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THE EFFECT OF TRANSPORT AND COMMUNICATIONS EXPENDITURE ON ECONOMIC GROWTH IN NIGERIA

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Abstract

Adequate investment in transport and communications sector is vital for sustainable economic growth and development of any nation including Nigeria. Therefore, this paper investigated the influence of transport and communications expenditure on economic growth in Nigeria spanning 1980 to 2020. To achieve this objective, secondary data on real gross domestic product, government capital expenditure on transport and communications sector, government recurrent expenditure on transport and communications sector, interest rate and inflation rate were collected from the numerical bulletin of Nigeria's apex bank. The Autoregressive Distributed Lag (ARDL) technique was used as the main analytical tool. The result of ARDL Bounds test revealed the existence of long run association among the variables. The results revealed that in the long run, both capital and recurrent expenditure on transport and communications sector have positive and insignificant relationship with economic growth. At the same time, interest rate exhibited negative and insignificant relationship with economic growth; while inflation rate displayed a negative and significant relationship with economic growth. In the short run, capital expenditure on transport and communications sector, as well as inflation rate have positive and significant relationship with economic growth. Also, recurrent expenditure on transport and communications sector, as well as interest rate have negative and insignificant relationship with economic growth. The study concluded that it is only capital expenditure on transport and communications sector that has meaningfully contributed to increase in economic growth in Nigeria during the period of study. Therefore, the study recommended that government should ensure adequate funding of transport and communications sector and the fiscal responsibility laws put in place be implemented without delay to ensure better accountability and prudence in

the management of funds allocated to the sector so that the services of telecom operators will be enhanced, likewise, some of our roads, railways and airports that are in bad conditions will be reconstructed. This will reduce the cost of moving products and services from producers to consumers, which in turn will increase economic growth, reduce cost of goods and services, accident as well as loss of lives and property in the country.
Keywords: Economic Growth, Expenditure, ARDL, Transport, Communications

INTRODUCTION

The processes of conveying or moving goods and people from one place to another, as well as sending and receiving messages, orders, etc. occupy an important role in a country's commercial life, industry and in the overall economic growth and development of any country (Anyanwu, Oyefusi, Oaikhenam & Dimowo, 1997; Amadi, Amadi & Nyenke, 2013). The provision of adequate and reliable transport and communications infrastructure is essential for efficient operation of any economy. This is because good infrastructure raises productivity and lowers production costs. It leads to an enormous increase in the volume of trade, making it possible for increased and concentrated population to survive and for them to be provided with wide and more varied diet. It expedites the deliveries of perishable and non-perishable goods.

In addition, transport and communications infrastructure provides intermediate inputs that enter into the production of other sectors and raise factor productivity. It also reduces the cost and time of moving goods and services to where they can be used more efficiently to increase productivity in the economy (Amadi, Amadi & Nyenke, 2013). According to Umo (2012), transport and communications sector is critical to the growth of any modern economy. It is an important driver of efficiency and productivity, required for the growth of the economy, employment generation and poverty reduction. It is also required for driving the competitiveness of the economy. There is simple evidence that countries that have made substantial economic progress in terms of growth and development are also those that have put adequate hard infrastructure including power, transport and communication infrastructure in place. This sector (i.e., transport and communications sector) has great potentials for stimulating economic growth in Nigeria. Therefore, investments in transport and communications infrastructure will serve as a driver for economic growth by promoting access to economic markets.

In order to achieve adequate economic growth, successive governments in Nigeria have allocated huge sums of money, often meagre relative to the importance of this sector in various budgets to the development of transport and communications which are grouped together for purposes of budgetary allocations. For instance, total financial commitments of the federal

government to the transport and communications sector in 1986, 1990, 2000, 2006, 2008, 2011, 2012 and 2013 shows continuous increase in trend of ₦641.9M, ₦1109.8M, ₦5336.6M, ₦16000.0M, ₦30124.45M, ₦32305.98M, ₦33033.16M and ₦33740.37M respectively (CBN, 2007 and 2014). In addition, a functional classification of recurrent expenditure in 2017 indicated that outlay on the economic sector at N315.0 billion, rose by 7.8 per cent and constituted 6.0 per cent of the total. Within the economic sector, road and construction accounted for 41.4 per cent, while agriculture and natural resources, transport and communications and "others" were 14.3, 7.7, and 36.6 per cent of the total, respectively. A scrutiny of capital expenditure by function showed that outlay in the economic sector was N539.0 billion 46.3 per cent of the total, compared with 46.2 per cent in 2016. Analysis of total federal government spending on the primary welfare sectors revealed that outlay on roads and construction, increased by 52.9, per cent to N322.9 billion, over the levels in 2016 (CBN, 2017).

