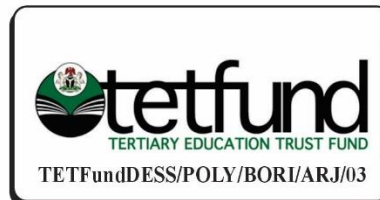


MACROECONOMIC DETERMINANTS OF SUSTAINABLE ECONOMIC GROWTH IN NIGERIA: ARDL-BASED EVIDENCE



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Abstract - *This study was conducted to identify the macroeconomic aggregates that can foster and sustain economic growth in Nigeria. It examined the extent of the effects of foreign, public, and domestic private investments, credit to private sector, as well as other macroeconomic aggregates on real gross domestic product (GDP) growth in Nigeria, using the Auto Regressive Distributed Lag (ARDL) model. The data were obtained from the Central Bank of Nigeria (CBN) and World Bank Databases from 1986 to 2022. The results revealed that credit to private sector, domestic private investment, population growth, inflation and exchange rates strongly impact on real GDP growth in Nigeria; inferring that credit to private sector, foreign direct investments, public investment in infrastructure and trade openness contribute positively to real economic growth in Nigeria; while domestic private investments, population growth, inflation and exchange rates retard economic growth. Consequently, the government should encourage policies that stimulate more credit allocation and foreign investments, increase its spending on economic infrastructure; as well as introduce inflation and exchange rate reduction policies to boost and sustain real economic growth in the country.*

Keywords: *Macroeconomic Aggregates, Sustainable Economic Growth, Nigeria, ARDL*

1. Introduction

Enhancing and sustaining economic growth and development remain one of the most strategic macroeconomic objectives for most countries across the globe, including Nigeria. Economic growth, which refers to an economy's capacity to increase its productive capacity (optimized production of goods and services), is critical to enhancing the capacity of the private sector in stimulating industrialization as well as improves the overall standard of living of the people (Palmer, 2012), while enabling a country to provide desired public goods. Countries with higher levels of economic growth and development are bound to enjoy stable economic environment, higher income, lower incidence of unemployment and poverty, as well as a plethora of other economic and social benefits. It is against this background that government policy thrusts have often focused on accelerating the pace of growth and development.

The Nigerian government, over the years, has introduced a lot of policies to enhance the level of economic growth in the country. A key thrust of some of these policies has been to increase real investments. Whether domestic or foreign, private or public, real investment – a component of aggregate demand (Iyoha, 2004) – increases the productive capacity of the economy, creates employment, and expands production beyond national consumption. It is therefore a prerequisite for attaining inclusive and sustainable economic growth and development (Lucky & Uzah, 2017; Jongwanich & Kohpaiboon, 2008). Furthermore, the monetary and fiscal policies, over the last few decades, have also focused on achieving a more stable macroeconomic environment that can support the realization of the country's macroeconomic objectives.

Following the collapse of the global oil market in the early 1980s, the economy was completely deregulated by the end of the last quarter of 1986. A few years later, reforms were introduced in the Nigerian securities market to deregulate securities pricing by the Nigerian Securities and Exchange Commission (SEC) in 1993, and shortly afterwards, the Exchange Control Act of 1962 was abolished in 1995 (Onoh, 2002). The reorganization and reform in the stock market was to bring it to international standard, which was also translated to the banking sector through the banking sector consolidation and recapitalization reforms in 2005. These policies are expected to have a positive impact on the growth of the economic growth (Olotu & Jegbefume, 2011). However, despite the various macroeconomic, monetary and institutional reforms in the Nigerian Financial System, the economy is yet to be realigned on the path of sustainable economic growth and development.

In the last few decades, the country has continued to experience consistent decline in foreign earnings – due to uncertainties in the global oil market, persistent increase in domestic prices of goods and services and exchange rates, increasing unemployment level, high incidence of insecurity and a host of others; resulting in mixed reactions from both local and foreign players. There is therefore an urgent need for proactive steps to be taken to address this quagmire; especially by providing empirical evidence that would steer policy thrust.

