VOLATILITY OF FOREIGN EXCHANGE RATE AND INFRASTRUCTURE DEVELOPMENT: AN ARCH/GARCH ANALYSIS FROM NIGERIA (1986-2020)

Abstract

Living standard of citizen and economic growth symbolise infrastructural development and stability in a nation, therefore, the foreign exchange rate volatility on infrastructural development in Nigeria, 1986-2020.was examined with contradictory empirical. Central Bank of Nigeria provides the data set analysed by ARCH/GARCH model along-side with vector model. Empirical findings revealed both negative and positive relationship with capital expenditures resulting from exchange rate and total exports on capital expenditures, as total imports have positive impact. There is negative impact between external debt service payment and capital expenditures. Co-integrating coefficient revealed a slow adjustment speed parameter of about 21 percent. The ARCH/GARCH estimates revealed that exchange rate is controlled by its own GARCH components rather than ARCH factors or shocks. Therefore, exchange rate volatility determined its own shocks by GARCH. The study recommends that policy inconsistency regarding exchange rate volatility should be discouraged and infrastructural development should be prioritised by the three tiers of government as it is germane to welfare and living standard of the citizen.

Keywords: Capital Expenditures, Exchange Rate Volatility, Exports, Infrastructural Development

1.1. Introduction to the Study

In any economy with inadequate infrastructural development, the citizens suffer as others economic sectors inefficiency also emerge, encapsulated in high transportation cost, kidnaping, food insecurity and epileptic energy supply, high cost of industrial production and failed public utilities. The manifestations of economic growth are high standard of living, resulting in infrastructure development. The yearly budgeted expenditure for infrastructure by the three tiers of Nigerian government have no correlation with the physical presence of infrastructure owing to

exchange rate misalignment [Temidayo,2022] However, infrastructural development drives sustainable economic growth, developmental transformation supported by exchange rate stability. Government is accountable for the provision of public goods as from the classical economists' era following the huge capital involvement Babatunde [2018]. Temidayo [2022] in whole, the market alone cannot provide public goods, therefore, private sector should be allowed in the provision of public goods, [Oni, 2014]. Theoretically, this is supported by Wagner's Law of increase of State and activities.

Empirically, exchange rate volatility changes macro-economic fundamentals; hence devaluing the Naira amount budgeted for infrastructural development by government into insignificant level, leads to higher cost of imported materials, machines and including personnel cost Ojomolade [2019].This also impacted negatively on domestic purchasing power and foreign receipts from exports, [Akinlo, 2016; Nnamocha,2017; Owolabi,2012]. Capital expenditure is germane in infrastructure development [public goods] resulting in improvement in nation's standard of living. Exchange rate management is fundamental and its stability is crucial for economic growth, [Olaleye , 2019, Ojomolade,2020]. Impact of exchange rate volatility on development has received quite a lot of attention in literature recently with less emphasis on infrastructure development from Nigeria. There are streams of empirical with divergent outcomes on the effect of government expenditures on Nigeria economic growth. The empirical showing negative evidences of capital expenditure on infrastructure are: [Chandana & Adamu,2021; Gukat & Ogboru,2017; Saidu & Ibrahim,2019; Segun & Adelowokan,2015], while thoseshowing positive side are the works of: [Ahuja & Pandit,2020; Nyako & Asomani,et al,2019;Awode & Akpa,2018; Jibir & Aluthge, 2019; Olayungbo & Olayemi,2018]. The conflicting outcomes result from differences in methods, scope and data collected. It has been observed that exchange rate volatility

might have impacted on capital expenditure leading to the abandonment of some real capital projects. This affects oil export receipts which is not being adequate, comparing naira value with US dollar under the theory of purchasing power parity.

The empirical studies by [Saidu and Ibrahim,2019; and Gukat and Ogboru, 2017] show mix outcomes as huge government investment on infrastructure has no physical reflection on the infrastructural development. This means that expenditure increases on infrastructure did not impact significantly on economic growth. Government spending does not have any correlation with infrastructural development. Temidayo et al [2022] reveal positive but insignificant impact of government expenditure on development of education, transportation and communication. It however has positive and significant effect on the growth of agriculture. All variables did not have long run significant on economic growth.

