Impact of External Sector Determinants on Gross Domestic Product Per Capita in Nigeria

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Abstract
This study examined the impact of external sector determinants on economic growth in Nigeria. Specifically, the study examined the influence of exchange rate, foreign direct investment inflows, official development assistance received, and external debt on GDP per capita from 1987 to 2022. The study used Annual times series data obtained from the World Economic Indicators (WDI) of the World Bank. The econometric techniques of auto-regressive distributive lag (ARDL) method, Augmented Dickey-Fuller (ADF) Unit Root test, and Error Correction Method (ECM) were employed in the empirical analysis. The result of the unit root test showed that the variables had mixed order of integration. Further, the ARDL estimation showed that, in the long run, Nigeria's external sector did not exert any significant influence on growth in GDP per capita. However, in the short run, it was established that, while foreign direct investment inflows and external debt positively influenced growth in GDP per capita in Nigeria. Although, exchange rate and official development assistance received were statistically significant in influencing the behaviour of GDP per capita in Nigeria, the relationship was negative. The result further showed that the model was free from the problem of serial correlation, heteroscedasticity, and misspecification error. Finally, the study recommended that, Nigeria should fast-track increased access of FDI to maintain a short run growth of GDP per capita.

Keywords: *Growth rate, GDP per capita, External sector, Exchange rate*

1. Background to the study.

Economic stability is paramount for the growth of any economic system while instability can severely disrupt the growth of any economy. It is therefore necessary for economies that seek to move on the path of sustainable economic growth, to manage their economic activities efficiently and effectively. This is decisively dependent on proper knowledge of the interrelationships among the various mechanism and sectors of the economy, as well as those factors that influence their dynamics. It is also important in this regard, to identify and dismantle those binding constraints that hamper the growth of the economy. This can only be effectively addressed, if policy makers can learn from the past experience Uwakaeme (2022).

The Nigerian economy has consistently encountered significant challenges, notably failing to leverage its substantial economic potential for accelerated growth and development. Many other reasons have been advanced for the sluggish performance of her economic growth, which include: negligence of her non-oil export due to increasing oil price in the international market; persistent high demand for foreign goods and services in addition to increased importation of capital input for manufacturing sector, all in the face of dwindling foreign exchange earnings, external debt overhang in addition to its attendant increasing debt interest charges, decline in fresh equity participation in Nigerian enterprises, among others (Nyeche 2024; Uwakaeme, 2022).

A healthy external sector is a key macroeconomic policy objective of every developing economy to achieve economic growth in the world. The Nigeria's economy is basically an open economy, and her international transactions with the rest of the world, constitute the greater part of her aggregate economic activity. As a result, the economic prospects and development of Nigeria, rest largely on her international interdependence. The external sector determinants is a very significant segment of every developing and developed economy in the world. Nigeria's external sectors reflect the economic dealings between the citizens (residents) of Nigeria and the rest of the world and may occasionally be in equilibrium or disequilibrium (surplus or deficit). The major indicators of the external sectors are the exchange rate, balance of payments, foreign exchange and external debt (Korsu, 2007; Uwakaeme, 2022; Asuru & Wosu, 2017). Reports has showed that the countrys external sector is in a serious and very difficult and challenging position. Obviously, the importance of the external sector in Nigeria's troubled economy cannot be undermined (Ogbuagu, & Ewubare 2015). The country's economy response to external sector dynamics is exhibiting a mix results as it affect the gross domestic products per capita. It is on this strength that the study core objective was to examine the impact of external sector determinants on gross domestic product per capita in Nigeria.

