utilized. However, FPI exhibited a weak and negative influence, suggesting its limited direct contribution to real sector productivity. Importantly, the study highlights that institutional quality plays a critical moderating role. While improvements in institutional quality amplify the positive impact of ODA and marginally enhance the effect of FPI, they unexpectedly reduce the productivity gains from FDI and external debt. This suggests that the relationship between institutions and capital inflows is complex and context-dependent in Nigeria. The diagnostic and stability tests confirm that the model is robust, stable, and reliable for policy inference.

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