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Public-Private Partnership and Economic Growth in Nigeria (1981 – 2024)

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Abstract

This study seeks to examine the impact of public-private partnership and economic growth in Nigeria, using secondary annual time series data from 1981 to 2024 on the underlisted variables from the Central Bank of Nigeria Statistical Bulletin and data from World Development Indicators (WDI). The dependent variable, economic growth, was proxied by Real Gross Domestic Product (RGDP), while Public-Private Partnership Investment (PPPINV), Private Capital in Infrastructure (PCINFRAST), Gross Capital Formation (GCF), Trade Openness (TOP), Inflation Rate (INFL), and Interest Rate Accruable to Public-Private Partnership (INTR) were the independent and control variables, respectively. The test mechanisms adopted were the unit root test for co-integration and the Autoregressive Distributed Lag (ARDL) technique. Findings revealed that there exists a positive and significant relationship between public-private partnership investment, private capital in infrastructure, gross capital formation, and interest rate in both the short and long run periods, suggesting that these variables contribute immensely to enhancing public-private partnership and therefore improved economic growth in Nigeria when properly harnessed. However, the inflation rate and trade openness exhibited a negative and insignificant relationship with public-private partnership and economic growth in both periods, showing that during the period under

review, the underlisted variables had a devastating impact on economic growth in Nigeria. The study recommends that the government stabilize inflation, diversify trade, strengthen PPP governance, and channel investments into productive sectors. PPP investments should be increased by taking quick steps like accelerating projects and issuing bonds, as well as making long-term changes in laws, taxes, and financial markets.

Keywords: Public-Private Partnership, Private Capital in Infrastructure, Real Gross Domestic Product, Gross Capital Formation, Trade Openness, Inflation Rate, Interest Rate and Economic Growth

1.0 Introduction

Public-Private Partnerships (PPPs) are increasingly recognized as a key vehicle for overcoming infrastructural challenges. PPPs involve a collaborative arrangement where private entities partner with the government to finance, develop, and operate projects typically managed by the public sector in exchange for long term returns. These partnerships leverage the operational and financial efficiency of private entities to create value in areas traditionally constrained by public sector limitations. It is pertinent to state that the Nigerian government recognizes the significance and potential of PPPs as machinery for advancing infrastructure development across the country. For instance, in the recently released economic recovery and growth plan (ERGP), the government emphasized the use of PPPs to deliver critical projects, such as roads, rail, seaports, and airports.

The overall significance of infrastructure to livelihood is undebatable, such that it has become a significant component for promoting and sustaining growth and development across all regions (Corbett & Smith, 2010). With globalization and trends of urbanization increasing, the demand for adequate infrastructure to promote development and sustain livelihood is rising (Flores, 2013). Globally, government has been faced with the challenge of providing adequate infrastructure in terms of quantity and quality. These situations are rather prevailing in developing economies and emerging markets that are particularly constrained with financing these infrastructures from the traditional government finances using the annual budgets. Consequently, public-private partnership (PPP) evolved and became a preferred mode for delivering public infrastructure projects to achieve value for money (Gunnigan & Rajput, 2010).

Public-private partnership PPP is defined as a risk-sharing and long-term contract agreement between a public and private entity for the delivery of public goods and services with remuneration linked with performance (Vera et al., 2013). With PPP as a tool for infrastructure financing, a mechanism has been provided to better harness the strengths and exploit the benefits of the comparative advantages for the public and

private sectors of the economy (Jamali, 2004). Through these PPP arrangements, all actors are able to realize the partnership goals, especially infrastructure development. Despite the success of PPP as an alternative financing tool for effective infrastructure provision, most developing countries are yet to attract the needed private partners in infrastructure provision. Sub-Saharan Africa (SSA) continues to experience high poverty rates, making it the poorest region in the world (World Bank, 2017).

Although PPP is widely adopted as a financial tool, it continues to remain as an evolving paradigm in sub-Saharan Africa primarily due to prevailing barriers against non-successful implementation. At the moment, PPP projects have been concentrated in only a few countries such that about 80% of the total infrastructure projects financed through PPP in the sub-region have been concentrated in Nigeria, Uganda, Kenya, and South Africa alone over the past 25 years (World Bank, 2017). Governments globally have acknowledged the pivotal role of infrastructure in fostering economic growth and reducing poverty. In response to escalating infrastructure demands, PPPs emerge as a vital mechanism for enhancing efficiency in public service delivery, thus narrowing the infrastructure deficit. Historically, transferring the risks associated with project development, maintenance, and operations to the private sector has often resulted in superior quality and outcomes compared to government-led initiatives (Wang et al., 2017). Traditionally, through its intervention, government has taken a leading role in the allocation of investment, controlling the growth and development of the economy and producing certain goods and services. However, it has been argued that some of the governmental products and services could have been more efficiently and professionally produced if better practical management could have been brought in (Krueger, 1990).

Historically, poverty eradication, public health improvement, and educational advancement have been viewed as government prerogatives. However, reliance solely on governmental intervention has yielded limited success. Collaborative endeavors involving the public, private, and civil sectors have proven more effective in addressing major societal challenges. By leveraging diverse approaches and expertise, PPPs have demonstrated the capacity to achieve outcomes surpassing those achievable by any single sector operating in isolation. It is against this background that the study seeks to investigate whether PPP has the potential to stimulate growth and development in Nigeria spanning from 1981 to 2024.

2.0 The Need for Public Private Partnership as a Prolusion to Economic Growth in Nigeria.

Service delivery and availability in Nigeria are generally inadequate, characterized by inferior services and insufficient financing for infrastructural upkeep, sustenance, and repair. The situation has exacerbated poverty levels in the country, particularly in rural

areas (Itu & Keniga, 2021). According to Nwambuko et al. (2023), rural poverty in Nigeria encompasses various dimensions, including persistent communal conflicts, substandard health conditions, lack of clean water supply, limited access to basic education, gender disparities, inadequate housing, diseases, poor sanitation, hunger, and high fertility rates. This paradoxical state of rural poverty is striking in Nigeria, abundant in natural resources and considered one of the wealthiest in sub-Saharan Africa. Itu & Keniga (2021) highlight that these challenges are exacerbated by rapid urbanization. Efficient and effective urban infrastructure and service provision are important for realizing significant benefits in economic growth, poverty reduction, environmental sustainability, and overall sustainable development.