2 . Literature Review

The Two- Gap Model of Development

The Two- Gap Model of Development The two-gap approach was championed by Chenery and Strout (1956) with the idea that serious gap exists in the economy. These are the savings gap and the foreign aid gap. The two-gaps are separate and impose independent constraints on the achievement of the growth target in less developed counties (LDC). To fill the savings gap, foreign aid is required to meet the domestic needs of national income. Correspondingly, the theory has fixed relationship assumed between targeted foreign exchange requirement and net export earnings. In this case, if the net export earnings at any time falls short of the foreign exchange requirements, a foreign exchange is bound to occur and can be filled up by the foreign aid. The two-gap approach can be explained in terms of the national income identities like E –Y = I-S = M-X = E-F. E is national expenditure, Y is national income and output, I is investment, S is savings, M represents import, X is export, and F represents net capital inflow. In this analysis, I-S represents domestic savings gap, M-X is the foreign exchange gap. In every economy, savings gap can occur when domestic savings rate fall short of the investment required to attaining the target. Nigeria

over the years has been unable to mobilize adequately, savings that are necessary and sufficient to achieve the target in the agricultural sector. Savings – investment gap exist only when available domestic savings becomes too small to the extent necessary to obtain the needed rate of growth (Asuru & Wosu, 2017).

Uwakaeme (2022) investigated the relationship between her (RGDP), and some external sector macroeconomic indices. The study applied Co-integration technique, Error Correction Model (ECM) and Granger Causality tests for the econometric analysis. Evidence from empirical results confirmed that, in the long run, only foreign direct investment contributed positively to real economic growth, while foreign exchange rate, total export, trade openness, total import, external debt, and external debt service charges had significant adverse effect on Real Economic Growth. Onuoha (2014) examined the impact of exchange rate variation and inflation on the economic growth of Nigeria. Ordinary Least Square method was adopted to analyze the time series properties of the variables under consideration so as to determine the trend of the variations using annual data set on real GDP and inflation rate spanning from 1980–2010. The empirical analysis revealed that export and import showed a positive relationship but not statistically significant at 3.4%. The coefficient of Exchange rate showed a positive relationship but is statistically significant at 3.4%. This implies a positive relationship between inflation and exchange rate. The study contends that while high rate of inflation and inconsistent exchange rates is detrimental to economic growth, moderate and stable inflation rate supplements return to savers, enhances investment and therefore economic growth of a country.

Karahan (2020) evaluated the Influence of exchange rate on the economic growth in the Turkish economy. Using the quarterly data between 2002-Q1 and 2019-Q1, the relationship between exchange rate and economic growth was examined by employing Johansen cointegration test, Granger causality test and Innovation Accounting Techniques. Empirical findings suggest that there is a negative causal relationship between exchange rates and economic growth, as claimed by structuralist economists.

Ayenew (2022) investigated the effect of foreign direct investment on the economic growth of Sub-Saharan African countries. The study examined panel data from 22 nations in Sub-Saharan Africa from 1988 to 2019. The PMG/ARDL model was used to look at the short- and long-term effects of foreign direct investment on economic growth. The panel unit root test and panel co-integration test were employed to improve the model's estimation. According to the findings, in the long run, foreign direct investment had a favourable and significant effect, but it is statistically insignificant in the short run. The study concluded that foreign direct investment boosts long-term economic growth.

Muhammad, Muhammad and Hussain (2019) investigated the influence of official development support on Pakistan GDP per capita making use of time series yearly data from 1991 to 1917. ADF was used for examining the level of integration of the data. After that, ARDL was used for discovering the short and long-run relationship of the official development assistance and the GDP per capita. The results uncovered that official assistance relationship with GDP per capita became

negative in the short run in addition to a long-run period. In similar manner inflation also became negatively significant in the short and long run.

Obisesan, Akosile, and Ogunsanwo (2019) examined the effect of external debt on economic growth in Nigeria under the period of 37 years (1981-2017). The study employed least square econometric technique to ascertain the relationship between external debt variables and economic growth in Nigeria. The study found that external debt and external debt service payment had negative effect on economic growth while exchange rate had positive effect on economic growth in Nigeria. The coefficient of multiple determinations (R^2) showed that approximately 77% of variations in economic growth are explained by the explanatory variables (EXTD, EXTDS and EXR) while the remaining 23% is accounted by factors not specified in the model.