Government intervention policies were introduced saving naira value from the exchange rate volatility and oil export dependence to non-oil export. This notwithstanding, the naira value has been sliding continuously. The cost of constructing or building infrastructure has moved up beyond imaginable estimation, leading to more inadequate infrastructural development. Exchange rate before Structural Adjustment Program (SAP) 1986 was N0.5639 to $1, in 1986; $1/N0.7649 and two years later; 1988, it moves to N2.0206 (167.87% increase) since then Naira value has not recovered.

Majority of the infrastructural developed in the first and fourth National development plans have worn out for over usage by over 180 million populations, and replacement become difficult as naira continue depreciating, [Mobolaji & Wale,2012]. On March 5, 1992, the exchange rate was ₦9.50k to a dollar and it declined further (almost by another 100%) to ₦17.2984k to a dollar at the close of trading the same day [Osifo-Whiskey, 1993]. As at 1993, a dollar was selling for ₦43.00

at the black market, and interest rate rose from 45% to 50% with the deregulation of interest rates which impacted considerably on loanable funds as manufacturing and other sectors were struggling to survive due to exchange rate misalignment [Osifo-Whiskey, 1993].

The implications of the above on oil export receipts were unprecedented as amounts are subjected to severe depreciation. However, inspite of all these problems, few theoretical and empirical studies in Nigeria focus on exchange rate volatility and infrastructural development. This is the reason for the current work on volatility of foreign exchange rate and infrastructural development in Nigeria, 1986 to 2022

1.2. Research Problem

Increasing debt financing profile and the absence of corresponding infrastructural development has become a huge problem in Nigeria with naira depreciating continuously: 1990s, 2000s and 2010s were ₦35/$, ₦129/$, and ₦235/$ respectively (World Development Indicators, 2020). This has resulted in the dollar estimate of constructing second Niger Bridge, Lagos-Ibadan expressway, East-West road, and Abuja-Kaduna-Kano in naira value to become unimaginable high as a result of the volatility in exchange rate.

Nigerian economy, like other economies is suffering from the prolonged infrastructural deficits and sluggishness in the economic growth and development throughout time. The scarcity of foreign exchange receipts has bedevilled the capital resources for developmental purposes. Several empirical studies [Ubah, 2015; Ehikioya, 2019; Idris & Musa, 2019; Ugwulali et al, 2021; Akinwolere, 2021; Gukat & Ogboru; 2017; Ahuja Pandit, 2020; Nyarko-Asomani et al, 2019; Chandana,2022; Temidayo et al. 2022; Wim & David ,2015] have been carried out with mixed outcomes. Therefore, on this basis this study was carried out on foreign exchange rate volatility and infrastructural development as few empirically investigation has been carried out in Nigeria.

Purpose of the Study

Empirically, foreign exchange rate volatility and infrastructural development in Nigeria examined. However, specific points are to:

i. examine the link between foreign exchange rate volatility and infrastructural development in Nigeria.

ii. investigate the consequences of foreign exchange rate volatility on infrastructural development in Nigeria.

1.4. Scope of Study: The study covers 35 years, ranging between1986 to 2020 by adopting time series data, gathered from Central Bank of Nigeria to ascertain the problem of exchange rate volatility and infrastructural development in Nigeria. Entirety data sourced from secondary data set of CBN Statistical Bulletin 2020 edition.

2. Literature Review

2.1 Theoretical Review: The theories underpinning the work are purchasing power parity and infrastructural development theory

Theory of Purchasing power parity (PPP) John Wheatley originated the theory of Purchasing Power Parity and it popularity started with Gustar Cassel, a Swedish Economist in 1918 who is credited for articulating the Purchasing Power Parity (PPP) as empirically testable. The theory determined countries' currencies inequality resulting from inflation rate differential between two countries economy. Exchange rate differentials are variations arising in purchasing powers of the relative currency relative to the Base Exchange rates. Arguably, Chile provided most perfect example of purchasing power parity rule by pursuing forceful devaluations through in 1982 – 1985

2.1.2. Theory of Infrastructural Development/ Wagner's law of increase of state activities: Agenor developed the Infrastructure-Led Development Theory (2010). The idea advocates a long-term economic development based on public infrastructure, usually referred to as "primary growth engine". According to the theory, government investments in agriculture and public infrastructure will boost both commodity productivity and economic growth.