African nations, including Nigeria, must enhance basic services such as water supply, sanitation, waste management, transportation infrastructure, and healthcare to meet the needs of their population. Improved service delivery is essential for sustainable growth, development, and poverty reduction, as it enhances living standards and contributes to overall growth and development. These indices can be better funded and operate efficiently and effectively through PPP arrangements.

However, Kruegor (1990) opined that public sector provision of these services has often been inadequate and unsustainable due to various factors inherent in the public sector. Historically characterized by inefficiency and ineffectiveness, the public sector has struggled with poor performance, attributed to factors such as political interference, unclear objectives, limited operational autonomy, inadequate managerial skills, lack of accountability and transparency, bureaucratic red tape, low worker morale, inappropriate economic conditions, insufficient capital, and a lack of appreciation of market dynamics.

Consequently, the public sector has been unable to effectively, efficiently, and sustainably produce, deliver, and improve the quantity and quality of goods and services (Krueger, 1990). It is in addressing these shortcomings that PPPs have emerged.

Ismail et al. (2013) identified several justifications for adopting PPPs, including reducing costs for the government, improving public facilities and services, and encouraging innovation by the private sector. PPPs aim to harness the skills, expertise, and experience of both the public and private sectors to deliver standards of service to citizens, while PPPs do not absolve the government of responsibility and accountability. They redefine the government's role as a facilitator and enabler while the private sector assumes the role of providing services or facilities. PPPs involve a shared allocation of resources, risks, and rewards based on predetermined agreements formalized through contracts.

In other words, PPPs do not diminish the government's responsibility and accountability; rather, they continue to represent public infrastructure projects dedicated to fulfilling citizens' critical service needs. The government remains responsible for ensuring service quality, price stability, and cost effectiveness (value for money) within the partnership. Throughout the project's life cycle, the government maintains active involvement. In the PPP model, the government role is redefined as that of a facilitator and assumes the roles of financier, builder, and operator of the service or facility.

PPPs aim to leverage the skills, expertise, and experience of both the public and private sectors to provide a higher standard of services to customers or citizens. The public sector contributes stable governance, citizen support, and financing and assumes social, environmental, and political risks. Meanwhile, the private sector brings operational efficiencies, innovative technologies, managerial effectiveness, access to additional finances, and shares construction and commercial risks (Heald & Gwaughan, 1992).

It's essential to distinguish PPPs from privatization. PPPs involve long-term contracts between private operators and public authorities, while privatization entails selling public services or facilities to the private sector. PPPs offer opportunities for private sector innovation in design, construction, service delivery, and asset utilization to succeed. PPPs require clearly defined objectives, revenue-generating mechanisms, private sector capacity, and sufficient revenue in the private sector to successfully deliver project objectives.

TYPES OF PPP

Various types of public-private partnerships (PPPs) can be implemented to foster economic growth and development in Nigeria (Anjance, 2021). These include:

a) Build-Operate-Transfer (BOT): Under this model, exemplified by toll road construction projects, a private company constructs the road, collects toll revenue for a specified period, and then transfers ownership to the government.

b) Build-Own-Operate (BOO): Similar to BOT, the private entity retains ownership of the facility.

c) Build-Own-Operate-Transfer (BOOT): The private firm retains possession of the facility after construction to recover costs and earn profits, then transfers ownership to the private sector.

d) Build-Lease-Operate-Transfer (BLOT): The private company leases public property to develop a facility, operates it to recoup costs and generate revenue, and returns the property to the government after the lease expires.

e) Design-Build (DB): In this fundamental (PPP) model, the private company designs and constructs the facility according to government requirements, assuming fixed charges.

f) Design-Build-Finance (DBF): The private sector firm designs, builds, and finances the projects.

g) Design-Build-Finance-Operate (DBFO): The private company plans, constructs, finances, and operates the facility for a specified period, generating revenue to cover costs and yield profit.

h) Design-Build-Finance-Maintain (DBFM): Also known as a management contract, this model involves the public sector entity overseeing the project from inception to maintenance, with the private firm either charging a fixed fee or sharing profit.

i) Design-Build-Finance-Maintain-Operate (DBFMP): An extended version of DBFO, where the private firm also handles long-term maintenance.

j) Design-Construct-Maintain-Finance (DCMF): The private entity designs, develops, maintains, and invests in a facility leased to the government.

k) Operation and Maintenance (O & M): This model involves private companies being subcontracted to manage and maintain facilities.

2.1.1 Theoretical Framework

Institutional Theory and Sustainability

This article employs institutional theory as its primary theoretical lens, supplemented by the capability approach to address specific aspects of sustainable growth and development. Institutional theory provides valuable analytical tools for understanding how formal and informal rules, norms, and cultural-cognitive frameworks shape organizational behaviors and policy outcomes (Arimono, 2019). Within the context of PPPs in Nigeria, institutional theory helps explain how regulatory frameworks, procurement processes, contract structures, and governance arrangements influence sustainability outcomes.

This article draws particularly on the concept of institutional complementarity (Hall & Soskice, 2001), which posits that the effectiveness of institutional arrangements depends on their compatibility with other elements of the institutional environments. This concept helps explain why PPP frameworks that succeed in one context may fail in another and why comprehensive institutional reforms, rather than isolated policy changes, are often necessary to enhance PPP sustainability.

North's (1990) distinction between formal and informal institutions provides another valuable analytical dimension. Formal institutions include laws, regulations, and official procedures governing PPPs, while informal institutions encompass unwritten norms, practices, and shared expectations among stakeholders.