3. Methodology

Ex-post facto research design was adopted for this study. An Ex-post Facto research determines the cause-effect relationship among variables. Additionally, the research used the econometric method of autoregressive distributed lag and Error Correction Model (ARDL-ECM) to examine the long-run relationship between the dependent and independent variables. The annual times series data used were sourced the World Development Indicators of the world bank and the sample covered a period from 1987-2022. In the study, economic growth was proxied by GDP per capita which served as the dependent variable while the independent variables comprised exchange rate, foreign direct investment inflows, official development assistance received, and external debt.

3.1. Model Specification

The model used in this research work had the following specifications.
The functional form of the model are as follows:

$$GPC = f(EXR, FDI, ODA, XDT) \quad (1)$$

Stated in linear form gives;

$$GPC = b_\circ + b_1EXR + b_2FDI + b_3ODA + b_4XDT + \mu \quad (2)$$

Apriori Expectation: $b_1 > 0, b_2 > 0, b_3 > 0, b_4 > 0$

Formulating the Autoregressive Distributed Lag (ARDL) long-run model gives;

$$\Delta(GPC)t = b_\circ + b_1(GPC)t + b_2(EXR)t + b_3(FDI)t + b_4(ODA)t + b_5(XDT)t + \sum_{i=1}^{n} \Delta b_1(GPC)_{-t-1} + \sum_{i=1}^{n} \Delta b_2(EXR)_{t-1} + \sum_{i=1}^{n} \Delta b_3(FDI)_{t-1} + \sum_{i=1}^{n} \Delta b_4(ODA)_{t-1} + \sum_{i=1}^{n} \Delta b_5(ODA)_{t-1} + \mu_t \quad (3)$$

While the short-run Error Correction Model derived from the ARDL model yields;

Δ(GPC)t = $\partial_{\circ}$ + ∂_1(GPC)t + ∂_2(EXR)t + ∂_3(FDI)t + ∂_4(ODA)t + ∂_5(XDT)t + $\sum_{i=1}^{n} \Delta\, \partial_1(\text{GPC})_{t-1}$ + $\sum_{i=1}^{n} \Delta\, \partial_2(\text{EXR})_{t-1}$+ $\sum_{i=1}^{n} \Delta\, \partial_3(\text{FDI})_{t-1}$ + $\sum_{i=1}^{n} \Delta\, \partial_4(\text{ODA}))_{t-1}$ + $\sum_{i=1}^{n} \Delta\, \partial_5(\text{XDT}))_{t-1}$ + $\Pi ECM + \mu_t$ (4)

Where;

GPC = GDP per capita

EXR = Exchange rate

FDI = Foreign direct investment inflows

ODA = Official development assistance received

XDT = External debt

b_0 = $Intercept\ of\ the\ models$

$b_1 - b_4$ = $Slopes\ of\ the\ models\ respectively.$

$b_1 - b_5$ = $Long - run\ dynamic\ coefficients.$

$\partial_1 - \partial_5$ = Short − run dynamic coefficients.

μ_t = $Disturbance\ or\ error\ term$

Δ= $First\ difference\ operator.$

n = $Maximum\ lag\ lenght.$

Π = $Error\ correction\ coefficient.$

ECM = $Error\ correction\ term\ with\ one\ period\ lag.$

f = $Functional\ Notaton$

4. Results and Discussion

4.1 Unit Root Test

Due to its value in revealing the time series features of the variables, the unit root test came before the model estimation. The unit root test result utilizing the Augmented Dickey Fuller (ADF) method is presented in Table 1.

