

Air Transport Connectivity, Foreign Direct Investment and Economic Growth in Nigeria

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ABSTRACT

This study examined the dynamic and causal relationships among air transport connectivity, foreign direct investment (FDI), and economic growth in Nigeria using annual time-series data spanning 1990–2024, a period characterised by substantial reforms in the aviation sector and the broader economy. The study employed the Autoregressive Distributed Lag (ARDL) model and Granger causality analysis to examine both the short-run dynamics and the long-run relationships among the variables. The short-run results revealed that improvements in air transport connectivity exerted a positive and statistically significant effect on real gross domestic product (RGDP), although the effect weakened over time because of adjustment costs and sector-specific constraints. Human capital also contributed positively to short-run economic growth, whereas inflation and trade openness exerted adverse effects. In contrast, FDI and infrastructure did not produce statistically significant short-run effects. The long-run estimates suggested that air transport connectivity and human capital were positively associated with economic growth, while FDI, government expenditure, and gross fixed capital formation exhibited positive but statistically insignificant relationships. Inflation, infrastructure, trade openness, and the real exchange rate displayed significant negative associations with economic growth. However, these long-run findings were interpreted with caution because the ARDL bounds test produced inconclusive evidence of cointegration, although the Johansen cointegration analysis indicated stable long-run equilibrium relationships among the variables. The weak contribution of FDI reflected structural and institutional constraints, including its concentration in the extractive sector, weak domestic linkages, limited technology transfer, and low absorptive capacity. The study concluded that strengthening air transport connectivity, enhancing human capital, improving institutional quality, promoting development-oriented FDI in productive non-extractive sectors, and maintaining macroeconomic stability were essential for achieving sustainable and inclusive economic growth in Nigeria.

Keywords: Air Transport Connectivity, Foreign Direct Investment (FDI), Economic Growth, Human Capital, ARDL and Granger Causality

INTRODUCTION

Air transport has become an indispensable catalyst for economic transformation in both developed and developing economies. As globalisation intensifies and international production networks expand, air transport connectivity increasingly shapes the movement of people, goods, capital, and services, (Niewiadomski, 2017). For emerging economies such as Nigeria—Africa's largest market by population (over 225 million in 2024) and one of the region's most dynamic investment destinations—efficient air transport systems are fundamental for strengthening global integration, attracting foreign capital, and sustaining economic growth, (Anfofum, et al., 2015). The aviation sector enhances communication, facilitates trade, supports business mobility, and reduces transaction costs, thereby improving overall economic competitiveness, (Chaitarin, et., al., 2025). According to the International Air Transport Association (IATA, 2023), air transport directly contributes approximately 0.5% to Nigeria's GDP, while the broader aviation value chain supports nearly 1.8 million jobs nationwide.

Nigeria's aviation industry has experienced notable growth since the 1990s. Domestic air passenger traffic increased from fewer than 1 million passengers in 1990 to over 15 million passengers by 2021, reflecting expanded route networks, improved airport infrastructure, and increased private sector participation (FAAN/NCAA, 2022; Nwaogbe et al., 2023). Yet, despite this growth, the extent to which air transport

connectivity influences foreign direct investment (FDI) inflows—Nigeria received approximately US \$1.08 billion in FDI in 2024 according to the World Bank's World Investment Report and has continued to record very low quarterly FDI figures (e.g., a record low of about US \$29.83 million in Q2 2024)—and, by extension, economic growth remains insufficiently investigated, (Origin & Uwaezuoke, 2024). Existing scholarship has predominantly examined the macroeconomic contribution of aviation or the determinants of FDI in isolation, with limited attention to the interconnected pathways through which improved air connectivity may stimulate investment flows and underpin long-term economic performance.

A deeper understanding of these interactions is especially important in an economy characterised by infrastructural bottlenecks, fluctuating investment conditions, and dependence on external capital. Enhanced air connectivity can attract multinational enterprises seeking reliable logistics systems, stimulate tourism and service-sector development, and support export-oriented industrialisation. Conversely, rising FDI inflows may generate additional demand for air services, suggesting a potentially reciprocal relationship that shapes national economic outcomes, (Bannò, & Redondi, 2014; Saidi, et al., 2020). For example, regions with higher airport connectivity have consistently received larger shares of FDI projects, indicating a positive correlation between air accessibility and investment decisions (World Bank, 2023).

Against this backdrop, the central objective of this study is to examine the impact of air transport connectivity on foreign direct investment and economic growth in Nigeria, with a particular focus on identifying the direction of causality among these variables. Determining whether air connectivity drives FDI and growth, whether FDI stimulates aviation development, or whether economic expansion reinforces both sectors offers critical insights for policymakers aiming to maximise the developmental benefits of Nigeria's aviation industry.

Statement of the Research Problem

Air transport connectivity is widely recognised as a critical driver of contemporary economic activity, facilitating the efficient movement of capital, labour, goods, and knowledge across both national and international boundaries, (Ait-Bihi-Ouali, et al., 2020). By reducing spatial frictions, expanding market access, and strengthening integration into global value chains, well-developed air transport networks are expected to enhance a country's attractiveness to foreign direct investment (FDI) and, consequently, support sustained economic growth, (Saidi, et al., 2020). As a result, aviation infrastructure has become an increasingly central component of development strategies in both advanced and developing economies.

Despite its strong theoretical relevance, the precise mechanisms through which air transport connectivity influences FDI inflows and economic growth remain insufficiently understood, particularly in developing country contexts. Existing debates in the literature revolve around whether improvements in air connectivity merely respond to economic expansion or actively stimulate investment and growth by lowering transaction costs, improving business mobility, and signalling infrastructural readiness to foreign investors. This uncertainty is further compounded in economies characterised by structural rigidities, institutional weaknesses, and uneven infrastructural development.

In the Nigerian context, this issue is especially pertinent. As Africa's largest economy and a strategic regional hub, Nigeria has recorded notable expansion in its aviation sector, reflected in airport modernisation initiatives, route liberalisation policies, and increasing passenger volumes, (Oluwakoya & Ajayi, 2023). However, these developments have not been consistently accompanied by commensurate increases in stable, productivity-enhancing FDI inflows or sustained improvements in economic performance. This apparent disconnect raises critical concerns regarding the effectiveness of air transport connectivity in supporting FDI-led growth in Nigeria. Moreover, air transport development, investment promotion, and economic growth have often been pursued as largely separate policy objectives, thereby weakening strategic coherence and reducing overall policy effectiveness. The absence of a clear analytical understanding of how air transport connectivity interacts with FDI dynamics to influence economic growth has constrained evidence-based policymaking and limited the alignment of aviation, trade, and investment policies.

Accordingly, there is a compelling need for a context-specific investigation into the role of air transport connectivity in shaping foreign investment flows and economic growth in Nigeria. Addressing this gap is

essential not only for advancing empirical scholarship but also for informing integrated policy interventions capable of leveraging air transport infrastructure as a catalyst for sustainable, investment-driven economic growth.

