Government Capital Expenditure: Implication for Economic Growth Prospect in Nigeria

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Abstract
The purpose of this study was to clarify the impact of government capital expenditure on economic growth. It used GDP growth as a substitute for economic growth. The capital expenditure was not considered aggregated but was decomposed (that is, the components of the capital expenditure are taken into account). Capital expenditure components include capital expenditure in businesses and services, capital expenditure in social welfare, capital expenditure on economic services and capital expenditure on social and community services. The study used FDI as a control variable. In this study, we used the vector autoregressive (VAR) model. The results of the regression show FDI does not have an impact on economic growth while capital expenditure on economic services, social and community services, administration and total capital expenditure has an impact on economic growth. The paper recommends that government should put in place policy measures that will guarantee an increase in the level of capital expenditure every year

Keywords: *Capital Expenditure, Economic Growth and Vector Autoregressive*

Jel Classification Code: *H50, E01*

1. Introduction

Government spending is an important component of the economy's total income. It is an integral part of finance. It is also a central means of fiscal policy to correct economic fluctuations. It can be used alone to remedy economic instability or in combination with taxes and monetary policy.

Public spending in Nigeria continues to grow due to the huge income from the production and sale of crude oil and the increasing demand for public (utility) commodities such as roads, telecommunications, energy, education and health. There is a growing need for human and national security both inside and outside the country. Available records show that total government spending and its components have continued to grow over the last three decades. For example, current total government spending increased from 4.85 billion Naira in 1981 to 36.220 billion Naira in 1990 and from 15.89.27 billion Naira in 2007 to 3.831.98 billion Naira in 2015. (CBN, 2015). Meanwhile, government investment spending increased from 6.57 billion Naira in 1981 to 24.05 billion Naira in 1990. Investment in 2000 and 2015 was 239.45 billion Naira and 81.35 billion Naira, respectively (see CBN, 2019).

However, because Nigeria is one of the poorest countries in the world, increased government spending may not have resulted in significant growth and development. In addition, many

Nigerians continue to suffer from terrible poverty while living on less than $1.5 a day for more than half-life (Okoro, 2013). In addition, macroeconomic indicators such as the balance of payments, import obligations, inflation, exchange rates and national savings show that Nigeria has not worked well for the last three decades (Okoro, 2013).

The relationship between government spending components and economic growth is an important subject of analysis because the two are related (Stiglitz, 1989). For decades, economists in both developed and underdeveloped countries have had different views on the relationship between government spending and economic growth. Some scholars believe that increased government spending will lead to increased economic growth. However, some believe that increased government spending can lead to negative growth. This may be due to the crowding-out effect of private investment due to deficit finance. Therefore, government spending was seen as an increase in productivity. At the same time, it is considered a development obstacle for funding. By borrowing to raise funds for public spending, the government competes with private investors for capital, keeps private investment out, and creates huge external debt (World Bank, 1991).

Indeed, government spending on health and education is believed to help improve labour productivity by promoting growth in the form of induced country production (Amasoma, Nwosa & Ajisafe, 2011). Similarly, spending on infrastructures such as roads, telecommunications and energy lowers production costs in both small and large industries, which increases private sector investment and corporate profitability, thereby increasing the national economy and promoting growth (Ranjan & Shanma, 2008; Al Yusuf& Couray, 2009). Olukayode (2009) believes that both recurring public spending and capital spending, especially on social and economic infrastructure, can drive growth.

From the aforementioned, it can be seen that there is no unison agreement on the nature of the impact of government spending on economic growth. Some studies show that it is positive and some show that the impact is negative, while some other studies show that government spending does not affect economic growth. Therefore, there is no consensus on the impact of government spending on economic growth, So this study aims at finding out which of the sides should support the studies on the impact of government spending on economic growth (that is whether the impact is positive, negative, or ineffective). Therefore, the research question is will government spending affect GDP in Nigeria? And do the components of government spending affect GDP in Nigeria? In light of the foregoing, the general objective is to assess the impact of government spending on economic growth, while the specific objective is:

i. To assess the impact of government spending on GDP in Nigeria.
ii. To examine the impact of components of government spending on GDP in Nigeria

The research hypotheses that have been formulated are as follows.
H_{01}: Government spending does not affect GDP in Nigeria.
H_{02}: Government spending components do not affect GDP in Nigeria.
The justification of the research is based on three perspectives namely theory, policy purpose and future research. If found that the finding in this study is in line with the existing theory, it means the theory is supported by the current study. But, if the finding is not in tandem with the

existing theory, it will call for review of the theory if several empirical studies find similar results over time.