Table 1: Augmented Dickey Fuller (ADF) Unit Root Test Results

Variable	ADF Test Stat.	5% Critical Value	P-value	Order of Integration	Test Option	Remark
GPC	-3.937905	-3.544284	0.0208	I(0)	Trend & Intercept	Integrated of order 0
EXR	-4.535098	-3.548490	0.0050	I(1)	Trend & Intercept	Integrated of order 1
FDI	-3.621633	-2.948404	0.0103	I(0)	Intercept	Integrated of order 0
ODA	-4.224781	-3.548490	0.0107	I(0)	Trend & Intercept	Integrated of order 0
XDT	-4.452301	-1.951000	0.0001	I(1)	Trend & Intercept	Integrated of order 1

Source: Author's computation from Eviews software, 2024

The ADF test result in Table 1 for GPC, FDI, and ODA implies that these variable are stationary at level [I(0)], suggesting that they do not exhibit unit roots. Fluctuations in these series and their volatility do not follow a random walk pattern and maintain a stable behaviour. This evidence of stationarity in these variables was because GPC, FDI, and ODA had ADF statistics of -3.937905, -3.621633, and -4.224781 respectively which are lesser than their respective critical values of -3.544284, -2.948404, and -3.548490 at 5 percent level of significance. On the other hand, EXR and XDT were not stationary at level however, they were then differenced once and found to be stationary or integrated of order one [I(1)] suggesting that they do not have a unit root and their statistical properties do not change over time. This result was based on the fact that the respective ADF test statistic for the EXR and XDT series of -4.535098 and -4.452301 are more negative than their respective critical value of -3.548490 and -1.951000 at the 5 percent level. Following the evidence of mixed order of integration, the ADRL method of estimation became appropriate for the study.

4.2. Lag Length Selection

A lag length selection criteria test was carried out to ascertain the ideal lag length for the estimated ARDL model. The appropriate lag length was chosen using the Akaike Information Criteria (AIC), which penalizes overparameterization. The result from this test is presented in Table 2.

Table 2: Result of Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-491.1305	NA	20153199	31.00816	31.23718	31.08407
1	-375.238	188.3253*	70293.90*	25.32738	26.70150*	25.78286*
2	-356.8532	24.13008	120250.1	25.74083	28.26006	26.57588
3	-330.5301	26.32314	156655.7	25.65813	29.32247	26.87275
4	-282.2838	33.16934	82070.46	24.20524*	29.01468	25.79943

Source: Author's computation from Eviews software, 2024

The result in Table 2 indicates that the appropriate lag length for the model under AIC was lag four (4). As can be observed, the lag length of 4 has the smallest value of 24.20524 under the AIC column, making it most suitable over the rest.

4.3. Cointegration Test

ARDL bounds cointegration test method was utilized by the study in examining the evidence of long run relationship between the variables of the study. The result is shown in Table 3.

Table 3: ARDL Bounds Cointegration Test Result

Test Statistic	Value	Signif.	I(0)	I(1)	Decision
F-statistic	3.701225	10%	2.2	3.09	Cointegrated
K	4	5%	2.56	3.49	
		2.5%	2.88	3.87	
		1%	3.29	4.37	

Note: K denotes number of explanatory variables

Source: Author's computation from Eviews software, 2024

Table 3 presents the result of the F-Test used to determine the presence of a long-run relationship among the variables in the specified model. The F-statistic for this model is 3.701225; and because, the latter is greater than the critical bounds of 2.56 for I(0) and 3.49 for I(1) at 5 percent level of significance, the study affirms presence of a long-run equilibrium relationship between GPC and the independent variables.

4.4. Model Estimation

The short run and long run result from the ARDL method of estimation is presented in Table 4.

Table 4: ARDL Long and Short Run for Model

Dependent Variable: GPC

Short run results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GPC(-1))	-0.263609	0.129599	-2.034037	0.0764
D(GPC(-2))	0.155964	0.139625	1.117017	0.2964
D(GPC(-3))	0.374972	0.147614	2.540214	0.0347
D(EXR)	-0.212518	0.036131	-5.881821	0.0004
D(EXR(-1))	0.040151	0.036762	1.092182	0.3065
D(EXR(-2))	0.002275	0.033077	0.068784	0.9468
D(EXR(-3))	-0.103975	0.035992	-2.888810	0.0202
D(FDI)	2.181531	0.722246	3.020484	0.0165
D(FDI(-1))	5.546200	1.023183	5.420538	0.0006