Existing empirical evidence further reinforces this need. Most studies examining the nexus between air transport connectivity, FDI, and economic growth have focused predominantly on developed and selected emerging economies, including the United States, Turkey, Australia, Thailand, the Philippines, Vietnam, Indonesia, Malaysia, Singapore, Uruguay, and Argentina. Beyond the fact that empirical findings from these studies are mixed and often contradictory, significant differences in political, economic, institutional, and geographical structures limit the direct applicability of their conclusions to Nigeria. More importantly, there remains a notable scarcity of empirical studies within the Nigerian context. The few available studies—such as Onakoya (2012), Alabi (2019), Omodero (2019), Aderemi et al. (2020), and Udeh et al. (2025)—have largely examined FDI from a growth-centred perspective, without explicitly incorporating air transport connectivity into the analytical framework. Consequently, these studies fail to establish a clear causal relationship among air transport connectivity, FDI inflows, and economic growth in Nigeria. This methodological limitation underscores the need for a more comprehensive and robust econometric approach capable of capturing the interconnected dynamics of aviation infrastructure, foreign investment, and economic growth.

This study seeks to examine both the effects and the causal relationships among air transport connectivity, foreign direct investment (FDI), and economic growth in Nigeria. The remainder of the article is structured as follows. Section 2 provides a critical review of the relevant theoretical and empirical literature on air transport connectivity, FDI, and economic growth, with particular emphasis on the Nigerian context. Section 3 describes the methodological framework and data sources employed in the analysis. Section 4 presents and discusses the empirical findings, while Section 5 concludes the study by summarising the key results and highlighting their policy implications.

LITERATURE REVIEW

Theoretical Review

This study is anchored in the New Economic Geography (NEG) theory, pioneered by Krugman (1991), which provides a robust and unifying framework for examining the relationship between air transport connectivity, foreign direct investment (FDI), and economic growth in Nigeria. The theory explains how reductions in transport costs, achieved through improved connectivity, encourage the spatial concentration of economic activity, attract foreign investment, and stimulate economic growth by enhancing market access and lowering transaction costs, (Hanson, 1996). These theoretical mechanisms align closely with the core variables of this study, as they link air transport connectivity directly to investment location decisions and overall economic performance, (Head & Mayer, 2004). Within the Nigerian context, improved air transport connectivity has the potential to strengthen agglomeration effects in major economic centres, enhance integration into global value chains, and support sustained economic growth. Importantly, NEG also accommodates bidirectional causality, recognising that rising FDI inflows and economic expansion can further stimulate demand for air transport services.

Empirical Review

Dalango (2020) examined the determinants of foreign direct investment (FDI) inflows in Ethiopia from 1981 to 2018 using the Autoregressive Distributed Lag (ARDL) approach. Unit root tests confirmed mixed integration orders, validating the model. Bounds testing revealed a long-run relationship between FDI and its determinants, showing that trade openness, market size, domestic bank credit, inflation, human capital, and exchange rates significantly influenced FDI in the long run, while trade openness, inflation, and exchange rate dynamics were important in the short run. The study emphasised the importance of stable macroeconomic conditions, efficient credit markets, and predictable exchange rate policies in maximising FDI benefits.

Similarly, Onakoya (2012) investigated FDI's impact on economic growth in Nigeria using a structural macro-econometric model estimated with three-stage least squares (3SLS). Capturing intersectoral linkages, the study

found that FDI significantly influenced economic output, although effects varied across sectors. Consequently, it recommended sector-specific policies, improved trade openness, and targeted incentives to enhance investment and growth. In contrast, Awe (2013), employing a two-stage least squares (2SLS) model, reported a negative FDI-growth relationship in Nigeria, largely due to weak inflows and poor domestic linkages, highlighting the need for stronger domestic investment promotion, regulatory frameworks for multinationals, and policies limiting excessive profit repatriation.

Beyond Nigeria, Kukaj and Ahmeti (2016) explored FDI in Kosovo and other Balkan states, finding that its contribution to development depends on institutional quality, absorptive capacity, and policy frameworks. The study concluded that both the volume and effectiveness of FDI were inadequate, underscoring the need for institutional reforms and stronger government-business collaboration. More recently, Udeh et al. (2025) analysed FDI-growth dynamics from 1994 to 2023, emphasising that although FDI can stimulate growth through technology transfer, productivity enhancement, and infrastructure development, its impact is highly context-dependent, particularly on governance, institutional quality, and absorptive capacity.

Empirical evidence in Nigeria reinforces these findings. Aderemi et al. (2020) identified market size, past FDI inflows, exchange rates, and economic growth as positive determinants of FDI, while inflation discouraged inflows. Omodero (2019) found that corruption positively influenced FDI, reflecting Nigeria's institutional context, whereas Alabi (2019) reported that FDI significantly promoted economic growth between 1986 and 2017. Overall, these studies suggest that FDI's growth-enhancing potential depends critically on macroeconomic stability, institutional quality, and supportive policies.

Regarding air transport, Anfofum et al. (2015) found a positive and significant effect of air transport on economic growth, supported by long-run equilibrium and unidirectional causality from transport to growth. The study recommended integrated transport policies underpinned by managerial expertise, transparency, and accountability. Similarly, Brida et al. (2018) observed a stable long-term relationship between GDP and air passenger volumes in Uruguay and Argentina, with causality running from GDP to air transport, indicating that economic growth drives travel demand. Elasticity analyses revealed stronger GDP shocks on passenger demand in Uruguay than in Argentina, reflecting market and geographical differences.

Extending the analysis to Europe, Castro and Fontoura (2022) assessed airport and hub connectivity across EU countries from 2008 to 2019. Hub connectivity was found to correlate more strongly with GDP, FDI, trade flows, and tourism than airport connectivity, underscoring the importance of hub-oriented aviation policies for sustained economic growth. In Southeast Asia, Nguyen (2024) confirmed that air transport connectivity significantly enhances economic growth in selected economies (Thailand, Philippines, Vietnam, Indonesia, Malaysia, Singapore), though this effect weakened during the COVID-19 pandemic. Tourism had no direct impact, whereas FDI and trade remained key drivers.

Chaitarin et al. (2025) examined threshold effects in ASEAN countries, finding that air transport positively affects growth only after reaching critical connectivity levels, beyond which trade and FDI accelerate. In South Africa's Western Cape, Nonyati (2020) reported that improved air connectivity significantly boosted tourism and trade, though its effect on FDI was comparatively weaker, highlighting air transport as a key enabler of regional economic development.

Finally, studies from advanced economies confirm similar trends. Khanal et al. (2022) found asymmetric effects in Australia, where positive air transport shocks foster long-term growth, but negative shocks exert stronger adverse impacts. Tolcha et al. (2020) demonstrated heterogeneous causal relationships in Sub-Saharan Africa, with air transport stimulating growth in low-income countries and economic development driving transport demand in more advanced economies. Yağar-Eğilmez (2020) showed in the US that air transport, export capacity, and economic growth are cointegrated, with export-driven growth benefiting from strong civil aviation and air freight infrastructure. Adedoyin et al. (2020) further highlighted the moderating role of ICTs and Industry 4.0 technologies in enhancing FDI-driven growth via air transport. Similarly, Kalayci and Yanginlar (2016) confirmed that macroeconomic expansion in Turkey drives civil aviation growth, while Castro and Fontoura (2022) and Nguyen (2024) corroborated the broader importance of hub connectivity and air transport in facilitating trade, FDI, and regional development.