While several empirical attempts have been made in a bid to identify critical growth-stimulating factors in Nigeria, such as Ismaila and Imoughele (2015), Udeaja and Obi (2015), Ajide (2014) and Ndambendia (2010), among others; there is need for more recent empirical studies in this regard, especially considering the spate of economic misfortune that has befallen the country since the United States of America's (USA) exit as the major purchaser of Nigeria's crude oil. Thus, the present study employs a more robust statistical technique (the ARDL model) and a more-inclusive model in an attempt to identify the major stimulants to sustainable economic growth in the country. The specific objectives of the study are to ascertain the extent to which credit to private sector, foreign private investments, domestic private investments, public investments, population growth, trade openness, inflation and exchange rates affect real GDP growth in Nigeria over the past three to four decades.

2. Literature Review

2.1 Conceptual Literature

In the growth literature, macroeconomic aggregates such as capital, labour, investment, trade (exports and imports), interest rate, exchange rate, and inflation rate, etc. have been identified to influence economic growth; one way or the other. Investment is critical in stimulating long term economic growth by increasing output through capital formation (Jongwanich & Kohpaiboon, 2008; De Long & Summers, 1993), which could be private or public. Private investments comprise of foreign and domestic real and portfolio investments that influence the aggregate output of a country (Sohail et al., 2014), while public investments are those carried out by the government to support the private sector, especially through expenditure on infrastructure.

Inflation connotes the persistent increase in prices of goods and services in an economy (Nyoni & Bonga, 2018; Fatukasi, 2012). Generally, inflation impacts economic growth negatively but theoretical evidence has shown that inflation can also enhance growth. Thus, for most countries as well as for Nigeria, ensuring stable prices remains a core objective of monetary policy. To this end, Keynesian theorists argue that demand-pull inflation is triggered by increased

demand for goods and services. On the other hand, the monetarists view inflation as a natural outcome of heightened expansion in the quantity of money rather than in growing output. Several studies that investigated the effect of inflation on the Nigerian economy affirm a negative effect (Uwakaeme, 2015; Agwu, 2014; Babatunde & Shuaibu, 2011; Chimobi, 2010), but others, such as Olu and Idih (2015) and Umaru and Zubairu (2012), establish a positive effect of inflation.

Other macroeconomic aggregates that are essential for economic growth include interest rate, money supply, exchange rate, and financial sector development. In the same vein, national savings and national debt are also held to determine the growth of the economy. Furthermore, increasing money supply (expansionary monetary policy) can increase investment-targeted borrowings, which can alter output in an economy. The classical economists believe that investment equals savings, which implies that an economy that encourages savings can achieve its macroeconomic growth objective.

Furthermore, exchange rate equilibrates the external sector of the economy, determining foreign investment flows and trade. However, both institutional and policy factors shape exchange rate policies in emerging economies such as Nigeria, which can also affect the rate of growth. A critical challenge has been policy mismatch and inconsistency. For instance, there have been over 10 different exchange rate regimes in less than a decade, some of which have been reintroduced after a few years of being abolished.

2.2 Theoretical Review

The underlying theories of the present study are basically the Neoclassical and Endogenous Growth Models. The Solow (1956) and Swan (1956) models, which mirror the Neoclassical model draws on the Cobb-Douglas aggregate production function as well as a capital accumulation equation. Although technological progress is not factored into these models, they emphasize that the population growth rate and the investment rate are the main determinants of per capita income level. They assume economic growth to be temporal; only until per capita income reaches its steady state level – Solow's (1957) model included technology, which was exogenous. Thus, the focal point of the neoclassical growth model is that economic growth, which is measured by the per capita output level is determined by the level of technology, rate of investment, and the growth rate of the population while technological changes, on the other hand, accounts o the sustained rate of growth in per capita output overtime. Furthermore, policy changes, and other temporary shocks, can only affect growth temporarily up to the point where a new steady state level is reached.