GDP = f (AINP, PINF) ..... (1)

Gross Domestic Product, Agricultural Input, and Public Infrastructure, respectively, are represented by GDP, AINP, and PINF respectively. According to the hypothesis, a substantial shift towards infrastructure spending will only provide acceptable outcomes if the degree of efficiency of public investment is sufficiently high. Infrastructure inadequacy promotes inefficient technologies among producers, resulting in poor and low productivities as Wagner studies government expenditure and economic progression. Theoretically, country's income increases likewise as the government spending. The government extension activities and programs lead to an increase in government expenses

2.2. Conceptual Review

2.2.1 Instability of Exchange Rate

Within the period of 1981 and 1985, Nominal Exchange Rate in Nigeria hovers from ₦0.64: $1 to ₦0.96: $1 showing superiority of naira to dollar. Between this period. Naira started depreciating against dollar from 1988.It experienced an appreciation from about ₦132/$ 2004 to about ₦128/$ in 2008. However, in 1990 it was $1/N8.0378 and slide into N21.8861 to a dollar 1995 further depreciated to N102.105 in year 2000. This moved from N132.147 in 2005 to N150.298; N193.279; and N 258.81 in 2010,2015 and 2020 respectively. As at December2021 and 2022, the exchange rate was N314.52 and N423.7166 correspondingly. The movement in exchange rate

depreciation volatility is significant, which is affecting the naira purchasing power relating goods and services.

Exchange rate volatility refers movements in currency value either upward or downward (depreciating or appreciating) over a period of time. It measures how far the actual observed price differs from the predicted value [Pindyck, 2002];.[Kashif, Slade & Blaze 2010] .and measured using the standard deviation of the asset return. [Shiller and Radikoko, 2014].

Table 1. Exchange rate movements and volatility in percentage 1981-2022

	$/N	Volat..%
1981	0.6	9,091
1985	0.8938	9.7933
1990	8.0378	159.86
1995	21.8861	34.46
2000	102.105	73.31
2005	132.147	5.88
2010	150.298	2.75
2015	193.279	5.72
2020	258.81	6.78
2021	314.52	21.53
2022	423.7166	34.72

Source: Authors' Computation, 2022

2.2.2 Foreign exchange rate policy

Exchange rate policy is the mechanism that the Central bank use to manage exchange rate in a country. Nigeria has used various exchange rate policies before and after the adoption of SAP (Orji, Ogbuabor, Okeke & Anthony-Orji, 2018). Some of the policies are: Flexible, Fixed, Crawling, Dirty float, Dutch Auction and others. (Olaleye 2019, 2020)

2.2.3. Infrastructural Development

Infrastructure development contributes to a country's economic progression, and lack of it impedes advancement (Oke, 2013), and on this superstructure, other institutions are made (Kumar, Kumar & Vivekadhish, 2016) consequently, Kodongo and Ojah, (2018) concluded that African countries including Nigeria need adequate and new infrastructure for improvement. Batuo (2015) test significant impact of infrastructure on economic development in African countries using panel data model. Accordingly, Pradhan et al (2015), information technology and economic advancement are intertwined. Infrastructure, according to Mohmand, Wang, and Saeed (2017), improves trading and underdeveloped regions to attain full potential at future period.

2.2.4. Volatility in Exchange Rate and Infrastructural Development in Nigeria

Infrastructure are funded directly from government budgeted expenditure. Lack of finances and exchange rate volatility aptly lead to unimaginable infrastructure development deficits.

Budget expenditure estimates for maintaining existing infrastructures in Nigeria through 1977-1986, 1997-2006 and 2007-2014, were as follows: transportation increased to 79.6% from a negative point of 1.84 before sliding back to 7.03 %. Education, health, and construction infrastructure increased from 8.78 %, 11.1 %, and 18.8 % to 33.1 %, 44.1 %, and 57.1 % respectively while building infrastructure stood at 13.3%, 13.3 %and 4.96 %, between 2007 and 2014 respectively. From 2015 to 2020, transport, communication and construction increased to 10.55% and 7.84% correspondingly, while education and health fell to 9.46% and 11.02% respectively between 2015 to 2020.The physical present of infrastructure did not reflect the huge amount budgeted yearly due to exchange rate volatility coupled with the increasing cost of infrastructures over the years.