This article pays attention to the interaction between these institutional forms, recognizing that formal PPP frameworks may be undermined or enhanced by informal institutional practices (Helmke & Levitsky, 2004). This article also incorporates insights from recent institutional scholarship on institutional work for the purposive actions of sectors aimed at creating, maintaining, or disrupting institutions (Lawrence et al. 2019). This perspective highlights the agency of various stakeholders, such as government officials, private investors, civil society organizations, and international agencies, in shaping PPP institutions towards sustainable configurations. It can be said that sustainable PPPs are backed by strong and efficient institutions.

The Capability Approach and Sustainable Growth/Development:

While institutional theory provides tools for analyzing the structural dimensions of PPPs, this article complements this with Sen's (1999) capability approach to address the normative dimensions of sustainable development. The capability approach conceptualizes development as the expansion of sustainable freedom that people have reason to value, rather than merely increasing income or economic growth. This perspective aligns with the contemporary understanding of sustainable development that emphasizes human well-being, environmental sustainability, and social equity alongside economic considerations.

Applied to PPPs, the capability approach diverts attention to how instructional projects attest to the capability and functioning of local communities, particularly marginalized groups. It provides a framework for evaluating whether PPP enhances capabilities related to health, education, mobility, economic opportunity, and environmental quality. Additionally, it encourages considerations of procedural freedoms, that is, the ability of affected communities to participate meaningfully in decisions about infrastructural development.

2.1.2 Empirical Review

Since 2010, scholarly attention has increasingly shifted towards the developmental impacts of PPPs, interrogating their contributions to poverty reduction, social inclusion, and environmental sustainability (Fombad 2015; Oscikyei and Chan 2017; Arinowo 2018). This shift is a reflection of a broader criticism of neoliberal development approaches and the growing recognition of the complex interdependencies between infrastructure, environment, and social well-being (Miraltab, 2004). Recent studies

have further expanded to executive. The governance dimension of PPPs, highlighting how institutional arrangements, regulatory frameworks, and stakeholder dynamics shape project outcomes (Ameyaw and Chan, 2015; Arimoro, 2019). Empirical evidence regarding PPP performance in developing outcomes is a picture of mixed results. Several studies document cases of where PPPs have successfully delivered infrastructural services, particularly in the energy, telecommunications, and transportation sectors (Foster & Bricceno-Garmendia, 2010; Yescombe, 2017). A good example is that of Lihana's Port Expansion; PPPs have enhanced trade capacity and introduced more efficient logistics systems (Centre for International Maritime Affairs, Ghana, 2024).

However, a substantive body of research also identifies persistent challenges and limitations (World Bank, 2023). Several PPP projects have been found to experience significant delay, cost overruns, or failure to meet service delivery targets (Daoud et al., 2023). These outcomes have been attributed to various factors, including regulatory frameworks, limited technical capacity, and governance failures or lack of political will (Osei-Kyei & Chan, 2017).

Finally, a review by Chou and Pramudawardham (2015) of 27 PPP projects across four developing economies found that only 18% incorporated substantive environmental targets beyond minimal compliance requirements. The recent research points to emerging good practices, particularly in road infrastructure PPP, where quality and proper monitoring are increasingly integrated into project designs and monitoring frameworks (Alova, 2020)

3.0 Methodology

The design adopted in this study is an ex post facto (after the fact) design. The choice of this design is made because the researcher has no control of the independent variables, and inferences about the relationship among the variables are made without the current interaction between the regressed and the regressors (Ndiyo, 2005). This study used information and data from secondary sources, and therefore time series data sourced from various publications of the Central Bank of Nigeria Statistical Bulletin and World Development Indicators (WDI) were used. The study's models were estimated using data on public-private partnerships, including PPP investment rate (PPPINV), private capital in infrastructure (PCINFRAST), and gross capital formation (GCF). Control variables were trade openness (TOP), inflation rate (INFL), and interest rate (INTR), while economic growth, the dependent variable, was represented by real gross domestic product (RGDP) for Nigeria from 1981 to 2024. A multiple regression analysis was used, predicated on various data diagnostics, including Augmented Dickey-Fuller (ADF) and Philip-Peron (PP) unit root tests, as well as the autoregressive distributed lag

technique (ARDL), employed in this study to determine the relationship between macroeconomic instability and economic development within the specified time frame.

3.1 Model Specification:

The model for this study is as specified as follows:

3.1.1 Public Private Partnership and Economic Growth equation:

The functional form of the model for public private partnerships and economic growth equation for this study is given as:

RGDP=F (PPPINV, PCINFRAST, GCF, TOP, INTR, INFL) ……(1)

The econometric form of the model is given as:

$RGDPt = a_0 + a_1PPPINV_t + a_2PCINFRASTt + a_3GCF_t + a_4TOP_t + a_5INTRt + a_6INFL_t + U_t$ ……..… (2)

Linearizing it we will have:

$logRGDP_t = a_0 + a_1logPPPINV_t + a_2logPCINFRASTt + a_3logGCF_t + a_4logTOP_t + a_5logINTR_t + a_6logINFLt + Ut$ ……..... (3)

RGDPt – Real Gross Domestic Product in time t
PPPINVt – Public Private Partnership investment rate in time t
PCINFRASTt – Private Capital in Infrastructure in time t
GCFt – Gross Capital Formation in time t
TOPt – Trade Openness in time t
INTRt –Interest rate in time t
INFLt – Inflation Rate in time t
Ut – Error term
A priori Expectation shows that $a_1(+)$, $a_2(+)$, $a_3(+)$, $a_4(+)$, $a_5(-)$ and a_6 (-).