By implication, Solow's model establishes that the rates of growth of population, investment and technology overtime, are responsible for the variations in per capita output across countries (Jones 1998, Romer 1996). More so, the initial stock of capital is far below the steady state rate of accumulation until a new steady state is restored. That is, the rate output growth is faster but at a lower rate as it approaches steady state level, which is the level where growth ceases. Consequently, countries with poorer economies (with lower levels of stock of capital and output) may tend to meet up with initially richer countries. Thus, the model predicts a faster rate of economic growth for poorer economies than their rich counterparts (Barro, 1997). However, a major criticism leveled against the neoclassical growth model is that it lacked empirical evidence in predicting the convergence of the output level of economies with similar technological endowments at a given steady state. More so, the model could not also identify the mechanisms through which government policies can have potential influence on the growth process.

Due to some inconsistencies in the neoclassical model, the endogenous growth theory was developed. Unlike the former, it shies away from the assumption of exogenous advance in technology, and rather proposes that steady-state growth arises endogenously through a number of channels. In lieu of the diminishing returns to capital put forward by the Solow and Swan models, it thrives on two broad building blocks. First, it views all production inputs as forms of capital that are reproducible, inclusive of physical and human capital (Lucas 1988) or the state of knowledge (Romer 1986). Second, growth is endogenously generated, with spillover effects or externalities included in the growth process. Consequently, many crucial factors in the attainment of sustainable economic growth are captured in the present study.

These models identify critical elements that influence aggregate output (economic growth), thus providing the basis for the research model. Incidentally, most of these variables have been identified to influence economic growth in Nigeria, though selectively. The above theories justify the variables modelled in this study, which provide more comprehensiveness than in most other studies in Nigeria.

2.3 Empirical Review

A handful of empirical studies have been conducted to ascertain the influence of macroeconomic aggregates on economic growth. Oladipo et al. (2024) employed the Autoregressive Distributed Lag (ARDL) model to test the link between macroeconomic variables and economic growth. The study estimated the effects of exchange, inflation, and interest rates (independent variables) on GDP growth

(dependent variable), using 87 quarterly observations obtained from the Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS) statistical bulletins from 2000 to 2022. The results revealed that the variables were cointegrated and that exchange rate has the most significant detrimental effect on economic growth in both the long and short runs.

Apkelu (2022) studied the effect of macroeconomic aggregates on Nigeria's economic growth for the 1981-2020 period using data obtained from the CBN and NBS. Applying the ARDL estimation, the results showed evidence of cointegration with government expenditure, government revenue, unemployment rate and inflation rates were statistically significant in the long run. A similar study conducted in Indonesia by Fitriady et al. (2022) revealed that FDI and HDI significantly affect economic growth. Wulandari et al. (2020) also found that investment had a statistically positive influence on economic growth in Indonesia.

Nyoni and Bonga (2018) examined the determinants of economic growth in Nigeria by employing a systematic review of some empirical studies conducted in Nigeria between 2010 and 2017. The results obtained revealed that population growth, inflation rate, interest rate, FDI, exports as well as private & public investments are the major determinants of economic growth in Nigeria. They recommended that the government should consider the above factors in policy formulation. Akinkunmi (2017) investigated Nigeria's growth patterns since its independence in 1960 up to 2015. He examined the effects of investment, employment, trade openness, political stability and political freedom on GDP growth in Nigeria. The result of the ARDL model indicated that investment level strongly impacted growth whereas political stability and political freedom had negative but insignificant impacts on GDP growth. Thus, they recommended that government policy should be driven with a careful consideration of these macroeconomic aggregates.

Ismaila and Imoughele (2015) also conducted an empirical investigation to ascertain the macroeconomic factors that determine economic growth in Nigeria between 1986 and 2012. The study utilized time series data sourced from the CBN, which were analyzed using cointegration and OLS techniques. We used time series data obtained from CBN for a period of 26 years that is 1986 to 2012. The results revealed that gross fixed capital formation, FDI and government expenditure account for the magnitude of economic growth in Nigeria. The study recommended government's consistent investment in infrastructure while tighter monetary and fiscal policies should be employed to enhance economic growth.

Udejaja and Obi (2015) examined the factors that necessitate economic growth in Nigeria. The study utilized time series data from 1970 to 2009, which were analyzed through the instrumentality of cointegration and VECM techniques. The results showed evidence of long run relationship between macroeconomic aggregates and real GDP per capita. More so, FDI and health expenditure have positive influences on real GDP per capita while domestic savings, financial depth, education expenditure and trade openness were negative. However, only domestic savings and the three-period as well as the one and three-period lags of education and health expenditures, respectively, are significant. They therefore advocated for FDI and domestic credit-stimulating policies in order to enhance economic growth in Nigeria.