Table 2: Estimated growth of Nigeria's recurrent and capital budgets for infrastructure (%)

Year	1987-1996	1997-2006	2007-2014	2015-2022

Transport & Communication	49.2	79.6	7.03	10.55
Education	48.4	33.1	13.3	9.46
Health	38.9	44.1	13.3	11.02
Construction	27.0	57.4	4.96	7.84

Source: Author's Computation; CBN Statistical Bulletin and Financial and Economic Reports data (2022).

Above table 2 reveals insignificant contributions of the various sectors to Nigeria growth.

The sectors contributed about 0.005 %, 0.001 %, 0.001 %, 0.0003 %, 0.002, 0.001 and 0.001 % respectively, between 1981 and 1990. Between 1991 to 2000, this increased to about 0.1 %, 0.02 %, 0.02 %, 0.03 %, 0.02 %, 0.01 %, and 0.01 % respectively. Also, between 2001 and 2010, these infrastructures' contributions to growth rose insignificantly to about 0.3 %, %, 0.2 %, 0.2 %, 0.01 %, 0.1 %, 0.1 %, and 0.2 respectively. Finally, between 2011 to 2020, these infrastructures' contributions to growth rose insignificantly to about 0.6 %, 0.4 %, 0.4 %, 0.1 %, 0.2 %, 0.04 %, and 0.2% respectively. Insignificant growth in infrastructure contribution to economic growth observed owing to exchange rate volatility.

Table 3: Infrastructural Contributions to Nigeria Economic Growth, 1981-2020 (%)

Year	***Infrastructural Components (% of GDP)***						
	Social & Communication Services			***Economic Services***			
	Education	***Health***	***Others***	***Agriculture***	***Road Construct***	***Tran& comm***	***Others***
1981-1990	0.0046	0.0012	0.0009	0.0003	0.0016	0.0007	0.0008
1991-2000	0.0734	0.02	0.02	0.03	0.02	0.01	0.0104
2001-2010	0.2686	0.15	0.15	0.05	0.10	0.09	0.231
2011-2020	0.616	0.38	0.43	0.07	0.20	0.04	0.1799

Source: Author's Computation. CBN and Financial and Economic Reports (2020).

2.3. Empirical Review

Econometric relationship between infrastructure expansion and exchange rate of 42 Sub-Sahara Africa nations from 1980 to 2017 was examined. It observed that short- and long-term run existed between the variables when Panel Vector Auto-regression was applied by Akplehey (2020)

Impact of exchange rate volatility and economic progress in Nigeria was studied by Akinwolere (2021) for 34 years (1986 to 2019) using Vector Error Correction Model and findings revealed exchange rate volatility impacted economic growth significantly.

Changes in the exchange rate and growth was considered by Ribeiro, McCombie, & Lima (2017), exchange Rate volatility influenced and harmed exports and imports at short and long run.

Ojomolade, Adejuwon, and Akinjide (2021) worked on determinants of Foreign Exchange Rate Volatility and Non-Oil Export in Nigeria. ARCH and GARCH models were employed for the data set of 36 years. Findings revealed non-oil export has a positive link with the variables considered.

Investigation carried on exchange instability and economic growth was done in Nigeria by Ehikioya (2019) utilising Generalised Autoregressive Conditional Heteroscedasticity (GARCH) and Generalized Method of Moments technique with observed negative impact on economy.

Public expenditure on education and economic growth for 1971-2012 was statistically significant and positive as was explored in Chude & Chude (2013)

Public expenditure and infrastructural development in Nigeria was studied in 2020 by Temidayo et al, comparative analysis of democratic and military regimes and ARDL was used to analyse, resulting in transportation and agriculture impacted positively in short run on economic growth.

Amassoma, Nwosa, and Ajisafe, (2019) examined linkages between components of government spending and economic growth in Nigeria, 1970-2010. Expenditure on agriculture had influence on economy while on education, health and transport had insignificant influence from the reviewed result. Effect of Government expenditure for 36 years on Nigeria critical sectors were

examined by Aremu et al (2020.) Observed result, government expenditure on defence impact negatively and transportation did not on economy.