Furthermore, in 2018, a functional classification of recurrent expenditure indicated that outlay on the economic sector at N372.5 billion, rose by 11.2 per cent and constituted 6.6 per cent of the total. Within the economic sector, roads and construction accounted for 40.3 per cent. Analysis of capital expenditure by function showed that outlay in the economic sector was N753.5 billion or 44.8 per cent of the total compared with 43.6 per cent in 2017. Within the economic sector, roads and construction, accounted for 36.0 per cent of the total. Analysis of total federal government spending on the primary welfare sectors revealed that expenditure on roads and construction increased by 39.8 per cent to N421.6 billion compared with the levels in 2017 (CBN, 2018).

In 2019, a breakdown of recurrent expenditure on a functional basis indicated that outlay on the economic sector, at N477.5 billion, rose by 28.2 per cent and constituted 6.8 per cent of the total. Within the economic sector, roads & construction accounted for 39.5 per cent, while agriculture & natural resources, transport & communications and "Others" were 14.7, 8.5, and 37.3 per cent of the total, respectively. An examination of capital expenditure by function showed that outlay in the economic sector was N812.7 billion or 43.4 per cent of the total, compared with 44.8 per cent in 2018. Analysis of total federal government spending on the primary welfare sectors revealed that expenditure on roads & construction rose by 14.0 per cent or N59.0 billion relative to the level in 2018 (CBN, 2019). Yet the country has not achieved adequate economic growth. For instance, in the year 2016, the economy of Nigeria was under pressure. Real sector activities were significantly constrained by low crude oil production and price shocks, foreign exchange shortages and energy deficit, among others. Therefore, the economy contracted, as provisional data indicated that Real Gross Domestic Product (RGDP),

measured at 2010 constant basic prices, declined by 1.5%, in contrast to 2.8% growth in 2015. Oil and non-oil sector output declined by 13.7 and 0.2%, respectively.

In the year 2017, the economy witnessed a mild recovery from recession. The Real Gross Domestic Product (RGDP), measured at 2010 constant basic prices, grew by 0.83%, in contrast to the contraction of 1.58% in 2016. In the year 2018, the real Gross Domestic Product (GDP), measured at 2010 constant basic prices, grew by 1.9%, compared with the growth of 0.8% in 2017. In the year 2019, the economy maintained a modest growth. The Real Gross Domestic Product (RGDP) measured at 2010 constant basic prices grew by 2.3%. The inability of the country to achieve sustainable economic growth can be attributed to inadequate infrastructures (including transport and communications infrastructure) (CBN, 2019).

The state of transport and communications infrastructure has not met the expectations of average investors in Nigerian economy. The failure of infrastructural facilities in Nigeria to enhance economic growth is now legendary. Bad and inaccessible roads, poor communications network, poor internet services, etc., are well known to constitute economic deadweights undermining both individual and national productivity. The inefficiency in infrastructural services has imposed high transaction costs on the nation's economic activities, hence its progress. It has also undermined its global competitiveness. The country has failed to attract substantial domestic and foreign investments because of its bad reputation in infrastructure provision. In the light of the above, this paper examined the effect of transport and communications expenditure on economic growth in Nigeria from 1980 to 2020. The remaining parts of this paper were organized into literature review, materials and methods, results and discussions, conclusion and recommendations.

LITERATURE REVIEW

The Unbalanced Growth Theory

This theory is associated with Hirschman (1958). A number of economists including Kindleberger (1958) and Rostow (1959) have also agreed with the idea of unbalanced growth theory. The rationale behind this theory is that underdeveloped countries are faced with limited resources such that it is not possible for them to invest in all the sectors of the economy simultaneously. Hence, investment should be made in a few selected viable sectors or industries which could then generate or spread growth to other sectors of the economy so that the economy gradually moves from the path of unbalancing to that of balanced growth (Wilson, 2002).

According to Hirschman, the best way to achieve economic growth and development in underdeveloped countries is to purposely unbalance the economy a long a predetermined

strategy. According to him, development can only take place by unbalancing the economy. He maintained that an economy can be unbalanced along two types of investments, namely, Social Overhead Capital (SOC) and Directly Productive Activities (DPA). SOC investment is defined by Wilson (2002) to comprise those basic services (i.e., social and economic infrastructures) without which primary, secondary and tertiary productive activities cannot function. The SOC investments include investment in education, health, transport and communications. DPA on the other hand, is defined to include investment in actual productive activities.