Nwoye et al. (2015) investigated the impact of Nigeria's macroeconomic environment on economic growth. It specifically examined the extent to which exchange, inflation and monetary policy rates affect GDP growth rate in Nigeria from 1999 to 2013. Employing the ordinary least square regression technique, they found a negative effect of monetary policy rate while exchange and inflation rates positively influenced GDP growth but only monetary policy rate was found to be significant. They recommended that the MPR should be more flexible in order to stimulate economic growth.

Ajide (2014) investigated the extent to which FDI, economic freedom and other macroeconomic indices influence real GDP in Nigeria, using annual time series data from 1980 to 2010. Employing multivariate regression technique, he found that labour, life expectancy, economic openness and economic freedom were crucial to Nigeria's economic growth. Disaggregated components of economic freedom also revealed that size of government and freedom to trade internationally had negative and positive effects on growth. The study recommended strengthening of the components of economic freedom by reducing government interventions while increasing government expenditures on health and education, which are capable of enhancing life expectancy.

Kolawole (2013) carried out an empirical investigation of the effects of macroeconomic stability indices, such as exchange rate, interest rate and inflation rate, on real GDP growth in Nigeria from 1980 to 2011; using the ECM and Granger causality estimation techniques. It was found that real interest rate has significant positive effect on real GDP growth whereas the effects of external debt and real exchange rate were negative.

Aurangzehl (2012) investigated how investment impacts Pakistani economic growth using data that spanned the period from 1981 to 2010. They analyzed the extent to which public investment, private, and foreign investments affect gross

domestic product through the instrumentality of the multiple regression technique. The results showed that investments had a significant and positive impact on the level of economic growth. Furthermore, bi-directional causality was also found to exist between gross domestic product and both foreign and public investments.

3. Methodology

The study utilized the quasi-experimental research design, which matches empirical evidence with theoretical postulation (a priori criterion) using available historical data. The data employed were gathered from the databases of the Central Bank of Nigeria (CBN) and the World Bank, as well as from internet sources, and covers the period from 1986 to 2023. The model adopted for the study, following theoretical and empirical postulations, is specified mathematically and econometrically as:

$$RGDP = f(CPS, FDI, DPI, GCE, POPL, OPN, INF, EXR)$$

(1)

$$RGDP = \beta_0 + \beta_1 CPS_t + \beta_2 FDI_t + \beta_3 DPI_t + \beta_4 GCE_t + \beta_5 POPL_t + \beta_6 OPN_t + \beta_7 INF_t + \beta_8 EXR_t + \varepsilon_t \quad (2)$$

A priori: $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 > 0 > \beta_7, \beta_8$

Where RGDP = Real Gross Domestic Product, CPS = Credit to Private Sector, FDI = Foreign Direct Investment, DPI = Domestic Private Investment, GCE = Government Capital Expenditure, POPL = Population Growth Rate, OPN = Openness of the economy, INF = Inflation Rate, EXR = Exchange Rate, β_0 = Regression Intercept, β_1 - β_8 = Coefficient of the estimators, ε = Error term, and t = time period. The method employed for analyzing the data was the Auto Redistributed Lag Model (ARDL), given that the variables were found to be stationary at mixed orders of integration.

Table 1: Measures of Variables and A priori Expectations

Variable	Definition	Type	Measurement	A priori
RGDP	Real GDP Growth	Dependent	$\frac{RGDP_t - RGDP_{t-1}}{RGDP_{t-1}} \times 100$	
CPS	Credit to Private Sector	Independent	$\frac{\text{Credit to Private Sector}}{\text{GDP}} \times 100$	+
FDI	Foreign Direct Investment	Independent	$\frac{\text{Foreign Direct Investment}}{\text{GDP}}$	+
DPI	Domestic Investment	Independent	$\frac{\text{Gross Fixed Capital Formation}}{\text{GDP}}$	+