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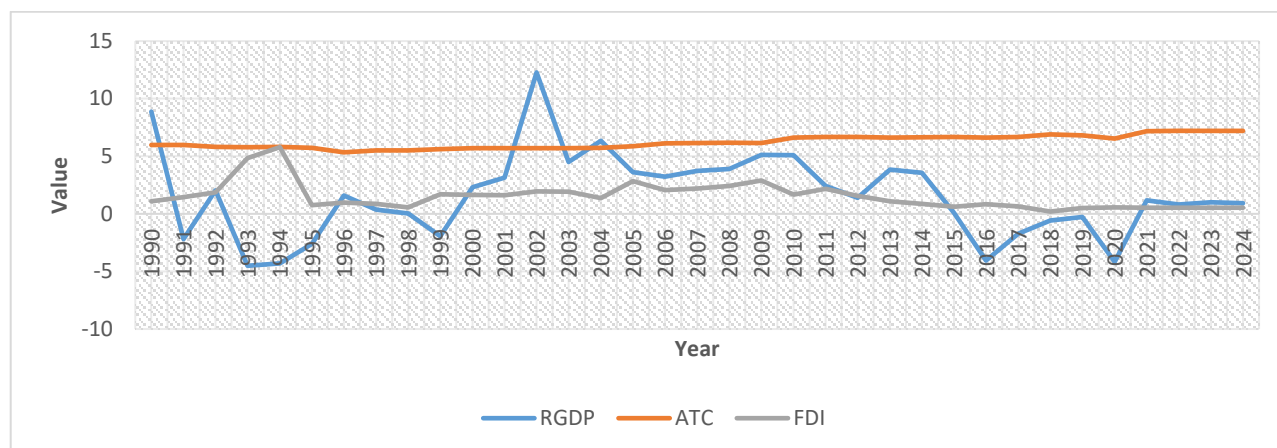


Fig.1: Trend of RGDP, Air Transport Connectivity (ATC), and FDI in Nigeria (1990-2024)

Source: Authors' Compilation (2025)

The figure 1 above highlights a clear divergence in the behaviour of real gross domestic product (RGDP), air transport connectivity (ATC), and foreign direct investment (FDI), thereby reflecting differing dynamics in economic performance and its key drivers. RGDP displays pronounced volatility, with sharp fluctuations marked by strong expansion in the early 2000s, followed by notable contractions around the mid-2010s and only a weak, unstable recovery thereafter. This pattern indicates that economic growth has been highly responsive to macroeconomic shocks and structural disruptions rather than sustained fundamentals. By contrast, ATC follows a relatively stable and steadily upward trajectory, punctuated only by minor short-term deviations. This consistent rise suggests sustained investment and policy commitment to aviation infrastructure, even during periods of broader economic weakness. Consequently, the resilience of ATC stands in sharp contrast to the instability of RGDP, implying that improvements in connectivity have not consistently translated into immediate growth gains.

FDI, meanwhile, records an initial increase before entering a broadly declining path, interrupted by brief recoveries and a gradual tapering towards the end of the period. This trend points to weakening investor confidence, potentially driven by policy uncertainty, macroeconomic instability, and structural constraints. Taken together, these patterns suggest that while air transport connectivity has progressed steadily, economic growth and foreign investment have remained volatile, highlighting a disconnect between infrastructural advancement, capital inflows, and real economic outcomes.

METHODOLOGY

Data and Sources

This study utilises annual time-series data spanning the period 1990 to 2024, with 2024 chosen as the terminal year due to the availability of comprehensive and up-to-date data. The selection of 1990 as the starting point is methodologically justified, as it coincides with the initiation of major structural and policy reforms in Nigeria's aviation sector and the broader economy, including deregulation measures, increased private sector participation, and greater openness to foreign investment. This period also marks Nigeria's deeper integration into the global economy, making it particularly suitable for analysing the long-run relationships among air transport connectivity, foreign direct investment (FDI), and economic growth. Data for the study were sourced from reputable and internationally recognised institutions to ensure accuracy and reliability. These sources include the World Bank's World Development Indicators, the National Bureau of Statistics (NBS) of Nigeria, and the Central Bank of Nigeria (CBN) Statistical Bulletin. The variables compiled at the national level encompass key indicators of air transport connectivity, FDI inflows, and overall economic growth, providing a robust empirical foundation for the analysis.

Model specification

Based on the theoretical review and empirical consideration, the following model was used in this work: The relationship between the variables of interest is presented in the following form:

1. In a general function term:

$$RGDP = f(ATC, FDI, K, HC, OPEN, INFR, INF, GEX, RER) \text{-----} (i)$$

The functional form of econometric model can be specified as follows:

$$\ln RGDP_t = \alpha + \beta_1 \ln ATC_t + \beta_2 \ln FDI_t + \beta_3 \ln K_t + \beta_4 \ln HC_t + \beta_5 \ln OPEN_t + \beta_6 \ln INFR_t + \beta_7 \ln INF_t + \beta_8 \ln GEX_t + \beta_9 \ln RER_t + \mu_t \text{-----} (i) \quad \text{Where;}$$

RGDP= RGDP per capita

ATC= Air transport connectivity (Proxy for total air passenger traffic)

FDI=Foreign Direct Investment Inflow (real FDI inflows (US\$) or FDI as % of GDP)

K=Physical capital (gross fixed capital formation (GFCF) per capita)

HC= Human capital (average years of schooling, secondary enrolment or human capital index)

OPEN=Trade openness— (Exports + Imports)/GDP.

INFR=Infrastructure index—(electricity production per capita, paved roads, or an index combining multiple infrastructure indicators)

INF= Inflation rate

RER= Real effective exchange rate

GEX= Government spending— (public investment or capital expenditure as % of GDP)

2. ARDL ($p, q_1, q_2, q_3, q_4, q_5, q_6, q_7, q_8, q_9$) Dynamic Specification.

The general ARDL error-correction form of the model can be written as:

$$\begin{aligned} \Delta \ln RGDP_t = & \alpha_0 + \sum_{i=1}^p \phi_i \ln RGDP_{t-i} + \sum_{i=0}^{q_1} \phi_i \Delta \ln ATC_{t-i} + \sum_{i=0}^{q_2} \phi_{2i} \Delta \ln FDI_{t-i} + \\ & \sum_{i=0}^{q_3} \phi_{3i} \Delta \ln K_{t-i} + \sum_{i=0}^{q_4} \phi_{4i} \Delta \ln HC_{t-i} + \sum_{i=0}^{q_5} \phi_{5i} \Delta \ln OPEN_{t-i} + \sum_{i=0}^{q_6} \phi_{6i} \Delta \ln INFR_{t-i} + \\ & \sum_{i=0}^{q_7} \phi_{7i} \Delta \ln INF_{t-i} + \sum_{i=0}^{q_8} \phi_{8i} \Delta \ln GEX_{t-i} + \sum_{i=0}^{q_9} \phi_{9i} \Delta \ln RER_{t-i} + \lambda_1 \ln RGDP_{t-1} + \lambda_2 \ln ATC_{t-1} + \\ & \lambda_3 \ln FDI_{t-1} + \lambda_4 \ln K_{t-1} + \lambda_5 \ln HC_{t-1} + \lambda_6 \ln OPEN_{t-1} + \lambda_7 \ln INFR_{t-1} + \\ & \lambda_8 \ln INF_{t-1} + \lambda_9 \ln GEX_{t-1} + \lambda_{10} \ln RER_{t-1} + \eta_t \end{aligned}$$