Impact of currency rate fluctuation and economic growth was studied by Bar-Guellil et al (2018). The system estimator was used for performing the empirical analysis based on data from 45 emerging nations for 31 years (1985 to 2015). Exchange rate volatility has a damaging influence on economy.

3.**Methodology**

Introduction: The research design used ex-post factor method as the data set were from secondary source, gathered from Central Bank Statistical Bulletin 2020 edition for the period 1986 to 2020 which was computed using descriptive statistics, GARCH, ARCH and VECM. Unit Roots was also applied to test non-stationarity among the variables.

Model Description and Justification

The unpredictability of foreign exchange rate is measured by ARCH/GARCH model as infrastructural development proxy by total government capital expenditures (CEXP) is explicitly expressed in this study based on the model of Doki et al. (2021). The model is however augmented to as depicted below:

CEXP = f (EXCR, EXPT, IMPT, EDSP) …….. (3.1)

Where,

CEXP= Total Government Capital Expenditures (proxy for infrastructural development in Nigeria)

EXCR = Nominal Exchange Rate,

EXPT = Total Exports (control variable),

IMPT = Total Imports (control variable),

EDSP = External Debt Service Payment (control variable),

Rewriting equation (3.1) in a linear estimable form:

$CEXP_t = \beta_0 + \beta_1 EXCR + \beta_2 EXPT_t + \beta_3 IMPT_t + \beta_4 EDSP_t + \mu_t$ …… (3.2)

A Priori Expectation:

i. CEXP has negative correlation with foreign exchange volatility

ii. IMPT has negative correlation with foreign exchange volatility

$\beta 1 < 0$; $\beta 2 > 0$; $\beta 3 < 0$; and $\beta 4 < 0$

where;

$\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$ = Parameters of the respective variables,

μt = Stochastic term

According to Koutusoyiannis (1997), the acceptable econometric model is based on the current economic situation(s) and data set collected for the research under investigation.

4. Data Analysis and Results

Table .4. Descriptive Statistics

	GCEXP	*EXCR*	*EXPT*	*IMPT*	*EDSP*
Mean	573.5119	118.6706	6446164.	5075944.	1.69E+09
Median	438.6965	126.4800	3087886.	1987045.	1.43E+09
Maximum	2288.996	381.0000	23516824	24153674	8.80E+09
Minimum	6.372500	3.180000	8920.600	5983.600	2.52E+08
Std. Dev.	554.7450	104.0424	6894639.	6386737.	1.73E+09
Skewness	1.157144	0.806998	0.861133	1.441577	2.700277
Kurtosis	4.062618	2.927046	2.684795	4.425982	10.99296
Jarque-Bera	9.457422	3.806697	4.470600	15.08792	135.7028
Probability	0.008838	0.149069	0.106960	0.000529	0.000000

Source: compiled by the author using E-view 10

The descriptive statistics revealed that capital expenditure (GCEXP) has mean value of ₦534billion and that of exchange rate (EXCR) ₦119/$. The average value of total exports (EXPT) is N645billion, while that of total imports and external debt service are N508billion and

₦1.69billion respectively. Kurtosis statistics provide values that is more that 5% significance level. Three of the variables have probability that are significant while two are not significant. The variables distributions are positively skewed. Jarque-Bera statistic shows that none of the variables indicated departure from the normality.

Unit Root Tests

The results from Unit Roots test, Augmented Dickey-Fuller (ADF) and Phillips-Perron (P-P) specified that all variables integrated at level and zero respectively. As a result of the stationarity of the variables, the Johansen and Vector Correction methods were used.

Table 5. Johansen Test

No. of Corrected errors(s)	Test Statistic	Critical Value 0.05	Prob.**
Panel A: Trace Statistic			
None *	116.8231	69.81889	0.0000
At most 1 *	70.14337	47.85613	0.0001
At most 2 *	37.75190	29.79707	0.0049
At most 3*	16.50559	15.49471	0.0351
At most 4*	5.347141	3.841466	0.0207
Panel B: Max-Eigen Statistic			
None *	46.67975	33.87687	0.0009
At most 1 *	32.39148	27.58434	0.0111
At most 2*	21.24631	21.13162	0.0482
At most 3	11.15845	14.26460	0.1465
At most 4*	5.347141	3.841466	0.0207

Source: compiled by the author using E-view 10

The Johansen Co-integration results revealed long run association among variables.