GCE	Government Capital Expenditure	Independent	$\frac{\text{Total Capital Expenditure}}{\text{GDP}}$	+
POPL	Population Growth	Independent	$\frac{\text{POPL}_t - \text{POPL}_{t-1}}{\text{POPL}_{t-1}} \times 100$	+
OPN	Trade Openness	Independent	$\frac{\text{Exports} + \text{Imports}}{\text{GDP}} \times 100$	+
INF	Inflation Rate	Independent	$\frac{\text{INF}_t - \text{INF}_{t-1}}{\text{INF}_{t-1}} \times 100$	-
EXR	Exchange Rate	Independent	$\frac{\text{EXR}_t - \text{EXR}_{t-1}}{\text{EXR}_{t-1}} \times 100$	-

Source: Author's Compilation (2025)

4. Results and Discussion

The descriptive statistics in Table 2 reveal that RGDP, GCE and POPL are symmetrical. More so, the standard deviations indicate lower variability in the data except RGDP. Furthermore, the variables are less skewed and peaked and are all normally distributed except FDI, GCE and INF. On the other hand, the ADF unit root test in Table 3 also indicates absence of unit roots in all the variables, which are stationary and integrated at their first differences (*I*/1) except RGDP, POPL and OPN, which are integrated at level (*I*/0). In addition, the ARDL Bounds test in Table 3 reveal the existence of a long run dynamic relationship between the macroeconomic aggregates and RGDP.

Table 2: Descriptive Statistics

	RGDP	CPS	FDI	DPI	GCE	POPL	OPN	INF	EXR
Mn	4.228911	11.90285	1.763013	30.65048	3.023734	2.579943	32.21842	18.74286	115.1789
Mdn	4.205888	8.615334	1.375078	28.37087	2.603400	2.586000	33.07435	12.50000	120.9700
Max	14.60439	22.75483	5.312726	54.95154	9.084243	2.681000	55.02120	72.80000	358.8100
Min	10.25320	5.806002	0.368464	14.16261	0.637199	2.489000	7.522814	5.400000	2.020000
Std. Dev.	4.621530	5.596863	1.174419	13.07880	1.930120	0.066296	9.813064	16.66238	99.79966
Skewness	0.484012	0.562022	1.107935	0.308562	1.053676	0.010374	0.217907	1.858775	0.758352
Kurtosis	4.408652	1.576469	3.772099	1.816637	3.952012	1.592494	3.097060	5.466120	2.851659
Jarque-Bera Probability	4.260334	4.797792	8.029904	2.597569	7.798088	2.889692	0.290724	29.02365	3.386825
	0.118817	0.090818	0.018044	0.272863	0.020261	0.235782	0.864709	0.000000	0.183891
Sum	148.0119	416.5999	61.70545	1072.767	105.8307	90.29800	1127.645	656.0000	4031.260
Sum Sq. Dev.	726.1902	1065.046	46.89485	5815.872	126.6624	0.149436	3274.072	9439.586	338639.0
Observations	38	38	38	38	38	38	38	38	38

Source: Researcher's Computation

Table 3: Unit Root Test

Variables	Test Level	t-statistic	Critical value (0.05)	Prob.	Order of Integration
RGDP	Level	-3.434069	-2.951125	0.0165	$I(0)$
CPS	Level	-0.683302	-2.957110	0.8370	$I(1)$
	1 st Difference	-5.317150	-2.957110	0.0001	
FDI	Level	-2.288774	-2.951125	0.1812	$I(1)$
	1 st Difference	-7.605561	-2.954021	0.0000	
DPI	Level	-1.974432	-2.951125	0.2961	$I(1)$
	1 st Difference	-4.688871	-2.954021	0.0006	
GCE	Level	-1.136496	-2.954021	0.7801	$I(1)$
	1 st Difference	-8.946136	-2.954021	0.0039	
POPL	Level	-3.466727	-2.960411	0.0160	$I(0)$
OPN	Level	-3.763906	-2.951125	0.0073	$I(0)$
INF	Level	-1.256683	-2.967757	0.6356	$I(1)$
	1 st Difference	-4.085417	-2.986225	0.0043	
EXR	Level	-1.718608	-2.951125	0.9995	$I(1)$
	1 st Difference	-3.949280	-2.954021	0.0046	

Source: Researcher's Computation

The result presented in Table 3 indicates that all the variables are stationary and fully integrated at level and first differences, $I(0)$ and $I(1)$, which indicates that all the variables do not have unit roots.