3. Bound Test for cointegration

To test for long-run relationship, the null hypothesis is: $H_0 : \lambda_1 = \lambda_2 = \dots = \lambda_{10} = 0$

Rejection of H_0 using the Pesaran, Shin and Smith (2001) bounds test confirms cointegration.

4. Long-Run coefficients: Once cointegration is established, long-run elasticity are obtained as:

$$\beta_i = -\frac{\lambda_i + 1}{\lambda_i}, i = 1, 2, \dots, 9$$

These measure the long-run responsiveness of RGDP to changes in each regressors.

5. Error-correction Representation

The parsimonious ECM form is:

$$\Delta \ln RGDP_t = \sum \gamma_i \Delta X_{t-1} + \theta ECM_{t-1} + \eta_t$$

Where; $ECM_{t-1} = \ln RGDP_{t-1} - \beta_1 \ln ACT_{t-1} - \dots - \beta_9 RER_{t-1}$

and $\theta < 0$ statistically significant confirms speed of adjustment to long-run equilibrium.

4.1 Data Analyses and Discussion of Findings

4.2 Descriptive Statistics

Table 4.2: Descriptive Statistics Result

	RGDP	ATC	FDI	GEX	GFCF	HC	INF	INFR	OPEN	RER
Mean	2.368	6.457	1.331	2.384	23.410	39.921	13.000	129.727	33.718	102.862
Median	2.437	6.623	1.090	1.900	24.630	42.714	12.540	141.220	33.010	101.439
Maximum	12.276	7.209	2.900	9.100	53.120	54.883	24.660	154.172	53.280	133.150
Minimum	-4.162	5.623	0.200	0.600	14.170	23.545	5.390	75.492	20.720	69.197
Std. Dev.	3.734	0.505	0.804	1.745	8.819	7.912	4.726	19.869	8.722	19.613
Skewness	0.504	-0.133	0.428	2.485	1.551	-0.498	0.573	-1.338	0.438	-0.258
Kurt	3.603	1.898	1.946	9.896	6.263	2.477	2.992	3.882	2.462	1.862
Jarq-B	1.436	1.338	1.921	75.276	21.116	1.318	1.367	8.265	1.103	1.626
Prob	0.488	0.512	0.383	0.000	0.000	0.517	0.505	0.016	0.576	0.444

Sum	59.199	161.43 3	33.28 3	59.60 0	585.25 1	998.01 2	325.00 5	3243.1 76	842.94 5	2571.5 52
Sum Sq. D	334.64 9	6.111	15.51 9	73.08 9	1866.7 70	1502.2 83	536.04 3	9475.5 62	1825.8 18	9231.8 97
Obs	25	25	25	25	25	25	25	25	25	25

Source: Authors' Computation (2026)

The descriptive statistics indicate that RGDP has a mean of 2.368 and a median of 2.437, with a moderate range from -4.162 to 12.276 and a standard deviation of 3.734, suggesting a fairly balanced distribution. ATC, representing air transport connectivity, is relatively stable, with a mean of 6.457, median of 6.623, and low variability (std. dev. 0.505). FDI exhibits moderate variation (mean 1.331, median 1.090, std. dev. 0.804) and slight positive skewness (0.428), reflecting occasional high inflows. In contrast, GEX and GFCF display substantial dispersion and positive skewness (2.485 and 1.551) alongside significant Jarque-Bera statistics, implying sporadic extreme values. HC, INF, OPEN, and RER demonstrate moderate variation and approximate normality, whereas INFR shows considerable spread and negative skewness (-1.338), indicating uneven development. Overall, while most variables approximate normal distributions, GEX, GFCF, and INFR exhibit deviations due to occasional shocks in government spending, investment, and infrastructure.

Correlation Analysis

Table 4.3: Correlation Analysis

	RGDP	ATC	FDI	GEX	GFCF	HC	INF	INFR	OPEN	RER
RGDP	1									
ATC2	-0.133	1								
FDI	-0.043	-0.408	1							
GEX	0.231	0.025	-0.012	1						
GFCF	-0.150	-0.584	0.244	0.078	1					
HC	0.245	0.789	-0.375	0.144	-0.809	1				
INF	-0.423	-0.212	0.424	-0.314	0.415	-0.548	1			
INFR	-0.028	0.862	-0.258	-0.012	-0.799	0.828	-0.251	1		
OPEN	0.344	-0.509	0.129	0.054	0.095	-0.305	-0.136	-0.434	1	
RER	-0.202	-0.046	-0.412	-0.445	0.018	-0.206	-0.015	-0.067	0.039	1

Source: Authors' Computation (2026)

The correlation analysis shows that RGDP has generally weak associations, being slightly positively related to GEX (0.231), HC (0.245), and OPEN (0.344) while weakly negatively correlated with ATC (-0.133), FDI (-0.043), GFCF (-0.150), INF (-0.423), INFR (-0.028), and RER (-0.202), indicating limited direct linear links. ATC2 is strongly associated with HC (0.789) and INFR (0.862) but negatively with FDI (-0.408) and GFCF (-0.584), suggesting connectivity aligns with human capital and infrastructure yet inversely with investment. FDI relates positively to INF (0.424) and GFCF (0.244) but negatively to ATC (-0.408), HC (-0.375), and RER (-

0.412), highlighting macroeconomic influence over transport and human capital. Overall, HC, INFR, and ATC are highly interrelated, whereas RGDP's direct correlations remain weak, indicating the need for multivariate analysis to capture complex interactions.