Table 1: Data Description and Sources

S/N	Variables	Description of Data	Expected Source
1	RGDP	It is a proxy for sustainable development and is used as a dependent variable in the model.	WDI (2024)
2	PPPINV	This is the nominal or real annual investment of public private partnership accruing to the economy. It is used as an explanatory variable in the model.	WDI (2024)
3	PCINFRAST	This is the rate of private capital set aside for infrastructural development. It serves as an independent variable.	CBN Statistical Bulletin (2024)

4	GCF	Gross capital formation refers to the total value of new additions to fixed assets (like building, machinery, equipment, and infrastructure) and changes in inventories (stocks of goods) in an economy during a period, usually a year. It serve as an independent variable	WDI (2024)
5	TOP	Trade Openness is the rate of import plus export divided by the GDP. It will serve as a control variable and an independent variable in the model.	CBN Statistical Bulletin (2024)
6	INTR	Interest rate is the rate or MPR rate of the CBN charged on income or investment. It serves as explanatory variables in the model.	CBN Statistical Bulletin (2023)
7	INFL	This is the persistent rise in the general price level. It is an increase in a consumer price index over time. It serves as a control and an independent variable in the model.	CBN Statistical Bulletin (2024)

4.0 DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Descriptive statistics and matrix of correlations

Table 2: Descriptive Statistics

	RGDP	PPPINV	PCINFRAST	GCF	INFL	INTR	TOP
Mean	5.537273	1.535909	79.95864	-0.350438	19.39432	18.20720	0.331818
Median	3.825000	1.130000	84.28500	1.539832	12.90000	17.24625	0.335000
Maximum	85.05000	5.790000	88.68000	40.74386	72.80000	46.08000	1.190000
Minimum	-13.00000	0.260000	41.55000	-30.18459	5.400000	8.916667	0.070000
Std. Dev.	13.09847	1.192762	11.66779	12.85740	16.65383	6.489129	0.187211
Skewness	5.159108	1.756956	-2.095609	0.142197	1.728820	1.836335	2.202593
Kurtosis	32.43923	6.264393	6.272514	4.360351	4.881464	9.168216	11.29813
Jarque-Bera	1784.079	42.17370	51.83872	3.540960	28.40783	94.48155	161.8186
Probability	0.000000	0.000000	0.000000	0.170251	0.000001	0.000000	0.000000
Sum	243.6400	67.58000	3518.180	-15.41929	853.3500	801.1170	14.60000
Sum Sq. Dev.	7377.511	61.17526	5853.901	7108.447	11926.05	1810.678	1.507055
Observations	**44**	**44**	**44**	**44**	**44**	**44**	**44**

The descriptive statistics of the variables are presented in Table 2 above. This table highlights key trends in Nigeria's public-private partnership and economic growth indicators during the review period. The data reveal a high level of private capital in infrastructure (PCINFRAST), inflation rate (INFL), and interest rate (INTR). For private capital in infrastructure (PCINFRAST), the mean, median, and maximum values are 79.95864, 84.28500, and 88.68000, respectively. For inflation rate (INFL), values are 19.39432 (mean), 12.90000 (median), and 72.80000 (maximum). For interest rate (INTR), the mean, median, and maximum values are 18.20720, 17.24625, and 46.08000, respectively.

In contrast, Real Gross Domestic Product (RGDP), Public Private Partnership Investment (PPPINV), Gross Capital Formation (GCF), and Trade Openness (TOP) made relatively low contributions to economic growth in Nigeria, with statistics of 5.537273 (mean), 3.825000 (median), and 85.05000 (maximum) for Real Gross Domestic Product. Public-private partnership investment (PPPINV) has a mean of 1.535909, a median of 1.130000, and a maximum of 5.790000. For gross capital formation (GCF), the statistics are -0.350438 (mean), 1.539832 (median), and 40.74386 (maximum). For trade openness (TOP), the statistics are 0.331818 (mean), 0.335000 (median), and 1.190000 (maximum), respectively.

The response of Real Gross Domestic Product (RGDP), Inflation Rate (INFL), and Interest Rate (INTR) to public-private partnership and economic growth has been volatile, showing fluctuations during the period. Real Gross Domestic Product (RGDP) statistics include a mean of 5.537273, a median of 3.825000, and a maximum of 85.05000 with a standard deviation of 13.09847. Inflation rate (INFL) statistics reveal a mean of 19.39432, a median of 12.90000, a maximum of 72.80000, and a standard deviation of 16.65383. Interest rate statistics include a mean of 18.20720, a median of 17.24625, a maximum of 46.08000, and a standard deviation of 6.489129, respectively.

Skewness and Kurtosis Analysis:

The skewness results indicate only one variable is positively skewed, suggesting right-tailed distributions. The kurtosis result shows that all the variables are leptokurtic (kurtosis > 3), indicating peaked distributions.

Normality and Variability:

The Jarque-Bera test confirms that all variables are normally distributed over the analysis period. The standard deviation values highlight the extent of variation in the data, with most variables showing significant deviations from their true values. With the exception of gross capital formation (GCF), which has relatively small deviations of 3.540960.

Table 3: Correlation Matrix

	RGDP	PPPINV	PCINFRAST	GCF	INFL	INTR	TOP
RGDP	1						
PPPINV	-0.18	1					
PCINFRAST	-0.89	0.18	1				
GCF	-0.30	-0.42	0.16	1			
INFL	-0.32	0.45	0.27	-0.42	1		
INTR	-0.08	0.45	-0.07	-0.16	0.78	1	
TOP	-0.34	0.45	0.24	-0.11	0.70	0.72	1

The correlation matrix of the variables is as shown in Table 3 above. The correlation matrix is a statistical tool that measures the relationship between multiple variables. It provides a table of correlation coefficients, which describe the strength and direction of the linear relationships between each pair of variables. From the table above, therefore, RGDP has no positive correlation coefficient with any of the variables. This therefore indicates that the variables tend to move in the same direction. Meanwhile, RGDP has a negative correlation with PPPINV, PCINFRAST, GCF, INFL, INTR, and TOP, which have a weak negative correlation (-0.18, -0.89, -0.30, -0.32, -0.08, and -0.34), indicating that as RGDP increases, PPPINV, PCINFRAST, GCF, INFL, INTR, and TOP tend to decrease. Also, from the table, there exist positive correlation coefficients between PPPINV and PCINFRAST, INFL, INTR, and TOP; PCINFRAST and GCF, INFL, and TOP; INFL and INTR and TOP; as well as INTR and TOP, etc., while there is a weak negative correlation between PPPINV and GCF; PCINFRAST and INTR; and GCF and INFL, INTR, and TOP.