If the findings show that the components of public spending have a positive impact on economic growth, governments will be advised to increase spending on various components to promote economic growth. If public spending negatively influences economic growth, governments will be advised to reduce spending on various sectors to promote economic growth. However, if it turns out that public spending and the components of public spending do not affect economic growth, the government will be advised not to be bothered about manipulating the components of spending to boost economic growth.

This study aims to serve as reference material for future researchers, as it provides a debate perspective on whether government spending and its components have a positive, negative, or no impact on economic growth just like some extant studies serve as a shoulder upon which the present study rest.

Considering the scope of the study, the study examines the impact of total government spending and the components of government spending on economic growth. The Nigerian study is a detailed study of the Nigerian series only, not West Africa, Africa, or any other geographic separation. This survey covers the period from 1981 to 2020. The choice of this period is based on the fact that the number of economic sectors in the calculation of GDP increased from 33 economic sectors to 46 economic sectors during this period (CBN, 2015).

The study is divided into 5 sections. The first section describes the introductory aspects of the study, including the background of the study, the definition of the problem, the purpose of the study, and research questions. Review of related literature is discussed in Section 2 with emphases on conceptual, theoretical, and empirical reviews. Section 3 covers research methods that take into account empirical models, estimation methods, and data sources, and Section 4 discussed analysis and presentation of results while Section 5 provides conclusions and recommendations of the study.

2.0 Literature Review

This section focuses on conceptual review, which observes the meaning of government spending and economic growth. It also covers the discussion of various economic growth theories including endogenous growth model, Solow-Swan growth model etc. and empirical review.

2.1 Conceptual Review

2.1.1 Government Expenditure

Government spending can be described as public spending. It is the monetary value of government activities in the economy. Activities include the responsibility of various governments, from maintaining law and order, providing infrastructure, and ensuring the safety of citizens' lives and property. It is also called government spending. It is supported by the national or central, state and local governments. Public spending can be defined in the same way as spending by public institutions such as central, state and local governments to meet the general social needs of the people. Ishola (2011) defined government spending as the state's spending to carry out its activities within a given period. It can be applied to the reduction or expansion of economic activity. Browning and Browning (1994) found that "total government spending indicates that the government is involved in national economic affairs." "It can be seen as the absorption of resources by the public sector. Here, the public sector in the broadest sense is the part of the economy where economic and non-economic activities are under the control and general direction of federal, state and local governments (Anyanwu, 1997). Public spending is broadly divided into recurrent spending and capital investment. In addition, recurrent spending and capital spending have subcategories including administrative, economic services, social and municipal services, and relocation.

2.1.2 Economic Growth

Economic growth means an increase in production measured by an increase in the gross domestic product (GDP) in the economy at any given time. It can also be described as a quantitative change in economic performance. This means changes in production levels in the economy. It can also be defined as a change in the production level of a country's goods and services over some time. Mathematically it can be expressed as:

$$Y^1 = \frac{\Delta Y_t}{Y_{t-1}} = \frac{Y_t - Y_{t-1}}{Y_{t-1}} \quad \text{...2.1}$$

Where Y^1 = Economic growth

ΔY_t= change in output or GDP

Y_{t-1} = output in the previous year

Y_t = Output in the current year.

Economic growth also has to do with how much an economy produces than it produces in the previous year. As defined by Shearer (1961), it is the change in per capita income and welfare of the people.

2.2 Theoretical Review

2.2.1 Theories of Economic Growth

In the modern period, the first answer to the question of what determined growth was from Adam Smith, in The Wealth of Nations, published in 1876. In the same vein, Nobel Laureate Arthur Lewis put forth the basics in the theory of economic growth, which can be considered as rich and relevant now as its publication in 1955.