Table 6. Vector Error Correction Model

The adjustment coefficient in the short run is represented by Error Correction Term, capturing short run forces to the long run. ECT is -0.207111 signifies deviation from the long run equilibrium which is currently corrected at an adjustment speed of about 21%. The ECT is

negative and statistically significant since t-statistic value is higher than the rule 2. The coefficient of determination (R^2) indicates 53% of GCEXP and adjusted R-Square is 34% growth in the GCEXP attributed to the explanatory variables at 5% degrees of freedom in the model.

The current year value of GCEXP is negatively affected by the lagged of prior years' value of GCEXP. Table 6 A percentage increase in the one-year lagged value of GCEXP, D(LNGCEXP (-1)), leads to about 0.1% decrease in the current level of GCEXP in Nigeria, which is insignificant as value of the t-statistic of DLNGCEXP is less than 2. Whereas a percentage increase in the two-year lagged value of D(LNGCEXP (-2)) decreases current level of GCEXP by about 0.08 percent, which was also insignificant at value less than two.

The coefficient of D(LNEXCR(-1)), one period lag EXCR, is -0.403069 and it depicts a negative effect on the current rate of GCEXP. Hence, a one percent increase in DLNEXCR(-1) leads to about 0.4% decrease in capital expenditures. This finding is not in conformity with economic theory which says, home currency depreciation is consequential on foreign exchange rate increases, hence, less increase in international competitiveness and export earnings. The 2-period lag of LNEXCR impacted positively and insignificantly on capital expenditures in Nigeria. This is in conformity as to Doki et al 2021.

The coefficient of total exports is 0.261965, signifying 1% increase in export, increase government capital expenditure by about 0.3%. The coefficient of one-year lagged of import is 0.170637; a 1% increase in import would increase capital expenditures on infrastructures by about 0.2% The 2-period lag coefficient of import is 0.121861. a 1% increase in import would increase capital expenditure by about 0.12%. the impact is insignificant similar to the on-period value coefficient.

The coefficient of external debt service payment (LNEDSP) is -0.023449. therefore 1% increase in external debt service payment lead to 0.02 % decrease in the current capital expenditures

Table 6. Heteroskedasticity Test ARCH

statistic	5.051898	Prob. F(1,30)	0.0321
Obs*R-squared	4.612039	Prob. Chi-Square(1)	0.0317

Source: compiled by the author using E-view 10

The result from table above, the prob. Chi-Square (1) indicates that β_1 is statistically significant at 5% level with Probability value of 0.032, hence, no ARCH effects is rejected.

Table 7 ARCH/GARCH Model

Variable	*Coefficient*	*Std. Error*	*z-statistic*	*Prob.*
C	5.355877	8.123721	0.659289	0.5097
CEXP	0.072548	0.018795	3.860007	0.0001
EDSP	1.27E-09	3.80E-09	0.334276	0.7382
EXPT	7.14E-07	5.02E-06	0.142236	0.8869
IMPT	1.25E-05	5.76E-06	2.176284	0.0295
Variance Equation				
C	-1.686082	22.14117	-0.076151	0.9393
RESID(-1)^2	0.567252	0.373439	1.518992	0.1288
GARCH(-1)	0.745948	0.184627	4.040299	0.0001
R-squared	0.738224	*Adjusted R-squared*	0.703321	

Source: compiled by the author using E-view 10

Table above shows that GARCH is statistically significant, implying that volatility of preceding years influences current year exchange rate. Findings show that the Nigerian exchange is controlled by GARCH components rather than ARCH factors or shocks. As a result, we can deduce that Nigeria's currency rate volatility is mostly determined by its own shocks, such as GARCH.