4.2 Unit Root Test

The Augmented Dickey-Fuller and the Philip-Perron unit root tests were conducted to examine the stationarity condition of the variables. As indicated in Table 4 below, RGDP, GCF, PCINFRAST, and PPPINV are stationary at level in ADF and PP, while INTR, INFL, and TOP were stationary after first differencing in both ADF and PP. In other words, the variables are integrated of order zero and one (i.e., I(0) and I(I)).

Where some of the variables are I (0) while others are I (1), one suggests the problem of unit root in the equations. It becomes imperative to perform co-integration tests to determine the presence of equilibrium relationships amongst the variables in each equation. The study adopts the ARDL bound testing technique for co-integration, as the variables are integrated of diverse orders (i.e., order zero and order one).

Table 4: ADF and Philip-Perron Unit Root Test Results

	ADF			PP		
Variables	Level	1st Difference	Order of integration	Level	1st Difference	Order of integration
RGDP	-5.869648	-	I(0)	-	-	I(0)
PPPINV	-4.070224	-	I(0)	-	-	I(0)
PCINFA	-3.948124	-	I(0)	-	-	I(0)
ST	-3.069793	-	I(0)	-	-	I(0)
GCF	-2.535807	-6.313508	I(1)	-	-	I(1)
INFLA	-	-	I(1)	-1.214525	-3.052150	I(1)
INTR	0.338619	-4.111230	I(1)	-	-	I(1)
TOP						

Source: Researcher's computation (2025), using E-Views 9.

Note: Mackinnon critical values for ADF at 1, 5 and 10% levels are -3.60, -2.93 and -2.60 respectively, and for PP are 3.605, 2.936 and 2.606, respectively. * means significant at 5% level.

4.3 Lag Length Selection

Table 5: Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-751.3893	NA	69330713	37.91947	38.21502	38.02633
1	-630.4491	193.5044	1973995.	34.32245	36.68688	35.17736
2	-568.6270	77.27765	1309832.	33.68135	38.11466	35.28429
3	-495.6245	65.70224	784986.9	32.48122	38.98341	34.83221
4	-312.2793	100.8398*	5444.187*	25.76396*	34.33503*	28.86299*

* indicates lag order selected by the criterion

Source: Researcher's computation (2025), using E-Views 9.

The efficiency and validity of an error correction model depend on the lag structure. The study used VAR lag order selection criteria to determine the lag lengths. The study employed the Akaike Information Criterion (AIC) and Schwarz Criterion (SC), and the result shows four optimal lag lengths in the inclusive growth index and fiscal deficit models, as shown in Table 5 above. In order to reduce the possibilities of underestimation whilst maximizing the likelihood of recovering the true lag (Venus, 2004), the study used three and four as the maximum lag lengths, respectively.

4.4 Co-integration Test Results

From the bound testing result reported in Table 6 below, long run relationship exists amongst the variables in all the estimated equations, given that the values of the F-statistic are greater than the critical values at the five per cent level in both the upper and the lower bounds. Therefore, the null hypothesis of absence of co-integration is rejected, while the study proceeds to estimate the long run coefficient of each of the equations.

Table 6: Co-Integration Test Results

5% critical value					
Equations	K	F-Stat	I (0)	I (1)	Outcome
RGDP(PPPINV,PCINFRAST,GCF,TOP,INTR, INFL,)	6	3.57	2.45	3.61	Co-integration

Note: K =number of parameters

Source: Researcher's computation (2025), using E-Views 9.

4.5 Findings, Presentation and Analysis of Econometric Results of the Long run coefficients of Public Private Partnership and Economic Growth Equation Results

Table 7: Dependent variable: RGDP

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PPPINV	28.885170	74.355842	0.388472	0.7078
PCINFRAST	1.118097	6.441927	0.173566	0.8665
GCF	6.432895	24.427990	0.263341	0.0089
INFL	-3.257308	8.767718	-0.371512	0.7199
INTR	5.589778	18.120225	0.308483	0.7656
TOP	-337.133104	859.569322	-0.392212	0.7051
C	-86.090283	493.726026	-0.174369	0.8659

Source: Researcher's Computation (2025).

4.5.1 Long-run coefficients of public-private partnerships and economic growth Equation

The long-run relationship between economic growth and the impact of public-private partnership variables is presented in Table 7 above. Based on the ARDL long-run estimates, the findings reveal the following insights:

The coefficient for PPPINV is positive and statistically insignificant, indicating that a unit increase in PPPINV results in a 288.8% increase in RGDP. This finding is in line with a priori expectation in the long run. The result shows that PPPs are growth-friendly in theory, but in practice, their contribution is weakened by poor governance, institutional inefficiencies, and structural challenges.

Similarly, the coefficient for PCINFRAST is positive and statistically insignificant, indicating that a unit rise in PCINFRAST results in an 111.8% increase in RGDP. This result also deviates from a priori expectation, suggesting that while private infrastructure investment is theoretically beneficial, in practice, it has not been large, efficient, or well-regulated enough to make a significant long-term contribution to economic growth in Nigeria.

Also, GCF exhibits a positive and statistically insignificant relationship with RGDP. A one-unit increase in GCF is associated with a 643.2% increase in RGDP. This result is in line with a priori expectations, suggesting that while investment increases tend to support growth in theory, in practice Nigeria's investments are inefficient, poorly diversified, and undermined by macroeconomic and institutional weaknesses, preventing them from making a statistically significant contribution to long-run growth.