Table 4: ARDL Bounds (Cointegration) Test

Test Statistic	Value	Signif.	$I(0)$	$I(1)$
F-statistic	11.78896	10%	1.95	3.06
K	8	5%	2.22	3.39
		1%	2.79	4.1

Source: Researcher's Computation

The result in Table 4 indicates that the F-statistic of 11.789 is greater than the critical values at the $I(0)$ and $I(1)$ levels. Consequently, there exists a long-run dynamic relationship between the selected macroeconomic aggregates and real GDP growth in Nigeria.

The ARDL short run test in Table 5 indicates that the regressors determine 85.6% of the variations in RGDP. The F-statistic of 10.06 and p-value of 0.000 equally indicate that the model has a very high goodness of fit. Furthermore, the t-statistics reveal that POPL and EXR, one-period lags of CPS, OPN and EXR, two-period lag of RGDP as well as the one and two-period lags of POPL and INF have significant effects on RGDP at 5% level of significance.

The ARDL Error Correction Test in Table 6 reveals that about 94% of the variations in RGDP are determined by the explanatory variables. The F-statistic of 39.2 is an improvement over the 10.1 in Table 4. The result also indicates that the model adjusts itself backwards to its long run equilibrium by a speed of 15.3%. The t-statistics reveal that all the variables have significant effects on RGDP except FDI and OPN; although OPN is significant at its one-period lag. The tests for serial correlation, heteroskedasticity, misspecification, normality and stability are presented in Tables 6-7 and Figures 1-3, respectively.

Table 5: ARDL Short Run Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	0.212639	0.099077	2.146201	0.0550
RGDP(-2)	0.940767	0.243341	3.866042	0.0026
CPS	0.289209	0.159285	1.815668	0.0967
CPS(-1)	0.454203	0.149381	3.040562	0.0112
FDI	0.074778	0.801200	0.093333	0.9273
FDI(-1)	-0.654383	0.643464	-1.016970	0.3310
DPI	-0.304095	0.143978	-2.112098	0.0584
DPI(-1)	-0.150191	0.209649	-0.716390	0.4887
DPI(-2)	0.407150	0.213429	1.907662	0.0829
GCE	0.157599	0.512882	0.307282	0.7644
POPL	-846.6824	210.1713	-4.028536	0.0020
POPL(-1)	1549.249	386.8100	4.005193	0.0021
POPL(-2)	-824.7384	194.3999	-4.242484	0.0014
OPN	0.003861	0.063858	0.060464	0.9529
OPN(-1)	-0.206835	0.066559	-3.107549	0.0100

OPN(-2)	0.078240	0.055835	1.401279	0.1887
INF	-0.116006	0.054636	-2.123235	0.0572
INF(-1)	0.203132	0.051005	3.982597	0.0021
INF(-2)	-0.146207	0.038853	-3.763051	0.0031
EXR	-0.131459	0.024297	-5.410613	0.0002
EXR(-1)	0.129329	0.029524	4.380467	0.0011
C	313.2295	54.63186	5.733458	0.0001
R-squared	0.950503	Mean dependent var	4.794084	
Adjusted R-squared	0.856010	S.D. dependent var	3.907288	
S.E. of regression	1.482661	Akaike info criterion	3.860275	
Sum squared resid	24.18112	Schwarz criterion	4.857947	
Log likelihood	-41.69454	Hannan-Quinn criter.	4.195961	
F-statistic	10.05892	Durbin-Watson stat	2.848365	
Prob(F-statistic)	0.000177			

Source: Researcher's Computation

4.1 Discussion of Findings

From the results in Table 6, CPS has a significant positive relationship with RGDP, which is consistent with the a priori expectation. This implies that an increase in bank credit to the private sector is likely to spur economic growth. This is because such credit is invested to boost the production of goods in services, which enhances aggregate output. Similarly, FDI also positively affects RGDP as theoretically expected, but it is insignificant at 5% level of significance, which implies that FDI inflows have not significantly stimulated economic growth in Nigeria. This may be attributed to the worsening economic climate in Nigeria for almost a decade, resulting in a fall in the real value of goods and services.