D(FDI(-2))	3.881307	0.852170	4.554614	0.0019
D(FDI(-3))	2.016334	0.606588	3.324061	0.0105
D(ODA)	-0.591702	0.509464	-1.161421	0.2789
D(ODA(-1))	-1.103631	0.478704	-2.305456	0.0500
D(ODA(-2))	-2.324031	0.500186	-4.646334	0.0017
D(XDT)	-0.019367	0.073595	-0.263159	0.7991
D(XDT(-1))	-0.146376	0.085300	-1.716020	0.1245
D(XDT(-2))	-0.052673	0.084415	-0.623979	0.5500
D(XDT(-3))	0.455708	0.089250	5.105957	0.0009
CointEq(-1)*	-0.598650	0.099655	-6.007241	0.0003
		Long run results		
EXR	-0.013148	0.021672	-0.606653	0.5609
FDI	-6.879993	10.91103	-0.630554	0.5459
ODA	0.864938	2.606515	0.331837	0.7485
XDT	-0.284480	0.279810	-1.016687	0.3391
R-squared	0.897248			
Adjusted R-squared	0.754976			
Durbin-Watson stat	1.870685			

Source: Author's computation from Eviews software, 2024

The result of the ARDL estimation in Table 4 shows that in the current period of the short run, EXR had a significant negative effect on GPC because the probability value of the its coefficient of 0.0004 is less than 0.05. This will imply that for every 1 unit increase in EXR, GPC will fall by 0.212518 unit. In contrast, in the first and second lag periods, there was no evidence of significant effect of EXR on GPC. However, in the third lag period of the short run, evidence of significant negative impact was established between ECR and GPC at 5 percent level. The value of the coefficient of -0.103975 in this period suggests that, for every 1 unit increase in EXR three years ago, GDP will fall by 0.103975 unit. Conversely, in the long run, there was no evidence of significant effect of EXR on GPC because the long run coefficient was associated with a probability value of 0.5609 greater than 0.05.

Further, the result shows that FDI significantly influenced GPC both in the current period and in the lagged period at 5 percent level. A cursory look at the result of the current period shows that FDI had a significant positive effect on GPC in the sense that its coefficient of 0.0165 was positively signed and would suggest that for every 1 unit increase in FDI in the current year, GPC increases by 5.546200 unit. This result demonstrates that changes in the performance of FDI determined GPC outcomes within the study period. However, in the long run, FDI did not establish any significant effect on GPC at 5 percent level.

In the current period of the short run, ODA did not significantly influence GPC growth at 5 percent level however, in the first and second lag periods evidence of significant influence on GPC was

established. This was possible because, the coefficients in the first and second lag periods were associated with respective probability values of 0.0500 and 0.0017 which are less than 0.05. Additionally, the corresponding coefficients in these lag periods were -1.103631 and -2.324031which suggests that for every 1 unit increase in ODA in the first and second lag periods, GPC will decline by 1.103631 and 2.324031 respectively. In the long run, ODA had no evidence of significant impact on GPC at 5 percent level; suggesting that in the long run, changes in GPC are not determined by changes in ODA.

In another development, XDT failed to establish any significant impact on GPC in the short run. Although, three years back (the third lag period) substantial evidence of significant impact on GPC was established because the probability value of 0.0009 associated with its positive coefficient of 0.455708 was greater than 0.05. In the long run, XDT possessed a negative coefficient of -0.284480 which is an indication of inverse relationship, however, it yielded a probability value of 0.3391, greater than 0.05.

The value (-0.598650) of the error correction term (ECM), represented as CointE (-1) in Table 4 is appropriately signed and it is significant at 5 percent level. This result suggests that, a deviation from the long-run equilibrium due to a short-run shock is adjusted at a speed of 59.9 percent each year. This high value indicates deviations from long-term equilibrium are addressed relatively swiftly, highlighting the economy's capacity to adapt to shocks and maintain stability over time. The adjusted R-squared had a value of 0.754976, which implies that changes in the independent variables accounted for 75 percent of changes in the dependent variable. This suggests that the model is a good fit. Further, the Durbin-Watson value of 1.870685 is close to the region of 2 and thus indicates that the model is free from the problem of autocorrelation.