Solow (1956) and Swan (1956) provided the mathematical underpinning of growth with a theoretical framework that still serves as a basis for the discussion of growth. The mathematical relationship is given as.

$$Qt = f(K_t, L_t, A_t) \quad \text{...2.2}$$

where subscript t is time and A, is productivity or technical progress; Q output, K is capital and L is labour. The important characteristic of the theory is its special specification, which assumes that the neoclassical production function assumes a certain scale of diminishing returns, with specific positive and negative substitutions between inputs resources. The Solow model assumes strict economic efficiency. The Solow-Swan production function is used in combination with certain savings rules to generate a simple general equilibrium. Mathematically it is expressed as below.

?K = saving - depreciation …………………………………...…………………… 2.3

This is the link between savings and growth in capital, with the assumption of a closed economy without government intervention, or a gross increase in capital stock which is equal to saving. To get the increase in the capital stock i.e. ?K, we have to deduct depreciation. Hence, the net addition to the capital stock is equal to saving minus depreciation.

Then, with the assumption that saving(s) is a constant fraction of income (Y) and that depreciation is a constant rate of the per cent of the capital stock. Considering these assumptions, then we obtain equation (2.4)

?K = SY – dK …………………………………………….................................... 2.4

Steady-state is reached when capital and per capita production is constant. An important prediction of this neoclassical growth model, widely used as an empirical hypothesis in recent years, is conditional convergence. This means that the lower the starting point of GDP per capita than the long-term stable position, the faster it will be. This is due to the decline in the rate of return on capital, which tends to be higher in rates of return and growth in economies with low capital per worker. In the Solow-Swan model, equilibrium is a condition because steady-state capital levels and production per worker depend on the savings rate, population growth rate, position of production function and can vary from one economy to another.

Another important theory of determinants of growth is the Harrod Domar growth model. Both scientists and scholars are interested in examining the rate of income growth required for the economy to function smoothly and uninterruptedly (Harrod, 1947; Domar, 1957). It can be seen that those models have different details, but they come to the same conclusion. Both models show that investment plays an important role in the process of economic growth. Harrod and Domar (1947) found that net investment needed to be steadily increased to achieve full employment in the long run. In addition, real income needs to grow continuously at a rate sufficient to fully utilize the growth capital stock.

The role of technological progress as a key component of long-term economic growth has been examined in recent studies that embrace a constant and increasing rate of return on capital. Known as endogenous growth theories, these theories suggest that the introduction of new accumulations of elements such as knowledge and innovation induces self-sustaining economic growth. In the wake of pioneering work by Romer (1986) and Lucas (1988), papers related to the scope of their work identify three major sources of growth. The first is the new knowledge mentioned in Romer 1990, Grossman and Helpman 1991. The second source of growth identified is innovation, which was mentioned in Aghion and Howitt (1992). The third source of growth in public infrastructure (Barro, 1990). Therefore, in contrast to the neoclassical counterpart, politics has been assigned an important role in promoting long-term growth. Regarding the discussion of convergence and divergence, the endogenous growth model suggests that convergence does not occur at all mainly because there is increasing returns in terms of scale. The simplest type of the new growth theory or endogenous growth theory production function is as below.

Q = AK ……………………………………………………………………………………2.5

Where Q is output, A is a positive constant that represents the degree of technology and K is denoted as physical capital.

2.3 Theoretical Framework

The theoretical basis for the study of economic growth is Solow-Swan (1956) i.e. neoclassical growth theory, which emphasized labour and capital accumulation through savings as determinants of economic growth. Also, the study is premised or endogenous Growth Model, which emphasis technological progress as an endogenous factor in contrast with the neoclassical theory that regarded it as an exogenous factor in determining economic growth. And it is pursed on some other new theories that consider labour, capital, like neoclassical and endogenous growth model, and other factors which include natural resources, investment, human capital innovation, technology, macro-economic management, research and development (R&D) institutional framework, FDI, geography institutional framework, demography etc. as determinants of economic growth see George and Paschalis (2008) and Endwi, Mill and Zhao (2013).

2.8 Empirical Evidence

There are several theories about the impact of government spending on economic growth. Some studies are from Nigeria and are discussed below.

Singh and Sahni (1984) use the Granger causality test to determine the direction of the causal relationship between India's national income and public spending. Both total spending (aggregated) and non-aggregated spending data for the period 1950-1981 were used. The data used in the survey was collected annually and deflated using the implicit Gross National Income Deflator. No causal process was found in this study that confirmed Wagner's or vice versa views. In a study of developed and developing countries by Landau (1986), using Pairwise Correlation Analysis, it was found that there was a negative correlation between government spending and growth in both developed and developing countries.