He argued that the unbalancing of the economy with social overhead capital (SOC) will encourage private investment in directly productive activities. For instance, an investment in transport and communications sector directly influences the production of farm and non-farms activities. Improved roads reduce transaction cost for both agriculture input and output. Public investment in rural roads directly reduce the cost of inputs and output in all kinds of rural opportunities, thereby directly improving rural income and reducing rural poverty. Another impact pathway arising from reduced transportation and transactions costs, lead to reduced input and food prices and causes real incomes to rise, especially incomes of families that are net purchasers of food. Investment in SOC - transport and communications sector will improve accessibility of an area by reducing travel time or increasing the potential to travel, it will also lead to increase in market size for manufacturing, tourism and/or labour, increased in competition and/or centralization, business efficiency, business investment and innovation, increase in profitability, also during construction of roads jobs will be created - labour for land clearing, design, earthworks, drainage, engineering structures, pavement, safety equipment, building, etc., this will lead to increase in wages and salaries, increase in aggregate demand; because workers have money to spend, increase in investment, increase in firms' productivity which in turn will lead to increase in economic growth.

As reported by Amadi, Amadi and Nyenke (2013), a large investment in social overhead capital (SOC) will bring about increase in private investment in the form of direct productive activities (DPA). In addition, if theories, like girls, could win beauty contests, unbalanced growth theory would certainly rate high because the doctrine of the unbalanced growth attempt to identify incentives, obstacles and resistance to growth and economic development and a feasible strategy to deal with them. The emphasis and reference for social overhead capital (SOC) approach serves well because underdeveloped infrastructure constitutes one of the constraints to economic growth and development in underdeveloped countries. Therefore, following this line of thinking, government spending on transport and communications sector is expected to influence economic growth positively which is consistent with the Keynesian theory.

Keynes (1936) argued that fiscal policy instrument (i.e., government expenditure) is an important tool for achieving increase in economic growth in an economy. To achieve stability in the economy, Keynes proposes economic interference by the government, primarily by fiscal policy. Through the Keynesian theory, public investment will contribute positively to economic growth. For instance, government expenditure on roads, communications, power, etc. will reduce costs of production, encourage investment in the private sector and increase profitability of firms, consequently promoting economic growth and development (Ranjan & Sharma, 2008; Cooray, 2009; Okulegu, 2013; Robinson, Eravwoke & Ukavwe, 2014; Inimino & George-Anokwuru, 2020). On this note, high public spending on transport and communication with the right combination of other factors as well as good policy environment will result in higher output-economic growth and development. Therefore, Y= f(GETC) (1)

Where; Y is economic growth, GETC is government expenditure on transport and communications. The relevance of this theory to the Nigerian economy is that it describes how the government of the country can help bring about increase in economic growth through spending on the various sectors of the economy including transport and communications sector (Inimino & George-Anokwuru, 2020). Hence, the Keynesian framework in which an increase in government spending will increase consumption and economic growth thus leading to poverty reduction was adopted in this work.

Empirical studies

Empirically, researchers have used different econometrics methods to investigate how expenditure on transport and communications sector has affected economic growth. For instance, Roller and Waverman (2001) on their part estimated the impact of telecommunication infrastructures on economic growth from 21 OECD countries over the past 20 years using simultaneous approach. After accounting for simultaneity and country specific fixed effect, Roller and Waverman (2001) found that the impact between telecommunication infrastructure and aggregated output was much reduced and statistically insignificant.

Boopen (2006) investigated the contribution made by transport capital to growth for a sample of Sub-Saharan African (SSA) using cross sectional and panel data analysis. They concluded that transport capital has contributed positively to economic growth of the SSA countries.

Pravakar, Ranjau, and Geethanjali (2010) used GMM and ARDL techniques to investigate the role of infrastructure in encouraging economic growth in china for the period of1975 to 2007. The result revealed that infrastructure and investment have played an important role in economic growth in China.

Nworji and Oluwalaiye (2012) investigated how public spending on road infrastructure has impacted on economic growth in Nigeria during 1980 to 2009 using OLS technique. They found out that government expenditure on transport & communication and defense have significantly impacted on economic growth. Meanwhile, inflation has positively and insignificant impact on economic growth. Similar result was found by Onakoya, Tella and Osoba (2012) when they explored the impact of investment in infrastructure of telecommunications on economic growth in Nigeria using 3SLS method.

Ndiyo and Ogar (2012) used survey method to review the efforts of Cross River State Government in up scaling transportation and communication infrastructure in Nigeria. They found out that Cross River State suffers because of inadequate funds for infrastructural maintenance, upgrading and lack of infrastructural control measures in the transportation & communication sector.

Fasoranti (2012) examined government expenditure and the Nigerian economy using simple multiple regression model. The study observed that government expenditures on health services, transport and communication impacted negatively on economic growth; however, expenditures in agriculture and security were not significant in the growth of the economy.