4.5. Post-estimation Tests

The results of the Serial Correlation LM test, Heteroskedasticity Test, and Ramsey RESET test are presented in Table 5.

Table 5: Post-estimation Test Results for the Model

Breusch-Godfrey serial correlation LM test	F-statistic	0.050898	Prob. F(1,7)	0.8280
	Obs*R-squared	0.230998	Prob. Chi-Square(1)	0.6308
Breusch-Pagan-Godfrey Heteroscedasticity	F-statistic	1.314454	Prob. F(23,8)	0.3603
	Obs*R-squared	25.30412	Prob. Chi-Square(23)	0.3348
Ramsey RESET	t-statistic	0.856235	Prob. Value	0.4202
	F-statistic	0.733139	Prob. Value	0.4202

Source: Author's computation from Eviews software, 2024

The result from the Breusch-Godfrey serial correlation LM test in Table 5 suggests that there is no indication of serial correlation in the model at 5 percent significance level. This is because the Lagrange multiplier (LM) statistic (Obs*R-squared) had a probability value of 0.6308 greater than 0.05. In the same vein, the probability value (0.3348) of the Obs*R-squared under the Breusch-Pagan-Godfrey heteroscedasticity test is greater than 0.05. Thus, this suggests that model has no evidence of heteroscedasticity within it. The result of the Ramsey RESET test shows that the F-statistic value of 0.4202 is greater than 0.05. This implies that the model of the study is misspecification error.

4.6. Discussion of Findings

The findings of the study showed that in the short run, EXR had a significant negative impact on GPC in both the current period and in the third lag period. This result suggests that higher exchange rates adversely affect the performance of the Nigerian economy in the short term. When a country's currency appreciates, its imports become more affordable for its people to purchase. Infant industries and local manufacturing will be affected by poor demand for their product by citizens and as such this can cumulate into loss of jobs and decline in the growth of the economy. Onuoha (2014) added that an increase in exchange rate will definitely lead to an increase in the rate of inflation in an economy which lowers economic growth. This result agrees with the work of Karahan (2020) whose study showed that exchange rate affects economic growth negatively. The result also showed that result also showed that in the short run, FDI exerted a significant positive effect on GPC within the study period. This result conforms with the a priori expectations and with theoretical views. The positive and significant result could arise from the positive spillover effect of foreign direct investment in the Nigerian economy. The result collaborates with the findings of Ayenew (2022). Further, the result showed that performance of GPC in the third lag period was negatively influenced by changes in ODA. This result highlights the importance of past developmental outcomes in the economy in influencing current economic variables. It further agrees with the work of Muhammad *et al.* (2019). The result also shows that EXT exerts significant influence on GPC in the third lag period. This result meets theoretical expectation. It suggests that past external borrowings were channelled to highly productive activities that would increase the overall output of the economy. This result disagrees with the findings of Obisesan *et al.* (2019).

5. Conclusion and Recommendations

5.1. Conclusion

The study examined the impact of external sector on economic growth in Nigeria from 1987 to 2022. The empirical evidences of the findings enable the study to conclude that external sector variables such as exchange rate, foreign direct investment inflows, official development assistance

received, and external debt only have short term influence on GDP per capita and the Nigerian economy at large. To this end, both exchange rate and official development assistance received negatively influence performance of GDP per capita while foreign direct investment inflows and external debt positively influenced GDP per capita in Nigeria.

5.2 Recommendations

The study makes the following recommendations following the findings reached:

1. Nigeria should fast-track increased access of FDI to maintain a short run growth of GDP per capita. A stable political climate, infrastructural development, and subsidies are ways nations can draw in more foreign direct investment.

2. Government should be careful in the intake of official development assistance into the Nigerian economy because, some come with conditions that undermine economic growth.

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