Ahsan et al. (1996) it has been shown that the use of additional fiscal or monetary variables can change the fiscal relationship between public spending and national income. A study of the relationship between government spending and economic growth in Ekpo (1996) found that total public spending had a positive impact on economic growth. However, Cheng and Lai's (1997) study on the dynamics of public spending in South Korea does not support the results of Ekpo (1996). Another study, Kelly (1997), in a cross-sectional study of the relationship between economic growth, public investment and public social spending in 73 countries from 1970 to 1989, it was found that social spending to promote welfare stimulate growth and increase productivity.

Dipendra (1998) investigated the causal relationship between Malaysian government spending and economic growth in his study with the help of an extended Granger causality test between two variable sets. Evidence from the results showed that there was no inverse causal

relationship between the variables under consideration.
In another study, Aschauer (2000) tested the classical growth model by examining the complementary effects of private and public capital on economic growth, using OLS and found that public spending has a positive impact on economic growth.

Fan and Rao (2003) also adopted government and non-government investments in transport, health, education, telecommunications, transport, social security, defence, and labour as explanatory variables in Asia, Africa, and Latin America. They tested the Cobb Douglas production function of each country's GDP as a dependent variable using OLS. Their findings revealed that spending on health and agriculture in Africa has a positive impact on economic growth, and spending on education and defence has a negative impact on economic growth in both Africa and Latin America.

Vamvoukas and John, (2005) used the Granger causality test to investigate the relationship between Thai government spending and economic growth. The results confirmed that there is a one-way relationship, as causality leads from government spending to growth. Therefore, it shows a significant positive effect of government spending on economic growth.
According to a study by Akpan (2005) on the impact of public spending on economic growth in Nigeria using ARDL, it was found that total spending had a positive impact on economic growth.
In a related study, Ram (2006) assessed the impact of government size on economic growth in developing and developed countries using the error correction model (ECM), it was found that government size has a positive short-run impact on economic growth.

Loto (2011), while studying the impact of spending on infrastructure on economic growth in Sub-Sahara African countries using decomposed public investment spending with auto-regressive distributed lag (ARDL) technique, found that infrastructure spending has a positive impact on economic growth in Sub-Sahara African countries.

In a related study, Ebong et al. (2016) examined the impact of government expenditure in Nigeria using the ordinary least square technique and found that government expenditure to have a positive impact on economic growth in both developed and less developed countries.
In another study, Nwaolisa and Ifeoma (2017) analyse the impact of public expenditure on economic growth in Nigeria using the ordinary least square (OLS) estimation technique and found that administration and education expenditure has a positive impact on economic growth while the impact of defence on economic growth is negative.

In a related study, Frank and Kereotu (2020) examine the impact of government expenditure on economic growth in Nigeria using the OLS estimation technique, with the finding that government expenditure has a positive impact on economic growth in Nigeria. In the same vein, Bappahyaya, Abiah and Bello (2020), in a study on the impact of government expenditure on economic growth in Nigeria where ARDL was employed, it was found that capital and recurrent expenditure have an impact on economic growth in Nigeria.

3.0 Methodology
This section discusses the methodology of the study including the model specification, estimation techniques, data and measurement, and sources of data.

3.1 Model Specification

In determining the impact of government spending on economic growth in Nigeria, the study adopts the Solow growth model with a bit of modification with the addition of government spending and FDI in the Cobb- Douglas production framework

$GDPGR_t = A_t K_t^{\alpha} EXP_t^{\beta} FDI_t^{\Phi} L_t^{1-\alpha-\beta-\Phi}$ ……………………………………………………… 3.1

Where:

GDPGR = Gross Domestic Product Growth Rate

A = Technology

EXP = Government Expenditure

FDI = Foreign Direct Investment

L = Labour Force

Expressing the equation in per capita forms, it becomes:

$$\frac{GDPGR_t}{AL_t} = \left(\frac{Kt}{(AL_t)}\right)^{\alpha} \left(\frac{EXP_t}{(ALt)}\right)^{\beta} \left(\frac{FDI_t}{AL_t}\right)^{\Phi} \text{……………………} 3.2$$