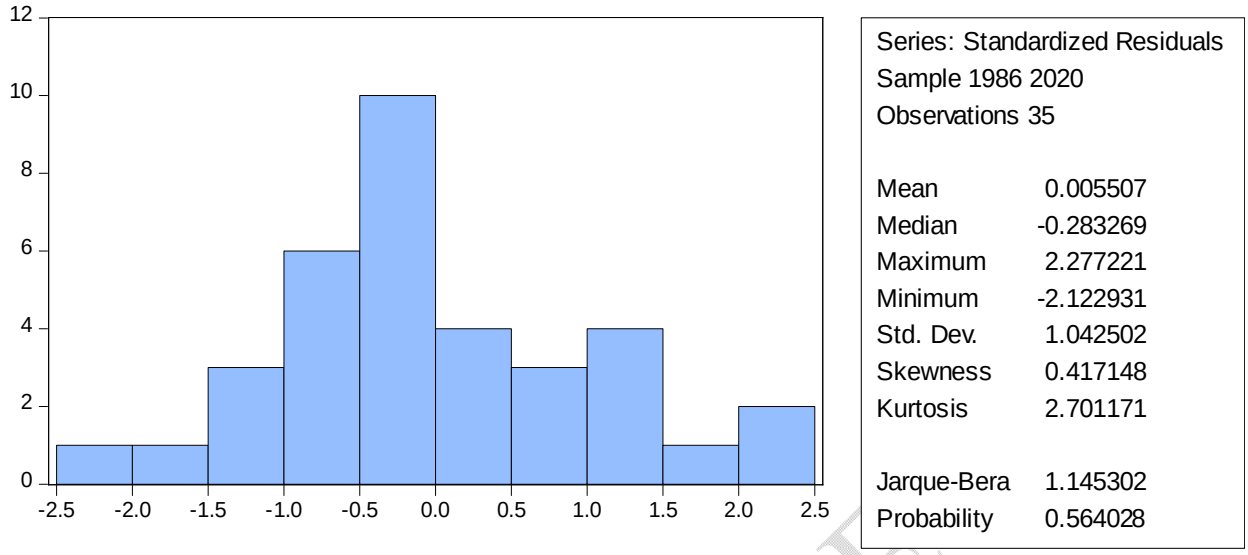

Figure 1: Normality test

Source: Author's computation (2022)

Fig 1 shows probability of 0.54028, greater than 5% significant level and Jarque-Bera is 1,145, therefore, residuals are normally distributed.

4.5. Discussion of Findings

The findings from the analysid ECT value displays negative and statistically significant value, that is, with economic theory (literature review). Hence, it means that preceding deviation is currently corrected through adjusted speed of about 21 % from the long run equilibrium

The coefficient of one period lag EXCR is negative and insignificant. Finding not in conformity with economic theory (literature review or a priori expectation) as naira depreciation against dollar occasioned by exchange rate instability, hence, decrease in export earnings and international competitiveness. The implication of finding local currency depreciation does not significantly boost government revenues vis-à-vis government capital expenditures (infrastructural development) in Nigeria.

The coefficient of total exports is positive and statistically significant, finding is in conformity with a priori expectation (literature review or a priori expectation) that an increase in export would increase revenues and government capital expenditures. The implication of this finding is that export promotion would significantly stimulate government revenues vis-à-vis government capital expenditures (infrastructural development) in Nigeria.

The coefficient of the one-year lagged import is negative and insignificant with literature review, an increase in importation would reduce indirectly government capital expenditure by the reduction in government revenues. Given that imports constitute a capital outflow. To this end, the implication of this is that imports do not significantly impact government.

From the result, the coefficient of external debt service payment indicates adverse but inconsequential effect on findings from literature reviewed (economic theory), is that an increase in debt payments would reduce government receipts and hence government capital expenditures. The implication of this is that debt service payment is regressive in nature and hence would not significantly stimulate government capital expenditures (infrastructural development) in Nigeria.

Finally, the ARCH or GARCH of preceding year's information on exchange has no bearing on current volatility, implying that volatility of the prior year’s influences current year exchange rate. Findings are in line with literature review in that that the Nigerian exchange rate is characterized by volatility which could result from both internal and external shocks affecting the economy.

5. CONCLUSION AND RECOMMENDATIONS

The theory of purchasing power parity argued inequality between countries' currencies arose from exchange rate differentials due to variations in currencies as relate to the Base Exchange Rates. Value of the exchange rate at the foreign market is affected by transactions on a country's current account. [ojomolade,2021] Exchange rate differential between naira and dollar currency leads to negative infrastructure development. [Akinwolere 2021] The government should consistently improve on the management of exchange rate and exports goods which can reduce the vulnerability of naira to other currencies.