Kayode, Babatunde and Abiodun (2013) explored the impact of government investment in transport on economic growth in Nigeria for the time 1977 to 2009 using the OLS technique. The researchers discovered the role transportation played was not significant to determine Nigeria's economic growth.

Bosede, Abalaba and Afolabi (2013) used Ordinary Least Squares technique to look at the impact of transportation infrastructure improvement on economic growth in Nigeria spanning 1981 to 2011. The finding revealed that output of transport and investment made on transport infrastructure in Nigeria has significant positive contribution to growth which showed that each impact is strong and statistically significant. Surprisingly, Amadi, Amadi and Nyenke (2013) used OLS method to examine how the expenditure of government on transport infrastructure has impacted on economic growth in Nigeria. The outcome showed that the expenditure of government on transport infrastructure has negative and insignificantly impact on economic growth in Nigeria.

Cheteni (2013) used data from 1975 to 2011, Vector Error Correction Model (VECM) and a Bayesian Vector Autoregressive model to explore the impact of investment in transport infrastructure and transport sector output on economic growth in South African. The VECM revealed that economic growth is influenced by domestic fixed transport investments, inflation, and exchange rate, yet on the BVAR model it was influenced by domestic fixed transport investments, inflation, multi factor output, real exchange rate and second period GDP.

Frederick, Ohaleme and Ugwuanyi (2013) studied the impact of expenditure in telecommunication on economic growth in Nigeria for the time 1970 to 2010 using econometrics techniques. Their estimated results showed that telecommunication, foreign direct investment and trade openness have impacted on output positively while unemployment impacted negatively.

Nedozi, Obasanmi and Ighata (2014) evaluated infrastructural development and economic growth in Nigeria, using simultaneous analysis. The result revealed that infrastructure is an essential part of economic growth in Nigeria. In addition, infrastructure is a middle goods and service for the real sector and a manufactured goods and service for consumers.

Badalyan, Herzfeld and Rajcaniova (2014) investigated the association and causal association between transport infrastructure, investment in infrastructure and economic growth from 1982 to 2010. They utilized panel co-integration analysis and panel causality analysis for Armenia, Turkey, and Georgia. The outcomes revealed a positive and statistically meaningful impact of gross capital formation and road/rail goods transported on economic growth in the short-run. On the whole, there exist bidirectional causality between economic growth and infrastructure investment and between road and rail passengers carried and investment in infrastructure was indicated in both the short and long-run.

Hardy (2014) explored the impact of GDP per capital on lagged telephone per capita and the number of lagged radios. The study showed that telephone per capita does have a significant impact on GDP, whereas the spread of radio does not. However, when the regression was attempted for developed and developing economies separately, no significant effects occurred.

Bustan (2015) carried out a literature reviewed research, the researcher reviewed the theoretical structure of the various sources of books and the results of previous studies related to how government spending on transportation sector affects economic growth and income distribution. Outcome from the theoretical framework revealed a significant influence of government expenditure in the transport sector on economic growth and income distribution.

Siyan, Eremionkhale and Makwe (2015) used secondary and primary data to explore the impact of road transportation on economic growth in Nigeria. Probit and multivariate models were used. The result showed that transport sector has positively impacted on economic growth in Nigeria.

Wasiu and Saidat (2016) used ARDL technique to explore the effect of telecommunication infrastructure investment on economic growth in Nigeria for the time 1980 to 2012. The outcome showed that FDI in ICT is more effective in improving and raising economic growth in Nigeria than government investment. The finding from Chow breakpoint test shows

that the liberalization of telecommunication has meaningful effect on economic growth in the country.

Omokaro and Ikpere (2019) investigated the role of public spending on construction, transportation and communication on economic growth in Nigeria from 1989 to 2013.Ordinary Least Squares technique was employed as the main tool of data analysis. The findings showed that expenditure on construction has positive and significant relationship with economic growth. At the same time, expenditure on transportation and communication has positive and insignificant relationship with economic growth.

Using Ordinary Least Squares technique, Barilee and Benvolio (2021) examined the relationship between expenditure of the federal government and economic development in Nigeria. The findings revealed a positive and significant relationship between government expenditure on transport and per capita income. This also means that government spending on transport infrastructure has helped to increase output of goods and services in Nigeria during the period covered by the study.

As much as the above-mentioned studies are laudable, one important thing that was observed in their studies including the one by Omokaro and Ikpere (2019) is that they looked at the role/influence of public spending in construction, transportation and communication on economic growth in a broad term without disaggregating government spending on transport and communications sector into its various components of government capital expenditure on transport and communications sector and government recurrent expenditure on transport and communications sector. But this study disaggregated the expenditure made by the federal government of Nigeria on transport and communications sector into capital expenditure on transport and communications sector and recurrent expenditure on transport and communications sector to see how they have influenced economic growth in Nigeria from 1980 to 2020.