Table 4.4: Results of Unit Root Test

Test at Level					Test at first level difference			
Variable	Test Statistic	5% critical value	Remark	S/NS	Test Statistic	5% critical value	Remark	S/NS
RGDP	-3.893	-2.951	I(0)	S	-----	-----	-----	-----
ATC	-0.178	-2.951	-----	-----	-5.114	-2.957	I(1)	S
FDI	-----	-----	-----	-----	-6.287	-2.954	I(1)	S
GFCF	-----	-----	-----	-----	-4.264	-2.954	I(1)	S
HC	-----	-----	-----	-----	-6.383	-2.992	I(1)	S
OPEN	-----	-----	-----	-----	-5.606	-2.957	I(1)	S
INFR	-----	-----	-----	-----	-7.029	-2.954	I(1)	S
INF	-----	-----	-----	-----	-4.757	-2.954	I(1)	S
GEX	-----	-----	-----	-----	-3.464	-3.029	I(1)	S
RER	-----	-----	-----	-----	-5.538	-2.954	I(1)	S
Where; S indicates Stationary; NS non-Stationary								

Source: Researcher's Compilation, (2026)

The unit root test in Table 4.4 indicates that RGDP is stationary at level (I(0)) with a test statistic of -3.893 exceeding the 5% critical value of -2.951, whereas all other variables—ATC, FDI, GFCF, HC, OPEN, INFR, INF, GEX, and RER—are non-stationary at level but become stationary after first differencing (I(1)), as evidenced by their respective test statistics exceeding the 5% critical thresholds.

This mixture of I(0) and I(1) variables implies that while RGDP is inherently stable, the explanatory variables require differencing to achieve stationarity, highlighting the necessity of a methodology capable of handling mixed integration orders. Consequently, these results justify the use of the ARDL bounds testing approach, which efficiently accommodates variables of different integration orders while allowing for the simultaneous estimation of short-run dynamics and long-run relationships.

Table 4.5: Johansen Co-Integration Test

Trace Max-Eingen & Max-Eingen Statistics						
H ₀	Trace Statistics	Critical value at 5% level	Prob.	Max-Eingen Statistics	Critical value at 5% level	Prob.**

None *	543.188	239.235	0.000	145.133	64.505	0.000**
At most 1 *	398.055	197.371	0.000	109.634	58.434	0.000**
At most 2 *	288.422	159.529	0.000	90.226	52.363	0.000**
At most 3 *	198.196	125.615	0.000	80.1994	46.231	0.000**
At most 4 *	117.996	95.754	0.001	47.401	40.078	0.006**
At most 5 *	70.595	69.819	0.043	27.505	33.877	0.237
At most 6	43.091	47.856	0.130	20.688	27.584	0.296
At most 7	22.403	29.797	0.277	11.275	21.132	0.619
At most 8	11.128	15.495	0.204	7.981	14.265	0.381
At most 9	3.147	3.841	0.076	3.147	3.841	0.076
Trace test indicates 6 co-integrating eqn.(s) at the 0.05 level, Denotes rejection of the hypothesis at the 0.05 level** indicates statistically significant.						

Source: Researcher's Compilation, (2026)

The Johansen cointegration test indicates the presence of six cointegrating relationships among the variables at the 5% significance level, as both the trace and maximum-eigenvalue statistics exceed their respective critical values with probabilities of 0.000 for the first six equations. This suggests that despite individual variables being non-stationary at level, there exists a stable long-run equilibrium linking RGDP, air transport connectivity, FDI, government expenditure, GFCF, human capital, trade openness, infrastructure, inflation, and the real exchange rate. Consequently, these results justify modelling the long-run and short-run dynamics using approaches such as the ARDL bounds testing framework, which accommodates mixed integration orders and captures both immediate and persistent effects.

Presentation of Results

Objective: effect(s) of air transport connectivity and foreign direct investment (FDI) on economic growth in Nigeria.

Bound Test Result

Table: 4.6.2: ARDL Bound Test Result

Test Statistic	Value	K	
F-statistic	2.509		
Critical Value		Lower bound	Upper bound
10%		1.88	2.99
5%		2.14	3.3
2.5%		2.37	3.6

1%	2.65	3.97
Notes: ** denote significant at 5% levels. Critical values		

Source: Research's Compilation, 2026 from E-view-9

The ARDL bounds test reported in Table 4.6.2 yields an F-statistic of 2.509, which exceeds the 5% lower critical bound (2.14) but remains below the corresponding upper critical bound (3.30). This places the test within the inconclusive region, indicating that the ARDL bounds procedure alone does not provide sufficient statistical evidence to either confirm or reject the existence of a long-run cointegrating relationship among real gross domestic product (RGDP), air transport connectivity, foreign direct investment (FDI), and the other explanatory variables. Consequently, the ARDL bounds test should not be interpreted as providing definitive evidence of long-run equilibrium.

Nevertheless, the inconclusive outcome of the ARDL bounds test does not necessarily imply the absence of cointegration. The Johansen cointegration test, reported in the preceding section, identifies six cointegrating vectors, providing strong and independent evidence of a stable long-run relationship among the variables. Given the mixed evidence from the two cointegration procedures, the ARDL long-run coefficients and the associated error correction model are presented to explore the potential long-run equilibrium and short-run adjustment dynamics. However, the long-run estimates should be interpreted with appropriate caution because the ARDL bounds test, considered in isolation, remains inconclusive. Accordingly, the substantive interpretation of the long-run relationships is made in conjunction with the stronger evidence provided by the Johansen cointegration results, thereby ensuring a balanced and methodologically rigorous assessment of the long-run dynamics among the variables.

Short-Run Estimates (Dependent Variable: RGDP)

Table 4.7: Short-Run Result of ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	-0.219	0.133	-1.649	0.138
D(ATC)	6.809	2.352	2.896	0.020**
D(ATC(-1))	-4.186	2.308	-1.813	0.107
D(FDI)	0.654	0.639	1.022	0.337
D(FDI(-1))	-1.330	0.695	-1.913	0.092
D(GEX)	0.648	0.498	1.299	0.229
D(GEX(-1))	0.793	0.291	2.721	0.026**
D(GFCF)	0.249	0.304	0.821	0.435
D(GFCF(-1))	-0.586	0.216	-2.706	0.027**
D(HC)	0.215	0.089	2.431	0.041**
D(INF)	-0.169	0.073	-2.311	0.049**
D(INF)	-0.049	0.063	-0.781	0.457

D(INFR)	-0.076	0.068	-1.121	0.295
D(OPEN)	-0.191	0.062	-3.095	0.015**
D(RER)	0.060	0.021	2.907	0.019**
D(RER(-1))	0.073	0.034	2.168	0.062
CointEq(-1)	-0.953	0.162	-5.883	0.000**