Infrastructure theory advocates government investments in agriculture and public infrastructure as it enhances economic growth. Long-term economic development based on public infrastructure, called "primary growth engine" needs to be enhanced. The implication is that if government did not invest adequately in infrastructure the economic productivity and growth will be impaired and living standard of the citizen affected, [Agenor, 2010]. Infrastructural development is germane in economic development, helping as economic and living standard indicators [Temidayo, 2022; [Chandana 2021] ; Chandana [2021] claimed that capital expenditure impacted positively and significantly on economy while Gukat and Ogboru [2017] and [Aremu et al 2020] says capital expenditure has negative impact on economy. Exports have positive and significant impact while exchange rate, import and service payments have negative impact capital expenditure which subsequently infrastructure development supported Akinwolere [2021] Government should pursues aggressively exchange rate stability policy and non –oil exports to earn more foreign receipts and reduce import consumption to safe the face of naira.

Ethical Approval
None

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Table 8. Vector Error Correction Estimates Appendix

Cointegrating Eq:	CointEq1
LNGCEXP(-1)	1.000000
LNEXCR(-1)	-0.334558
	(0.43571)
	[-0.76784]
LNIMPT(-1)	0.892639
	(0.29008)
	[3.07720]
C	-16.99404

Error Correction:	D(LNCEXP)	D(LNEXCR)	D(LNIMPT)
CointEq1	-0.207111	0.152426	-0.275096
	(0.07344)	(0.07870)	(0.06130)
	[-2.82024]	[1.93690]	[-4.48741]
D(LNGCEXP(-1))	-0.066515	-0.264465	0.291751
	(0.20292)	(0.21745)	(0.16939)
	[-0.32779]	[-1.21622]	[1.72235]
D(LNGCEXP(-2))	0.083832	-0.134678	0.363064
	(0.15927)	(0.17068)	(0.13296)
	[0.52634]	[-0.78908]	[2.73068]
D(LNEXCR(-1))	-0.403069	-0.131188	-0.175052
	(0.18188)	(0.19490)	(0.15183)
	[-2.21612]	[-0.67310]	[-1.15295]
D(LNEXCR(-2))	0.232719	-0.278680	0.030989
	(0.21092)	(0.22602)	(0.17607)
	[1.10335]	[-1.23297]	[0.17600]
D(LNIMPT(-1))	0.170637	-0.117064	-0.488475
	(0.18760)	(0.20103)	(0.15660)
	[0.90959]	[-0.58232]	[-3.11920]
D(LNIMPT(-2))	0.121861	-0.001512	-0.214793
	(0.17906)	(0.19189)	(0.14948)
	[0.68054]	[-0.00788]	[-1.43695]
C	-3.283364	4.442560	-3.459384
	(1.99294)	(2.13564)	(1.66366)
	[-1.64750]	[2.08020]	[-2.07938]
LNEDSP	-0.023449	0.023410	-0.062205
	(0.07369)	(0.07896)	(0.06151)
	[-0.31822]	[0.29646]	[-1.01125]
LNEXPT	0.261965	-0.312816	0.339706
	(0.11554)	(0.12381)	(0.09645)
	[2.26735]	[-2.52657]	[3.52215]
-squared	0.531295	0.287567	0.645965
dj. R-squared	0.339552	-0.003883	0.501132
ım sq. resids	1.645401	1.889458	1.146604
E. equation	0.273479	0.293061	0.228295
statistic	2.770870	0.986677	4.460081
ɔg likelihood	2.077998	-0.134900	7.856864
kaike AIC	0.495125	0.633431	0.133946
:hwarz SC	0.953168	1.091474	0.591988
ean dependent	0.164561	0.133303	0.216530

D. dependent	0.336516	0.292493	0.323223

Determinant resid covariance (dof adj.)	0.000293
Determinant resid covariance	9.52E-05
Log likelihood	11.93874
Akaike information criterion	1.316329
Schwarz criterion	2.827869
Number of coefficients	33