MATERIALS AND METHODS

This study used secondary data for the period 1980 to 2020. Annual time series data on real gross domestic product, government recurrent expenditure on transport and communications, government capital expenditure on transport and communications, interest rate and inflation rate were obtained from the statistical bulletin of Nigeria's apex bank – the Central Bank of Nigeria (CBN) from 1980 to 2020. Furthermore, the researcher would have loved to cover from 1960 when Nigeria gained independence from Great Britain to 2022 but because of paucity of data the researcher decided to cover for the period data were available. Therefore, the period 1980 to 2020 was chosen because of paucity of data.

Model Specification

The research model for this study is founded on the explicit form of the Keynesian theory which made it clear that an increase in public spending will increase consumption and economic growth. That is, Y = f(PS) were Y is economic growth and PS is public spending in transport and communications sector. This study also adapted the empirical model of Nworji and Oluwalaiye (2012) whose model is presented thus;

GDP = f(DEX, TRCE. INF) (2)

Where; GDP, is the gross domestic product, DEX represents the defence expenditure, TRCE, is expenditure on transport and communication by the federal government and INF is inflation rate.

However, following the theoretical underpinning with slight modification of equation (2), this study utilized Real Gross Domestic Product (RGDP) as the dependent variable, disaggregated government expenditure on transport and communications sector into capital and recurrent expenditure. At the same time, this study excluded DEX from the current model and introduced interest rate and inflation rate. Specifically, inflation rate - the persistent rise in the general price level of goods and services is an important variable influencing output growth in Nigeria, where food price and other exogenous factors including high imports of food and intermediate products play very important role. In general, very high levels of inflation may undermine output growth. However, if the rate of inflation is low, stable and sustainable, it may be interpreted as an indicator of macroeconomic stability that would enhance growth. And if the economy is at equilibrium higher inflation should impact adversely on growth (Onwioduokit & Bassey, 2013; 2014). Based on economic theory, this study expected an inverse relationship between inflation rate and economic growth. At the same time, interest rate - the cost of borrowing investible funds served as an independent variable in this study. The interest rate that was used in this study is the monetary policy rate (MPR). In line with economic theory, an inverse relationship was expected between interest rate and economic growth. Therefore, the model for this study is presented thus:

RGDP = F(GCETC, GRETC, INR, INF) (3)

The log form of equation (3) produced;

$LnRGDP_t = \varphi_0 + \varphi_1 LnGCETCt + \varphi_2 LnGRETCt + \varphi_3 INR + \varphi_4 INFt + \varepsilon_t$ (4)

Where; RGDP is economic growth, GCETC is government capital expenditure on transport and communications sector, GRETC is government recurrent expenditure on transport and communications sector, INR is interest rate, INF is inflation rate, ε is error term which denotes other variables not included in the model, Ln is natural log, *t* is the period of time and φ_0 is the intercept. The parameter estimates are expected to behave in line with $\varphi_1, \varphi_2 > 0$; while φ_3 and $\varphi_4 < 0$.

Techniques of Data Analysis

Augmented Dickey-Fuller (ADF) unit root test and Autoregressive Distributed Lag (ARDL) Bounds Test were used in this study as the main analytical techniques. Momentously, all the variables in the model were tested for stationary using the Augmented Dickey-Fuller unit root test procedure. Usually, the ADF test consists of estimating the following regression:

$\Delta Y_t = M_1 + M_2 t + \delta Y_{t-1} + \Sigma \alpha_i \Delta Y_{t-i} + \varepsilon_t$ (5)

Where: Y is a time series, t is a linear time trend, Δ is the first difference operator, ε is a pure white noise error term, M_1 is a constant, M_2 and δ are parameters and $\Delta Y_{t-l} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$, etc. The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term in (4) is serially uncorrelated. In ADF, we test whether δ = 0 (Gujarati & Sangeetha, 2007).

This study employed Autoregressive Distributed Lag Bounds testing method to co-integration developed by Pesaran and Shin (1999). Unlike other co integration test, bounds test is applicable irrespective of whether the variables included in the model are I(0) or I(1) or a mixture of those. However, the technique is not appropriate in the presence of I(2) series. Therefore, before employing the Bounds Test it was necessary to test for the level of integration of all the variables of interest by using the ADF Test. The test to find out if the variables in this study are co-integrated or have long-run relationship was done by computing the Bounds F-statistic (bound test for co-integration). The null hypothesis of no co-integration is rejected when the value of the test statistic exceeds the upper critical bounds value, while it is not rejected if the F-statistic is lower than the lower bounds value. Otherwise, the co-integration test is inconclusive. The Autoregressive Distributed Lag (ARDL) method was employed in order to capture the long-run as well as the short-run dynamic relationship among the variables. Therefore, the ARDL model is written as follows:

$$\Delta RGDP_{t,j} = b_0 + b_1 RGDP_{t-1,j} + b_2 GCETC_{t-1,j} + b_3 GRETC_{t-1,j} + b_4 INR_{t-1,j} + b_5 INF_{t-1,j} + \sum_{i=1}^{n1} a_{1i,j} \Delta RGDP_{t-1,j} + \sum_{i=0}^{n2} a_{2i,j} \Delta GCETC_{t-1,j} + \sum_{i=0}^{n3} a_{3i,j} \Delta GRETC_{t-1,j} + \sum_{i=0}^{n4} a_{4i,j} \Delta INR_{t-1,j} + \sum_{i=0}^{n4} a_{5i,j} \Delta INF_{t-1,j} + \mu_t \quad --- (5)$$

The vector error correction model is specified as follows:

$$\Delta RGDP_{t,j} = b_0 + \sum_{i=1}^{n1} a_{1i,j}\Delta RGDP_{t-1,j} + \sum_{i=0}^{n2} a_{2i,j}\Delta GCETC_{t-1,j} + \sum_{i=0}^{n3} a_{3i,j}\Delta GRETC_{t-1,j} + \sum_{i=0}^{n4} a_{4i,j}\Delta INR_{t-1,j} + \sum_{i=0}^{n4} a_{5i,j}\Delta INF_{t-1,j} + \lambda ECMt - 1 + \mu_t \; -- \; --- (6)$$

Where Δ is the difference operator while εt is white noise or error term, n is the optimal lag length, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$, represent the short run dynamics of the model and b_1, b_2, b_3, b_4, b_5, are the long run elasticities and μ_t is the error term. ECM_{t-1} is the error correction term obtained from the co-integration model. The error coefficients (λ_1) show the rate at which the co-integration model corrects its previous period's disequilibrium or speed of adjustment to restore the long run equilibrium relationship. The coefficient of ECM is expected to be negative and statistically significant. A negative and significant ECM_{t-1} coefficient implies that any short run movement between the dependent and explanatory variables will converge back to the long run relationship.

RESULTS AND DISCUSSION

This study examined how expenditure made by the federal government of Nigeria on transport and communications sector has impacted on economic growth in Nigeria from 1980 to 2020. Therefore, an econometric model was constructed. The model has real gross domestic product (RGDP) as the dependent variable while government capital expenditure on transport and communications (GCETC), government recurrent expenditure on transport and communications (GRETC), interest rate (INR) and inflation rate (INF) are the independent variables. See Tables one to five and Figure one for the various regression results and post estimate test results.

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Test *(E-views 10 output)*

Variables	Level form		First difference		Order of integration
	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value	
RGDP	-2.109012	-3.533083	-7.360246	-3.529758	1(1)
GCETC	-5.482991	-3.526609	-	-	1(0)
GRETC	-3.623935	-3.529758	-	-	1(0)
INR	-3.050399	-3.526609	-6.672627	-3.533083	1(1)
INF	-3.643246	-3.529758	-	-	1(0)

Note: RGDP, GCETC, GRETC, INR and INF as earlier defined

The result of the ADF test for each of the series presented in Table 1 reveals that at five per cent level of significance, GCETC, GRETC and INF were stationary at level 1(0) as their respective ADF statistics are greater than 5 per cent critical values, while RGDP and INR were stationary at first difference 1(1). Given that the variables were integrated of order 1(0) and 1(1). The requirement to fit in an ARDL model to test for long run relationship is satisfied.

Table 2: ARDL Bounds Test for Co-integration *(E-views 10 output)*

Model		**F-Statistic =** 7.590277
RGDP= F(GCETC, GRETC, INR, INF)		K = 4
Critical Values	Lower Bound	Upper Bound
10%	2.2	3.09
5%	2.56	3.49
1%	3.29	4.37

The result of the ARDL bounds test for co-integration reveals that there is a long run relationship amongst the variables (RGDP, GCETC, GRETC, INR and INF). This is because the computed F-statistic of about 7.59028 is higher than the upper critical bounds at 5% critical value. This provided evidence to reject the null hypothesis of no co-integration at 5% significance level for the economic growth (RGDP) model. Following the establishment of long-run co-integration relationship among the variables, the long-run and short-run dynamic parameters for the variables were obtained.

Table 3: Estimated ARDL Long Run Coefficients.