Source: Research's Compilation, 2026 from E-view-9

Table 4.7 reports the ARDL short-run estimates, showing that changes in air transport connectivity ($D(ATC)$) exert a positive and statistically significant effect on real gross domestic product (RGDP). This outcome implies that improvements in air transport connectivity generate immediate growth gains by enhancing accessibility, facilitating business travel, and accelerating the movement of high-value goods and services. However, the negative but statistically insignificant coefficient of the lagged term suggests that these short-run benefits may not automatically persist over time, particularly in the absence of complementary structural and policy support. This finding is consistent with the empirical evidence of Button and Taylor (2000) and Graham and Dennis (2010), who emphasised the role of air transport in stimulating short-term economic activity through improved market integration and efficiency. It is further supported by Brida, Cortes-Jimenez, and Pulina (2016) and Hakim and Merkert (2016), who documented significant short-run growth effects of air transport expansion, especially in developing and emerging economies. Conversely, the insignificance of the lagged effect resonates with the observations of Marazzo, Scherre, and Fernandes (2010) and Baker, Merkert, and Kamruzzaman (2015), who found that the growth-enhancing impact of air transport may weaken or reverse over time due to structural constraints, reverse causality, or limited absorptive capacity. Overall, the evidence underscores that while air transport connectivity delivers immediate economic gains, its long-term contribution to growth is contingent upon supportive institutional frameworks, adequate infrastructure, and a stable macroeconomic environment. Similarly, the lagged values of government expenditure ($D(GEX_{(-1)})$) and gross fixed capital formation ($D(GFCF_{(-1)})$) exert positive and statistically significant effects on real gross domestic product (RGDP), whereas their contemporaneous coefficients are largely insignificant. This pattern highlights the inherently delayed transmission mechanism through which fiscal spending and capital investment influence economic activity, reflecting the gestation lags associated with public infrastructure projects, capital accumulation, and implementation processes. The result is consistent with both Keynesian and endogenous growth theories, which posit that the growth-enhancing effects of government expenditure and investment tend to materialise over time rather than instantaneously. Empirically, this finding accords with Aschauer (1989), who demonstrated that public capital investment improves productivity and output with a temporal lag, as well as Devarajan, Swaroop, and Zou (1996), who showed that the growth impact of fiscal expenditure is conditional on its composition and timing. Further evidence from developing economies, including Abdul-Rahman and Ayorinde (2018) for Nigeria and Sakyi and Egyir (2017) for Sub-Saharan Africa, reinforces the view that past government spending and capital formation are more effective drivers of economic growth than contemporaneous expenditure. Conversely, the insignificance of current values resonates with Olayiwola and Okodua (2017), who argued that inefficiencies, implementation delays, and fiscal leakages often weaken the immediate growth effects of public spending in developing countries. Overall, the evidence underscores that sustained, well-sequenced fiscal and investment policies, rather than short-term expenditure surges, are essential for achieving durable and inclusive economic growth. Human capital ($D(HC)$) positively contributes to economic performance, reflecting the importance of a skilled workforce, while inflation ($D(INF)$) negatively affects RGDP, indicating short-term price pressures, and trade openness ($D(OPEN)$) exerts a negative short-run effect. The real exchange rate ($D(RER)$) positively impacts growth, with its lagged effect approaching significance. Conversely, foreign direct investment ($D(FDI)$) and infrastructure ($D(INFR)$) show insignificant short-run effects, implying that their influence unfolds gradually over time. Crucially, the error correction term ($CointEq(-1)$) is negative and highly significant (-0.953 , $p=0.000$), demonstrating that deviations from long-run equilibrium are swiftly corrected, with approximately 95% of disequilibrium adjusted within a single period, thereby confirming the model's stability and its effectiveness in capturing both short-run fluctuations and long-run convergence.

Long-run Estimates (Dependent Variable: RGDP)

Table 4.8: Long-run Estimates (Dependent Variable: RGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.**
ATC	6.546	2.754	2.377	0.045**
FDI	2.384	1.107	2.154	0.063
GEX	0.669	0.468	1.429	0.191
GFCF	0.054	0.137	0.396	0.703
HC	0.226	0.082	2.744	0.025**
INF	-0.258	0.097	-2.651	0.029**
INFR	-0.324	0.088	-3.688	0.006**
OPEN	-0.201	0.070	-2.860	0.021**
RER	-0.041	0.016	-2.592	0.032**
C	1.487	12.391	0.120	0.907

Source: Research's Compilation, 2026 from E-view-9

Table 4.8 presents the ARDL long-run estimates, which suggest that air transport connectivity (ATC) is positively and statistically significantly associated with real gross domestic product (RGDP). However, this finding should be interpreted with appropriate caution because the ARDL bounds test produced inconclusive evidence regarding the existence of a long-run cointegrating relationship. Consequently, although the estimated coefficient indicates that improvements in aviation connectivity may contribute to higher long-run economic performance, the result should be regarded as suggestive rather than definitive. From an economic perspective, the positive association is consistent with the proposition that enhanced air transport connectivity can improve market integration, reduce spatial and informational barriers, facilitate trade and tourism, and strengthen participation in global value chains, thereby supporting economic activity over time. Nevertheless, the inconclusive bounds test indicates that the long-run relationship may be more complex than that captured by the linear ARDL specification, and the estimated effect should therefore be interpreted alongside the stronger evidence of cointegration provided by the Johansen cointegration test. The result is broadly consistent with endogenous growth theory, which emphasises the productivity-enhancing role of transport infrastructure in promoting sustained economic performance. It also accords with the empirical findings of Button and Taylor (2000), Percoco (2010), Hakim and Merkert (2016), and Baker, Merkert, and Kamruzzaman (2015), who reported positive long-run associations between air transport development and economic growth. Nevertheless, given the mixed evidence from the cointegration tests, these findings should be viewed as indicative rather than conclusive. Future research could further assess the robustness of the long-run relationship using alternative cointegration estimators, such as Dynamic Ordinary Least Squares (DOLS) and Fully Modified Ordinary Least Squares (FMOLS), which provide useful complementary evidence under different econometric assumptions. By contrast, foreign direct investment (FDI) exhibits a positive but statistically insignificant coefficient, suggesting that although FDI may contribute to economic growth, its long-run impact in Nigeria remains limited and is contingent upon several structural and institutional factors. This result should be interpreted with appropriate caution in light of the inconclusive evidence from the ARDL bounds test regarding the existence of a stable long-run cointegrating relationship. Nevertheless, the finding is broadly consistent with the view that the growth-enhancing effects of FDI depend not only on the volume of capital inflows but also on the host economy's absorptive capacity and its ability to effectively utilise foreign investment.

A plausible explanation for the weak FDI–growth relationship in Nigeria is that a substantial proportion of FDI has historically been concentrated in the extractive sector, particularly the oil and gas industry, which is characterised by relatively weak backward and forward linkages with the broader domestic economy. As a result, opportunities for domestic value addition, technology transfer, productivity spillovers, and human capital development have remained limited. Furthermore, persistent infrastructural deficiencies, institutional weaknesses, regulatory uncertainty, security challenges, and governance constraints have constrained the economy's capacity to maximise the developmental benefits of foreign investment. The substantial repatriation of profits by multinational enterprises may further reduce the domestic reinvestment of earnings, thereby diminishing the overall contribution of FDI to long-run economic growth.

This interpretation is consistent with the findings of Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2004), who argued that the growth-enhancing effects of FDI depend critically on complementary factors such as financial development and human capital accumulation, as well as with Akinlo (2004), who found that FDI exerted only a weak long-run influence on economic growth in Nigeria. Taken together, these findings imply that attracting larger volumes of FDI alone is unlikely to generate substantial economic gains unless supported by policies that strengthen domestic absorptive capacity, promote economic diversification, deepen linkages between foreign and domestic firms, facilitate technology transfer and skills development, enhance institutional quality, and foster a more stable and predictable investment environment. Within this context, improvements in air transport connectivity appear to offer a more consistent and reliable platform for supporting long-run economic growth in Nigeria than reliance on FDI inflows alone. Nevertheless, this inference should be interpreted alongside the broader cointegration evidence presented in this study and with due recognition of the inconclusive outcome of the ARDL bounds test.