The coefficient for INFLA is negative and statistically insignificant, indicating that a one-unit increase in INFLA will result in a -325.7% decrease in RGDP. This result is in line with a priori expectation, suggesting that while moderate inflation may encourage PPP activity and nominal growth, its effect is too weak, inconsistent, and undermined by high costs, volatility, and weak institutions to be a reliable long-run driver of economic growth.

INTR is positive and statistically insignificant, indicating that a one-unit increase in INTR will lead to a 558.9% increase in RGDP. This finding deviates from a priori expectation, implying that while financing PPPs through interest-bearing capital can potentially enhance growth, in practice the impact is weak and unreliable because high financing costs, poor institutional quality, and project inefficiencies reduce the growth payoff.

Finally, the coefficient for TOP is negative and statistically insignificant, showing that a unit rise in TOP will lead to a -337.1% decrease in RGDP. This result deviates from a priori expectation, indicating that while PPP-linked trade liberalization has the potential to stimulate growth, its effect remains weak because of structural dependence on oil, weak PPP efficiency, poor competitiveness, and trade imbalances.

In summary, the long-run analysis highlights the complex interplay between the impact of public-private partnership variables and economic growth. While certain factors like public-private partnership investment (PPPINV), private capital in infrastructure (PCINFRAST), gross capital formation (GCF), and interest rate (INTR) positively influenced economic growth in Nigeria, others like inflation rate (INFL) and trade openness (TOP) posed significant challenges. These findings underscore the need for targeted policy interventions to stabilize inflation, diversify trade, strengthen PPP governance, and direct investment towards productivity, thereby enhancing sectors.

4.6 Findings, Presentation and Analysis of Econometric Results of the Short run coefficients of the impact of public private partnership and economic growth Equation Results

Table 4.8: Dependent variable: RGDP
Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PPPINV)	0.281631	4.513727	0.062394	0.9518
D(PPPINV(-1))	9.825600	3.416818	2.875658	0.0206
D(PPPINV(-2))	1.898982	3.213500	0.590939	0.5709
D(PPPINV(-3))	3.225017	2.430390	1.326955	0.2211
D(PCINFRAST)	-4.347746	1.255237	-3.463686	0.0085
D(PCINFRAST(-1))	0.246122	1.225538	0.200828	0.8458
D(PCINFRAST(-2))	-2.626687	0.848883	-3.094286	0.0148
D(PCINFRAST(-3))	1.925496	1.078537	1.785285	0.1120
D(GCF)	-0.437615	0.275631	-1.587685	0.1510
D(GCF(-1))	0.455366	0.328614	1.385718	0.2032
D(GCF(-2))	-0.066963	0.223340	-0.299826	0.7720
D(GCF(-3))	0.549085	0.306817	1.789619	0.1113
D(INFL)	0.415935	0.519292	0.800966	0.4463
D(INFL(-1))	0.171035	0.245660	0.696228	0.5060
D(INFL(-2))	-0.831944	0.304370	-2.733336	0.0257
D(INFL(-3))	0.688056	0.236884	2.904610	0.0198
D(INTR)	-0.294629	1.223367	-0.240835	0.8157
D(INTR(-1))	2.707526	1.800024	1.504161	0.1710
-	-0.861384	1.127330	-0.764092	0.4667

D(INTR(2))				
D(INTR(-3))	-0.937582	1.296149	-0.723360	0.4901
D(TOP)	-12.39671	24.510097	-0.505780	0.6267
	-107.73480			
D(TOP(-1))	2	39.211114	-2.747558	0.0252
D(TOP(-2))	67.207824	35.257375	1.906206	0.0931
D(TOP(-3))	-71.17398	39.661553	-1.794533	0.1105
CointEq(-1)	0.138315	0.417140	0.331580	0.7487

R-squared	0.946097	Mean dependent var	6.666000
Adjusted R-squared	0.737222	S.D. dependent var	13.13655
S.E. of regression	6.734040	Akaike info criterion	6.642790
Sum squared resid	362.7783	Schwarz criterion	7.993893
Log likelihood	-100.8558	Hannan-Quinn criter.	7.131306
F-statistic	4.529496	Durbin-Watson stat	2.475908
Prob(F-statistic)	0.015503		

Source: Researcher's Computation (2025).

The short-run dynamics of the relationship between the impact of public-private partnership and economic growth equation results, as presented in Table 4.8, reveal several significant findings.

The PPPINV exhibits a positive and significant relationship with RGDP in all the periods. Specifically, a 1% increase in PPPINV leads to 28.1%, 982.5%, 189.8%, and 322.5% increases in RGDP. The result is not in line with a priori expectations, underscoring the adverse effects of improving public-private partnership investment to enhance economic growth in Nigeria.

Conversely, in the current and second period lags of the short run, PCINFRAST exhibits a negative and significant relationship with RGDP but becomes positive and insignificant in the first and third period lags. Therefore, a unit rise in PCINFRAST will lead to -434.7% and -262.6% decreases in RGDP in the current and second period lags and 24.6% and 192.5% increases in the first and third period lags. The result of the current and second periods is in line with a priori expectation, while the result of the first and third periods is not in line with theoretical expectation, suggesting that while private infrastructure investment is theoretically beneficial, in practice, it has not been large,

efficient, or well-regulated enough to make a significant contribution to economic growth in Nigeria.

GCF shows a negative and insignificant relationship with RGDP in current and second-period lags but becomes positive and insignificant in first- and third-period lags of the short run. Specifically, a unit rise in GCF will lead to -43.7% and -6.67% decreases in RGDP and 45.5% and 54.9% increases in RGDP in first- and third-period lags. The result of current and second-period lags deviates from a priori expectation, while the result of the first and third-period lags was in line with a priori expectation, implying that it's the short run.