On the other hand, DPI has a negative effect on RGDP, even at the one-period lag, implying that increased domestic private investments has not contributed positively to economic growth in Nigeria. For example, DPI fell by 32.3% from 54.95% in 1986 to 37.21% in 1995 and 31.7% from 36.58% in 1996 to 24.58% in 2005 as well as 43.3% from 26.17% in 2006 to 14.83% in 2015. The consistent fall in DPI probably stems from the poor economic climate and unfavourable government economic policies that has made domestic private investments less competitive.

More so, public investment is found to have positive but insignificant effect on RGDP in Nigeria, as indicated in Table 4. This is consistent with the a priori

expectation but implies that the government has not meaningfully stimulated economic growth in Nigeria. This is due to the low level of government investment in infrastructure. For instance, government capital expenditure (as a percentage of total expenditure averages between 20-30 percent in the last two to three decades; despite the high volume and frequency of external public borrowings.

In contrast, POPL has significant negative effect on RGDP, which is inconsistent with the a priori expectation. This implies that labour has contributed negatively to economic growth in Nigeria. This could be attributed to the high level of unemployment as well as the poor human capital development (orchestrated by government neglect of public educational infrastructure) in Nigeria. However, the significant positive effect of the one-period lag of POPL implies that favourable labour policies could spur economic growth. OPN, on the other hand, has insignificant positive effect on RGDP but a significant negative effect at its one-period lag. This implies that international trade has not meaningfully stimulated Nigeria's economy. This is probably due to the consistent depreciation of the country's currency and the country's overdependence on foreign (especially capital and luxury goods).

Lastly, both INF and EXR has significant negative effects on economic growth in Nigeria, as theoretically expected; although the one-period lag of INF is found to have significant positive effects on RGDP – which also strengthens the notion that certain level of inflation may also be desirable to the economy.

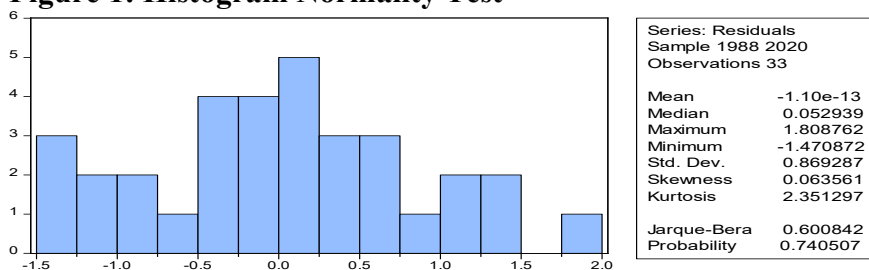
Table 6: ARDL Error Correction Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	313.2295	23.12056	13.54766	0.0000
D(RGDP(-1))	-0.940767	0.069844	-13.46961	0.0000
D(CPS)	0.289209	0.097359	2.970551	0.0127
D(FDI)	0.074778	0.343063	0.217971	0.8314
D(DPI)	-0.304095	0.083320	-3.649715	0.0038
D(DPI(-1))	-0.407150	0.085103	-4.784215	0.0006
D(POPL)	-846.6824	52.78784	-16.03934	0.0000
D(POPL(-1))	824.7384	48.90864	16.86284	0.0000
D(OPN)	0.003861	0.025598	0.150837	0.8828
D(OPN(-1))	-0.078240	0.029284	-2.671715	0.0217
D(INF)	-0.116006	0.022954	-5.053873	0.0004
D(INF(-1))	0.146207	0.017503	8.353037	0.0000
D(EXR)	-0.131459	0.013202	-9.957368	0.0000

CointEq(-1)*	-0.153406	0.011332	13.53753	0.0000
R-squared	0.964095	Mean dependent var	0.252402	
Adjusted R-squared	0.939529	S.D. dependent var	4.587613	
S.E. of regression	1.128136	Akaike info criterion	3.375427	
Sum squared resid	24.18112	Schwarz criterion	4.010309	
Log likelihood	-41.69454	Hannan-Quinn criter.	3.589045	
F-statistic	39.24435	Durbin-Watson stat	2.848365	
Prob(F-statistic)	0.000000			