Similarly, government expenditure (GEX) and gross fixed capital formation (GFCF) exhibit positive but statistically insignificant coefficients, suggesting that their long-run contributions to economic growth in Nigeria remained limited during the study period. Given the inconclusive evidence from the ARDL bounds test, these estimates should be interpreted with appropriate caution. By contrast, human capital (HC) displays a positive and statistically significant association with real gross domestic product (RGDP), indicating that improvements in education, skills development, and labour productivity may contribute to stronger long-run economic performance. This finding is consistent with the theoretical proposition that investment in human capital enhances productivity, fosters innovation, and strengthens the productive capacity of the economy. Conversely, inflation (INF), infrastructure (INFR), trade openness (OPEN), and the real exchange rate (RER) exhibit statistically significant negative coefficients, suggesting that persistent macroeconomic instability, infrastructure-related constraints, unfavourable trade dynamics, and exchange rate depreciation may impede long-run economic performance. Nevertheless, these relationships should be interpreted with due caution in light of the inconclusive ARDL bounds test and considered alongside the stronger evidence of cointegration provided by the Johansen cointegration analysis. In particular, the negative coefficient on trade openness may reflect structural characteristics of the Nigerian economy, including a high dependence on imports, limited export diversification, and weak domestic productive capacity, all of which may diminish the potential growth benefits typically associated with greater trade openness. Likewise, the negative coefficient on infrastructure may indicate that infrastructure investment has been inadequate, inefficiently allocated, or constrained by implementation and maintenance challenges, thereby limiting its effectiveness in promoting long-run economic growth. Overall, the findings suggest that air transport connectivity and human capital are likely to play important roles in supporting long-run economic performance in Nigeria. However, achieving sustained economic growth is also likely to depend on maintaining macroeconomic stability, improving the quality and efficiency of infrastructure investment, strengthening domestic productive capacity, and implementing trade and exchange rate policies that enhance economic competitiveness and resilience. These conclusions should be interpreted in conjunction with the broader cointegration evidence presented in this study, recognising the inconclusive outcome of the ARDL bounds test.

Objective: the causal relationships among air transport connectivity, foreign direct investment (FDI), and economic growth in Nigeria.

Table 4.6.2: Pairwise Granger Causality Test at Lags 2

Null Hypothesis:	Obs	F-Statistic	Prob.
GFCF does not Granger Cause RGDP	33	1.092	0.349
RGDP does not Granger Cause GFCF →		3.194	0.056*
INFR does not Granger Cause RGDP	33	1.129	0.338
RGDP does not Granger Cause INFR →		3.191	0.056*
HC does not Granger Cause ATC	33	3.582	0.041*
ATC does not Granger Cause HC →		0.106	0.899
OPEN does not Granger Cause ATC	33	1.725	0.197
ATC does not Granger Cause OPEN →		3.681	0.038*
INF does not Granger Cause FDI	33	3.740	0.036**
FDI does not Granger Cause INF ↔		7.802	0.002
INFR does not Granger Cause FDI	33	2.702	0.085
INF does not Granger Cause GEX →	33	3.609	0.040*
GEX does not Granger Cause INF →		2.213	0.128
RER does not Granger Cause GEX	33	3.583	0.041*
GEX does not Granger Cause RER →		0.652	0.529
INF does not Granger Cause GFCF	33	0.862	0.433
GFCF does not Granger Cause INF →		3.821	0.034*
OPEN does not Granger Cause GFCF	33	0.549	0.584
GFCF does not Granger Cause OPEN →		3.443	0.046*
INF does not Granger Cause HC	33	2.923	0.070
HC does not Granger Cause INF →		3.487	0.045*
INFR does not Granger Cause HC	33	0.114	0.893
HC does not Granger Cause INFR →		5.310	0.011*
RER does not Granger Cause INF	33	1.925	0.165
INF does not Granger Cause RER →		12.223	0.000*

Source: Research's Compilation, 2026 from E-view-9

Table 4.6.2 shows the pairwise Granger causality test at lag 2 reveals a complex network of directional relationships among the variables. Specifically, RGDP unidirectionally Granger-causes GFCF and INFR, indicating that past economic growth drives capital formation and infrastructure development, whereas the reverse does not hold, reflecting limited feedback effects. Human capital (HC) unidirectionally influences air transport connectivity (ATC), highlighting the role of a skilled workforce in enhancing transport networks, while ATC2 does not affect HC. Similarly, ATC unidirectionally impacts trade openness (OPEN), suggesting that improved connectivity facilitates trade, whereas trade does not significantly drive connectivity. Inflation (INF) and FDI exhibit a bidirectional relationship, demonstrating mutual influence between price dynamics and foreign investment. Additionally, INF unidirectionally affects GEX, while the real exchange rate (RER) unidirectionally influences GEX, indicating that inflation and currency fluctuations shape fiscal allocations. Furthermore, GFCF unidirectionally drives INF and OPEN, whereas HC Granger-causes INF and INFR, reflecting the contribution of human capital to price stability and infrastructure outcomes, and finally, INF unidirectionally drives RER, signifying that inflationary pressures determine exchange rate movements. Collectively, these results underscore the interdependence of macroeconomic growth, investment, human capital, and policy variables in Nigeria, with both unidirectional and bidirectional causal links shaping economic dynamics.

Table 4.9: Summary of Post-Estimation Diagnostic Tests

Diagnostic Test	Statistic/Value	p-Value	Interpretation
Wald Test	F = 2.762 (df = 9,8); Chi-square = 24.861 (df = 9)	F = 0.084; Chi-square = 0.003	Joint significance of regressors is marginally weak per F-test, but Chi-square indicates overall significance.
Breusch-Godfrey Serial Correlation LM Test.	F = 0.832; Obs*R-squared = 7.162	F = 0.480; Obs*R-squared = 0.028	F-statistic shows no serial correlation, but Chi-square suggests potential serial correlation; further checks recommended.
Heteroskedasticity Test (Breusch-Pagan-Godfrey).	F = 0.522; Obs*R-squared = 20.139; Scaled explained SS = 1.772	F = 0.896; Obs*R-squared = 0.689; Scaled explained SS = 1.000	No evidence of heteroskedasticity; homoscedasticity assumption satisfied.
Residuals Descriptive Statistics.	Mean = 1.28e-16; Median = -0.003; Max = 1.254; Min = -1.838; Std. Dev. = 0.633; Skewness = -0.408; Kurtosis = 3.994; Jarque-Bera = 2.276	Jarque-Bera Probability = 0.320	Residuals are approximately normally distributed with near-zero mean and symmetric distribution, confirming model adequacy for inference.