The coefficient of INFL is positive and statistically insignificant in current, first, and third period lags but becomes negative and statistically significant at the second period lag. Therefore, a unit rise in INFL will lead to 41.5%, 17.1%, and 68.8% increases in RGDP and an -83.1% decrease at the second period lag. The result of the current, first, and third period lags deviates from a priori expectation, while the result of the second period is in line with theoretical expectation.

The coefficient of INTR is negative and insignificant in the current, second, and third period lags and positive but insignificant in the first period lag. Therefore, a unit rise in INTR will lead to -29.4%, -86.1%, and -93.7% decreases in RGDP in the current, second, and third periods and a 270.7% increase in the first period lag. The result of the first-period lag deviates from a priori expectation, while the result of the current, second, and third-period lags is in line with a priori expectation, suggesting that in the short run, PPPs interest-bearing did not contribute to economic growth.

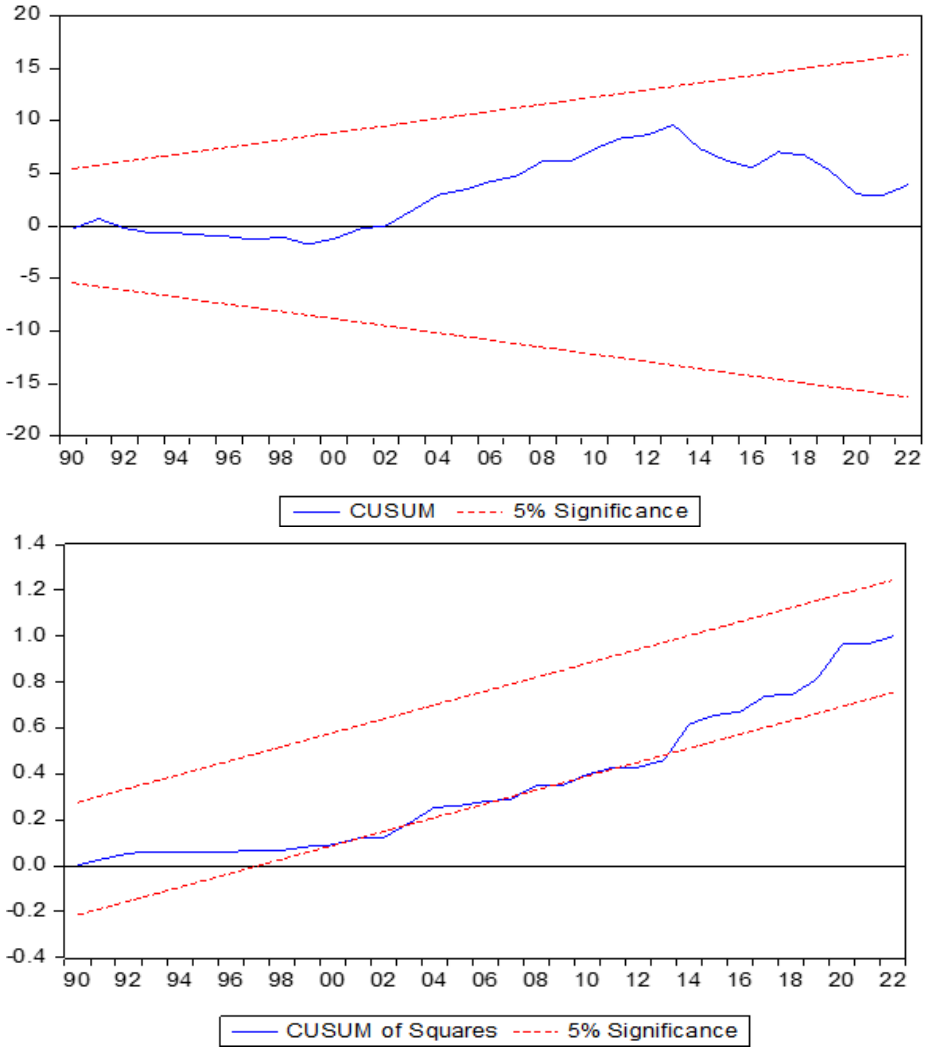
Finally, TOP exhibited a negative and significant relationship with RGDP in current, first, and third period lags but became positive in the second period lag, indicating that a one-unit increase in TOP will lead to -123.9%, -107.7%, and -711.7% decreases in RGDP in current, first, and third periods and 672.0%. The result of the current, first, and third period lags deviates from theoretical expectation, while the result of the second period lag is in line with a priori expectation, showing that in the current, first, and third periods of the short run, trade openness did not contribute to economic growth, while it impacted growth in the second period of the short run in Nigeria.

The ECM coefficient (0.138315) is correctly signed and statistically significant, indicating that approximately 13% of short-run disequilibria adjust to the long-run equilibrium within a year. The t-statistic (0.331580) confirms the significance of the ECM at the 5% level.

The R-squared value (0.946097) and adjusted R-squared (0.737222) demonstrate that approximately 99% of the variation in RGDP is explained by the included variables

(both current and lagged), with 6% attributable to factors outside the model. The F-statistic (4.53) confirms the joint significance of the model's variables, ensuring a good overall fit. Additionally, the Durbin-Watson statistic (2.47) indicates no autocorrelation, affirming the reliability of the results for forecasting and policy formulation.

The stability test using the cumulative sum (CUSUM) test in figure 4.1 below further shows that the variables included in the real gross domestic product equation were stable within the period of the study. This is evidenced by the swing of the trends within the CUSUM bound at the ± five percent significance level. The study, therefore, infers that the equation is stable and consistent enough to be adopted for economic policies and forecasts.



Source: Researcher's Computation (2025)

Figure 4.1: Real Gross Domestic Product and Public Private Partnership equation CUSUM.