Dependent Variable: RGDPARDL (4, 4, 3, 3, 4) *(E-views 10 output)*

Regressors	**Coefficient**	**t-Statistic**	**P-Value**
LOG(GCETC)	0.291194	1.347382	0.1993
LOG(GRETC)	0.009213	0.050372	0.9605
INR	-0.014925	-0.627442	0.5405
INF	-0.013735	-2.697875	0.0173

The estimated ARDL long run coefficients reveal that in the long run, both government capital and recurrent expenditure on transport and communications have positive relationship with economic growth in Nigeria. However, interest rate and inflation rate have negative relationship with economic growth in Nigeria. Surprisingly, only inflation rate is statistically

significant. This means that in the long run, policies targeted at controlling inflation will significantly help to enhance economic growth in Nigeria.

Table 4: Error Correction Representation for the
Selected ARDL Model ARDL(4, 4, 3, 3, 4) *(E-views 10 output)*

Regressors	Coefficients	t-Statistic	P-Value
LOG(GCETC)	0.013195	2.111387	0.0532
LOG(GRETC)	-0.012288	-1.649680	0.1213
INR	-0.003122	-1.680747	0.1150
INF	0.002018	4.335135	0.0007
ECM (-1)	-0.178255	-7.861713	0.0000
R-squared = 0.903730	Akaike info criterion	Schwarz criterion	Durbin-Watson
Adjusted R-squared = 0.817594	= -4.768445	= -3.984755	stat = 2.372054

Table 4 reveals the result of the short-run dynamic coefficients associated with the long-run relationships obtained from the ECM equation. The ECM is rightly signed (i.e., negative) and is also significant. It shows that disequilibrium in RGDP in the previous year (since the data are annual) is corrected in the current year. The Durbin Watson (DW) value of 2.372054, suggests that autocorrelation is not a problem to the model. The R^2 of 0.903730 also revealed the good fit of the model.

The coefficients of government capital expenditure on transport and communications, as well as interest rate appeared with the right signs (i.e., positive and negative respectively) based on economic theory. Thus, a percentage increase in government capital expenditure on transport and communications will increase economic growth by 0.013195 percent, while a percentage increase in interest rate will decrease economic growth by 0.003122%. Importantly, government capital expenditure on transport and communications is statistically significant at conventional level. Therefore, it was concluded that government capital expenditure on transport and communications has positively and significantly impacted on economic growth in Nigeria during the period of study. The outcome of the coefficient of government capital expenditure on transport and communications validates the empirical work of Barilee and Benvolio (2021) who unequivocally affirmed that government expenditure on transport infrastructure has helped to increase output of goods and services in Nigeria. This means that annual expenditure by the federal government to fund the transport and communications sector has resulted in an increase in aggregate demand, increase in investment and increase in economic growth during the period of study. The implication of this result is that, capital

expenditure on transport and communication sector has meaningfully (significantly) contributed to the increases in the output of goods and services in Nigeria during the period of study. Put differently, capital expenditure on transport and communications has significantly helped to enhance the output of goods and services in Nigeria during the period of study.

Furthermore, coefficients of government recurrent expenditure on transport and communications, as well as inflation rate appeared with wrong signs (i.e., negative and positive respectively). Thus, a percentage increase in government recurrent expenditure on transport and communications will reduce economic growth by 0.012288 percent, while a percentage increase in inflation rate will increase economic growth by 0.002018%. These outcomes do not conform to economic theory. Government recurrent expenditure on transport and communications is not statistically significant at conventional level. Therefore, it was concluded that government recurrent expenditure on transport and communications has negatively impacted on economic growth in Nigeria during the period of study. The reason why government recurrent expenditure on transport and communications sector has not meaningfully impacted on economic growth in Nigeria is because the sector is facing serious challenges including mismanagement of funds and sometimes fund allocated are embezzled or misappropriated, poor manpower planning, poor welfare package for workers in the transport and communication sector and etcetera.

Post estimate tests were employed to examine the reliability of the estimated model for prediction or policy purposes. Specifically, the Wald and normality tests were applied. The post estimate tests revealed that the ARDL model passed all the diagnostic tests considered. Specifically, the Jarque-Bera statistic revealed that the Error Term is normally distributed at the conventional level (i.e., 5%). This is because the probability value of the Jarque-Bera statistic of approximately 0.145 is greater than the 0.05% conventional level. The results of these tests are reported in Table 5 and Figure 1.

Table 5: Wald Test Result *(E-views 10 output)*

Wald Test:

Equation: Untitled

Test Statistic	Value	Df	Probability
F-statistic	93417.09	(5, 14)	0.0000
Chi-square	467085.5	5	0.0000

The result in Table 5 shows that the F-statistic is approximately 93417 and the probability value of 0.0000 is less than 0.05 at the conventional 5 per cent level. Therefore, all

the explanatory variables included in the estimated model are jointly significant in explaining economic growth (RGDP) in Nigeria over the data period.