Source: Research's Compilation, 2026 from E-view-9

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

This study examined the dynamic and causal relationships among air transport connectivity, foreign direct investment (FDI), and economic growth in Nigeria using annual time-series data spanning the period 1990–2024, which encompasses significant reforms in both the aviation sector and the wider economy. The short-run ARDL estimates indicate that improvements in air transport connectivity exert an immediate and statistically significant positive influence on real gross domestic product (RGDP), although this effect moderates over time owing to adjustment costs and sector-specific constraints. Economic growth is also influenced by lagged government expenditure and gross fixed capital formation, highlighting the importance of previous fiscal and investment decisions. Human capital contributes positively to short-run economic performance, whereas

inflation and trade openness exert adverse effects, reflecting the consequences of macroeconomic instability and external vulnerability. By contrast, FDI and infrastructure do not exhibit statistically significant short-run effects, suggesting that their potential growth contributions may materialise only gradually. Furthermore, the error correction term is negative and statistically significant, indicating a rapid adjustment towards long-run equilibrium. Nevertheless, this result should be interpreted alongside the inconclusive ARDL bounds test and the broader evidence provided by the Johansen cointegration analysis.

The long-run estimates suggest that air transport connectivity and human capital are positively associated with economic growth, implying that improvements in aviation connectivity, education, workforce skills, and productivity may support long-term economic performance. However, these findings should be interpreted with appropriate caution because the ARDL bounds test provides inconclusive evidence regarding the existence of a stable long-run cointegrating relationship, although the Johansen cointegration test indicates the presence of long-run equilibrium relationships among the variables. In contrast, FDI, government expenditure, and gross fixed capital formation display positive but statistically insignificant coefficients, suggesting that their contributions to long-run economic growth remain limited over the study period. Conversely, inflation, infrastructure, trade openness, and the real exchange rate exhibit statistically significant negative associations with economic growth, indicating that persistent macroeconomic instability, infrastructure-related constraints, unfavourable trade dynamics, and exchange rate depreciation may impede long-run economic performance. The Granger causality analysis further reveals important interdependencies among the variables, with economic growth influencing capital formation and infrastructure development, human capital promoting improvements in air transport connectivity, and bidirectional causal relationships existing between inflation and FDI. Collectively, these findings underscore the complex interactions among connectivity, investment, macroeconomic conditions, and economic growth in Nigeria.

The weak and statistically insignificant contribution of FDI to economic growth suggests that increasing the volume of foreign investment alone is unlikely to generate sustained economic transformation in Nigeria. Rather, the developmental impact of FDI appears to be constrained by several structural and institutional factors. A substantial proportion of FDI has historically been concentrated in the extractive sector, particularly the oil and gas industry, which has relatively weak backward and forward linkages with the domestic economy. Consequently, opportunities for technology transfer, knowledge diffusion, domestic value addition, employment generation, and productivity spillovers have remained limited. Furthermore, persistent infrastructural deficiencies, institutional weaknesses, regulatory uncertainty, governance challenges, security concerns, and the substantial repatriation of profits by multinational enterprises have further reduced the economy's ability to maximise the long-term developmental benefits of foreign investment. These findings imply that the effectiveness of FDI depends not only on the quantity of capital inflows but also on the absorptive capacity and structural readiness of the domestic economy.

Accordingly, policy should move beyond attracting larger volumes of FDI towards improving the quality and developmental impact of foreign investment. Greater emphasis should be placed on attracting FDI into non-extractive sectors such as manufacturing, agro-processing, transportation, logistics, technology, and other knowledge-intensive industries that possess stronger domestic production linkages and greater employment potential. Equally important is the need to strengthen backward and forward linkages between foreign-owned enterprises and domestic firms through local content initiatives, supplier development programmes, and incentives that encourage technology transfer, innovation, research collaboration, and skills development. At the same time, sustained investment in education, technical and vocational training, transport infrastructure, digital infrastructure, and institutional quality is essential for strengthening the absorptive capacity of the Nigerian economy and enhancing the productivity of foreign investment.

Beyond FDI, strengthening air transport connectivity should remain a strategic national priority through improved aviation infrastructure, enhanced safety standards, regulatory reforms, and deeper integration into regional and global aviation networks. Maintaining macroeconomic stability through prudent fiscal and monetary policies is equally important for reducing inflationary pressures, minimising exchange rate volatility, and creating a stable investment climate. Overall, the findings suggest that a coordinated policy framework integrating air transport development, high-quality and development-oriented FDI, human capital development, infrastructure investment, institutional strengthening, and sound macroeconomic management offers the greatest

potential for promoting sustainable, resilient, and inclusive economic growth in Nigeria. These conclusions should, however, be interpreted in conjunction with the broader cointegration evidence presented in this study, recognising the inconclusive outcome of the ARDL bounds test.

RECOMMENDATIONS

- i. **Prioritise the Strategic Development of Air Transport Connectivity:** Given the positive contribution of air transport connectivity to economic growth in both the short and long run, the Federal Government should continue to prioritise the development of the aviation sector as a key component of its national growth strategy. Policy interventions should extend beyond airport expansion to include improvements in regulatory efficiency, aviation safety, air traffic management systems, digitalisation, and integration with regional and global aviation networks. These measures will enhance market accessibility, facilitate trade and investment, improve regional connectivity, and strengthen Nigeria's participation in global value chains, thereby supporting sustainable economic growth.
- ii. **Strengthen Human Capital to Enhance Productivity and Absorptive Capacity:** The positive association between human capital and economic growth highlights the importance of sustained investment in education, technical and vocational training, research, innovation, and sector-specific skills development. Particular attention should be given to aviation, logistics, digital technologies, and related industries that complement transport connectivity. Strengthening human capital will not only improve labour productivity but also enhance the economy's absorptive capacity, enabling Nigeria to derive greater benefits from infrastructure development, technological progress, and foreign investment.
- iii. **Improve the Developmental Impact of Foreign Direct Investment through Structural and Institutional Reforms:** The weak and statistically insignificant contribution of FDI to economic growth suggests that policy should shift from merely attracting larger volumes of foreign investment towards improving its quality and developmental impact. Government should implement policies that encourage greater investment in non-extractive sectors, particularly manufacturing, agro-processing, transportation, logistics, technology, and other value-added industries with stronger domestic production linkages and higher employment potential. Efforts should also focus on strengthening backward and forward linkages between foreign-owned enterprises and domestic firms through local content initiatives, supplier development programmes, technology transfer, innovation partnerships, and skills development. In addition, improving institutional quality, reducing regulatory uncertainty, strengthening governance, and upgrading infrastructure will enhance the absorptive capacity of the economy and enable foreign investment to generate broader and more sustainable economic benefits.
- iv. **Promote Macroeconomic Stability and Improve the Efficiency of Public Investment:** The adverse effects of inflation, exchange rate depreciation, and unfavourable trade dynamics underscore the need for sound macroeconomic management. Monetary and fiscal authorities should pursue policies that maintain price stability, reduce exchange rate volatility, and promote a more balanced trade structure that supports domestic productive capacity and export diversification. At the same time, improvements in the quality, efficiency, and governance of public expenditure—particularly investment in transport, digital, and other productive infrastructure—are essential for maximising the long-term returns to both public and private investment and fostering sustainable economic growth.

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