5. Discussion of Findings

The short-run and long-run ARDL dynamics show an intriguing insight, as the regression result offers a positive and significant relationship between the four key variables of public-private partnership: public-private partnership (PPPINV), private capital in infrastructure (PCINFRAST), gross capital formation (GCF), and interest rate (INTR), which interacted with the dependent variable RGDP. The results suggest that increases in the underlisted variables, in essence, will lead to corresponding increases in economic growth in Nigeria, which is a major tool of public-private partnership to enhance economic growth in Nigeria.

However, the inflation rate (INFL) and trade openness (TOP) showed negative and insignificant relationships with economic growth in both the long and short run periods under review, reflecting that when these variables increase, economic growth tends to decrease. The negative relationship of inflation rate shows that during the period under review, inflation has an exacerbating and adverse effect on reducing purchasing power parity, thereby worsening the economic growth in Nigeria.

Moreover, the negative and insignificant relationship between trade openness and economic growth shows that PPP-linked trade liberalization has the potential to stimulate growth, but its effect remains weak because of structural dependence on oil, weak PPP efficiency, poor competitiveness, and trade imbalances.

The negative relationships between these two variables underscore the need for targeted policy interventions to address and stabilize inflation, diversify trade, strengthen PPP governance, and direct investment towards productivity-enhancing sectors.

Conclusion and Recommendation

The study investigates the impact of public-private partnerships on economic growth in Nigeria from 1981 to 2024, adopting the autoregressive distributive lag model. The study observed that changes in the ratios of public-private partnership investment, private capital in infrastructure, gross capital formation, and interest rate variables affect economic growth in Nigeria during the period under review. In addition, the study revealed a negative relationship between inflation rate and trade openness, implying that the ratios of these variables impede economic growth in Nigeria. It means that the continuous decline in inflation rate and trade openness will worsen the achievement of sustained economic growth and development in Nigeria, thereby not promoting public-private partnership.

Recommendations

Therefore, we recommend that:

i. The government should put in place policies that stabilize inflation, diversify trade, strengthen PPP governance, and direct investment towards productivity-enhancing sectors.

ii. Government should deliberately scale PPP investments aggressively by combining short-term quick wins (fast-tracking projects, bond issuance, and guarantees) with long-term reforms (legal frameworks, capital market deepening, and fiscal safeguards). This dual strategy will unlock private capital, expand infrastructure, and drive inclusive economic growth.

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APPENDIX
DATA SETS

YEAR	INFL (%)	INTR (%)	GCF (N'M)	PPPINV (%)	PCINFRAST (%)	RGDP (%)	TOP (%)
1981	9.97	8.9	-15.432	0.33	41.55	-13	0.18
1982	20.8	9.5	-18.346	0.3	45.33	0	0.16
1983	7.7	10.0	-20.9021	0.38	50.24	-5	0.12
1984	23.2	10.2	-30.1846	0.26	60.5	-5	0.1
1985	17.8	9.4	-15.2823	0.66	62.3	10	0.1
1986	7.4	10.0	0.244621	0.35	66.75	3	0.1
1987	5.7	14.0	-6.33705	1.16	59.54	85.05	0.07
1988	11.3	16.6	6.528742	0.76	84.88	10	0.19
1989	54.5	20.4	6.785273	4.28	86.14	7	0.16
1990	50.5	25.3	13.89385	1.09	87.78	8	0.21
1991	7.4	20.0	-1.30247	1.45	86.51	5	0.31
1992	13	24.8	0.520135	1.88	84.52	3	0.35
1993	44.6	31.7	7.562118	4.85	86.33	2	0.38
1994	57.2	20.5	-2.45384	5.79	88.61	0	0.31
1995	57	20.2	-6.57762	0.76	88.03	2	0.21
1996	72.8	19.8	6.832184	0.98	87.11	4	0.59
1997	29.3	17.8	5.877423	0.86	85.56	3	0.5
1998	8.5	18.2	1.425329	0.55	87.15	2	0.51
1999	10	20.3	2.703579	1.69	87.15	1	0.35
2000	6.6	21.3	7.303042	1.64	86.21	5	0.39
2001	6.9	23.4	-22.7928	1.61	84.67	3	0.42
2002	18.9	24.8	10.30784	1.96	84.6	2	0.4
2003	12.9	20.7	21.51552	1.91	82.95	10	0.29
2004	14	19.2	-19.1828	1.37	84.05	11	0.39
2005	15	17.9	3.252904	2.83	84.01	5	0.38
2006	17.9	16.9	40.74386	2.06	85.93	6	0.45
2007	8.2	16.9	-21.5497	2.19	87.28	6.5	0.36
2008	5.4	15.1	-2.12357	2.43	86.25	6	0.37
2009	11.6	19.0	9.564519	2.93	88.68	7	0.41
2010	11.5	17.6	3.978189	1.67	86.46	8	0.32
2011	13.7	16.0	-7.91501	2.18	84.63	7.4	0.37
2012	10.8	16.8	3.359867	1.55	84.57	6.6	0.42
2013	12.2	16.7	7.816524	1.09	82.19	5.4	0.35

2014	8.5	16.5	12.98638	0.86	80.64	6.3	0.31
2015	8.1	16.8	-1.5344	0.63	82.18	2.7	0.26
2016	9	16.9	-4.66855	1.1	82.02	-1.51	0.21
2017	15.7	17.6	-1.82955	0.93	82.32	0.8	0.18
2018	16.5	16.9	9.384233	0.5	81.64	0	0.22
2019	12.1	15.4	6.320929	0.74	80.81	2.21	0.31
2020	13.1	13.6	-13.8981	0.85	82.51	-1.79	0.35
2021	12.6	11.5	4.391968	0.8	81.66	3.65	0.33
2022	12.9	13.6	-0.3611	0.83	82.09	3	0.34
2023	25.65	26.2	1.654335	1.65	81.87	6.33	0.68
2024	44.93	46.1	2.300953	2.89	81.98	11	1.19

SOURCE: WDI 2024