Normality Test Result

The Jarque-Bera statistic was applied to examine whether the error term in the output growth model is normally distributed at 5 per cent significance level.

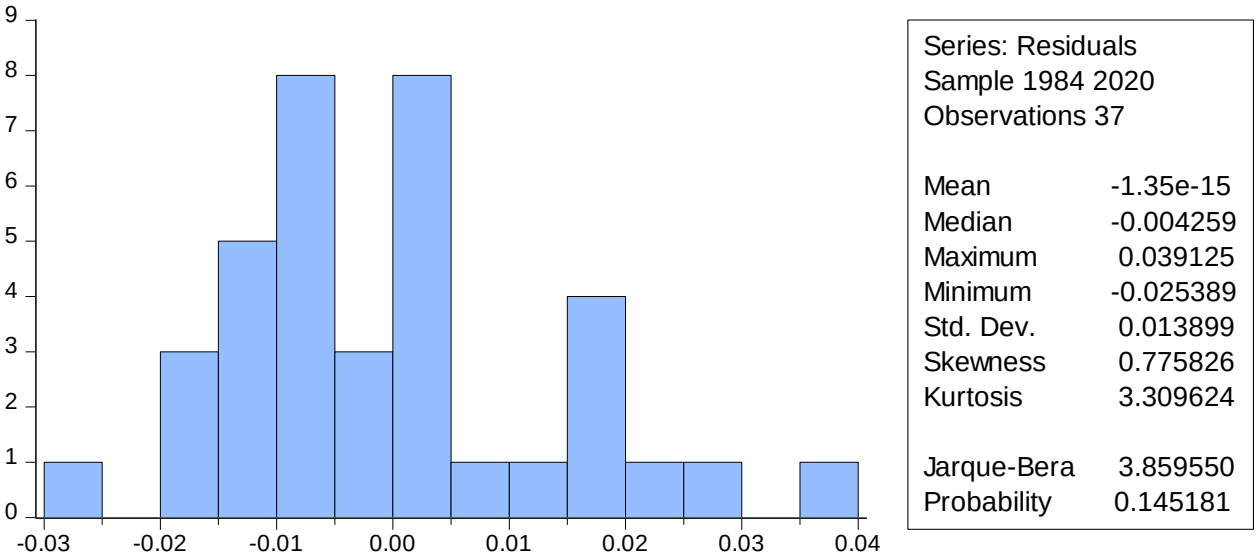

Figure 1: Normality Test Result *(E-views 10 output)*

The result shown in Figure 1 depicts that the error term is normally distributed at the conventional level (i.e., 5%). This is because the probability value of the Jarque-Bera statistic of approximately 0.145 is greater than the 0.05% conventional level. This implies that the Jarque-Bera statistic hypothesis of normally distributed residuals in the ECM model is accepted.

CONCLUSION AND RECOMMENDATIONS

The study on the influence of transport and communications expenditure on economic growth in Nigeria from 1980-2020 is of great important to the Nigerian economy. This is because public expenditure plays an important role in increasing economic growth. With the utilization of data on real gross domestic product, government capital expenditure on transport and communications, government recurrent expenditure on transport and communications, interest rate and inflation rate sourced from the statistical bulletin of Nigeria's apex bank and the adoption of the ARDL method of econometrics to capture the short and long-run relationship between endogenous and exogenous variables. The results revealed that in the long run, both

government capital and recurrent expenditure on transport and communications sector have positive and insignificant relationship with economic growth. At the same time, interest rate exhibited negative and insignificant relationship with economic growth; while inflation rate displayed a negative and significant relationship with economic growth. In the short run, government capital expenditure on transport and communications sector, as well as inflation rate have positive and significant relationship with economic growth. Also, government recurrent expenditure on transport and communications sector, as well as interest rate have negative and insignificant relationship with economic growth. The study concluded that it is only the capital aspect of government expenditure on transport and communications sector that has significantly (meaningfully) contributed to increase in economic growth in Nigeria during the period of study. Consequently, government should ensure adequate funding of transport and communication sector and the fiscal responsibility laws put in place be implemented without delay to ensure better accountability and prudence in the funds allocated to transport and communication sector so that the services of telecom operators will be enhanced, some of our roads, railways and airports that are in bad conditions will be reconstructed. This will reduce the cost of moving products and services from producers to consumers, which in turn will increase economic growth, reduce cost of goods and services, accident as well as loss of lives and property in the country. Essentially, this study has made a significant contribution to knowledge in that it examined the influence of transport and communications expenditure on economic growth in Nigeria from1980 to 2020. Furthermore, it is obvious that the subject matter of this study is by no means exhausted in this work. Therefore, further studies should focus on the effect of transport and communications expenditure on other macroeconomic variables in Nigeria.

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