Source: Researcher's Computation

Figure 1: Histogram Normality Test



Source: Researcher's Computation

Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	2.517517	Prob. F(2,9)	0.1354
Obs*R-squared	11.83867	Prob. Chi-Square(2)	0.0027

Source: Researcher's Computation

Table 8: Breusch-Pagan-Godfrey Heteroskedasticity Test

F-statistic	1.537531	Prob. F(21,11)	0.2331
Obs*R-squared	24.61434	Prob. Chi-Square(21)	0.2643
Scaled explained SS	1.847849	Prob. Chi-Square(21)	1.0000

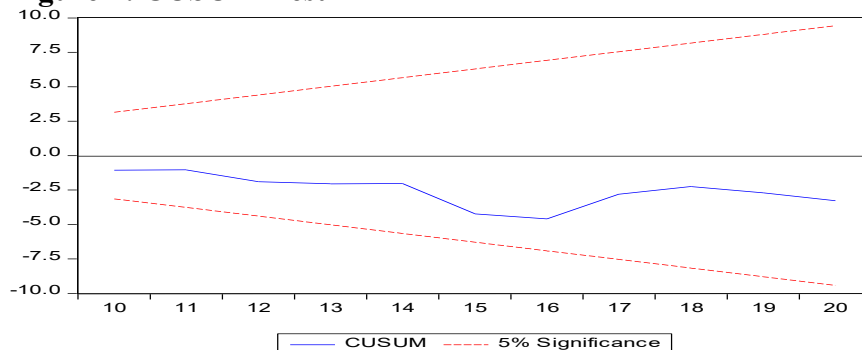
Source: Researcher's Computation

Table 9: Ramsey RESET Test

	Value	Df	Probability
t-statistic	0.392068	10	0.7032
F-statistic	0.153717	(1, 10)	0.7032

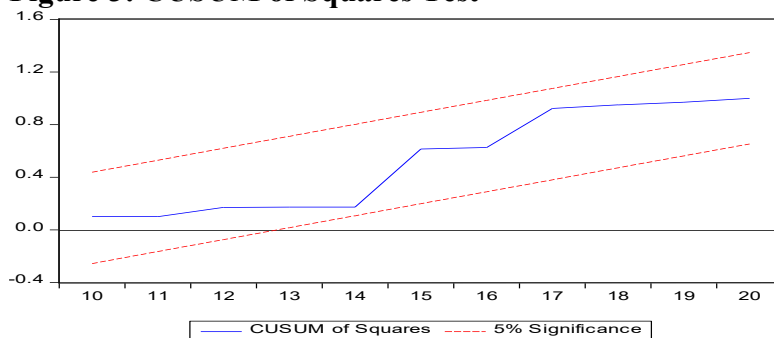
Source: Researcher's Computation

Figure 2: CUSUM Test



Source: Researcher's Computation

Figure 3: CUSUM of Squares Test



Source: Researcher's Computation

5. Conclusion

This paper sought to identify the macroeconomic aggregates that are critical to the achievement of enhanced and sustained economic growth in Nigeria, using the ARDL model. It examined the extent to which credit to private sector, foreign and domestic private investments, public investments and other macroeconomic aggregates have influenced Real GDP growth in Nigeria. The results indicated that credit to private sector, domestic private investment, population growth, inflation and exchange rates strongly impact on real GDP growth in Nigeria. The study concludes that credit to private sector, foreign direct investments, public investment in infrastructure and trade openness contribute positively to real economic growth in Nigeria; while domestic private investments, population growth, inflation and exchange rates retard economic growth. The government should therefore encourage policies that stimulate more credit allocation and foreign investments, increase its spending on economic infrastructure while targeting a reduction in inflation and exchange rates, to boost and sustain real economic growth.

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Contributions of Authors

B. G. Yobo (Corresponding Author) wrote the introduction, analysed the data, and discussed the results, while others reviewed literature and collected data. The authors do not have any conflict of interests.