If $\frac{GDPGR_t}{AL_t}$, $\left(\frac{Kt}{(AL_t)}\right)^{\alpha}$, $\left(\frac{EXP_t}{(ALt)}\right)^{\beta}$, $\left(\frac{FDI_t}{AL_t}\right)^{\Phi}$ = $gdpgr_t$, k_t, exp_t and fdi respectively then 3.3 becomes:

$gdpgr_t = k_t^{\alpha} exp_t^{\beta} fdi_t^{\Phi}$ …………………………………………………………………….. 3.4

Transforming 3.5 to linear equation to form the empirical growth model for this study; it becomes:

$lngdpgr_t = \beta_0 + \Phi_1 lnkt + \Phi_2 lnexp + \Phi_3 lnfdi + \varepsilon_t$ ………………………………………………3.5

Where: $gdpgr_t$= GDP growth rate per capita

k_t = capita labour ratio

fdi_t= FDI per capita

exp_t = Government expenditure per capita

ε_t= error term

$\beta 0$, Φ_1, Φ_2 and Φ_3 are parameter estimates using the appropriate econometrics techniques.

3.2.2 Components of Government Expenditure Model

Related to the manipulation above, the impact of the components of government spending on economic growth will be investigated using the model below.

$GDPGR_t = f(L_t, FDIt, CET, CEADMt, CESCSt, CEESt)$ ………………………………..3.6

Linearizing the equation, it becomes:

$GDPGR_t = \beta_0 + \eta_1 LNCET_t + \eta_2 LNFDI_t + \eta_3 LNCEADM_t + \eta_4 LNCESCS_t + \eta_5 LNCEES_t + \eta_6 KLR_t + e_t$……………………………….3.7

3.2.3 Definition of Variables

GDPGR = GDP growth rate
KLR = Capital Labour ratio.
LFDI = Log of Foreign Direct Investment.
LCEADM = Log of capital expenditure on administration
LESCS = Log of capital expenditure on social and community services
LCES = Log of capital expenditure on economic services
LCET = Log of total capital expenditure
e_t = Error term

η_1, η_2, η_3, η_4 and η_5 are parameter estimates that will be estimated using the appropriate econometrics techniques. The parameter estimates are expected to behave as $\eta_1, \eta_2, \eta_3, \eta_4, \eta_5$ and $\eta_6 > 0$.

3.2.4 Estimation Techniques

The time series to analyze the impact of government spending on GDP growth rate and to find out the impact of public spending components on growth in GDP was subjected to a unit root test by applying Augmented Dickey-Fuller. Then, if the results of unit root tests show that all the series are stationary at the first difference (i.e. the series are I(1) series), the ARDL bound test of Pesaran and Shin (2001) is employed to test for co-integration/long-run relationship among the variables. The result of co-integration, which shows that the series are co-integrated, necessitate the use of the ARDL estimation method for the study.

3.2.5 Sources and Measurement of Data

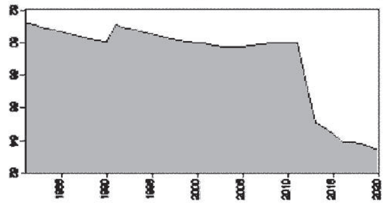
Data for the study were sourced from the CBN statistical bulletin. GDP growth rate (GDPGR) is measured as the log of gross domestic product. The reason for not using the growth rate of GDP is because the results of estimation from the growth rate is not robust. Capital labour ratio (KLR) is measured as the percentage of the labour force to population, foreign direct investment (LFDI) is measured as the log of FDI, capital expenditure on administration is measured as log of capital expenditure on administration (LCEADM), capital expenditure on economic services and total capital expenditure is measured in log forms. The data covers the period of 1981 to 2020.

4.0 Presentation of Result

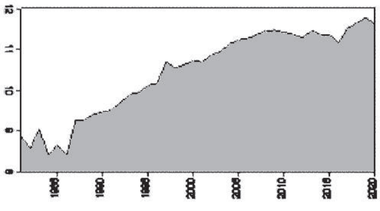
This section deals with discussion and presentation of descriptive statistics, correlation analysis, trend analysis, unit root test, co-integration test, regression results and diagnostic tests.

4.1 Trend, Descriptive and Correlation Analysis

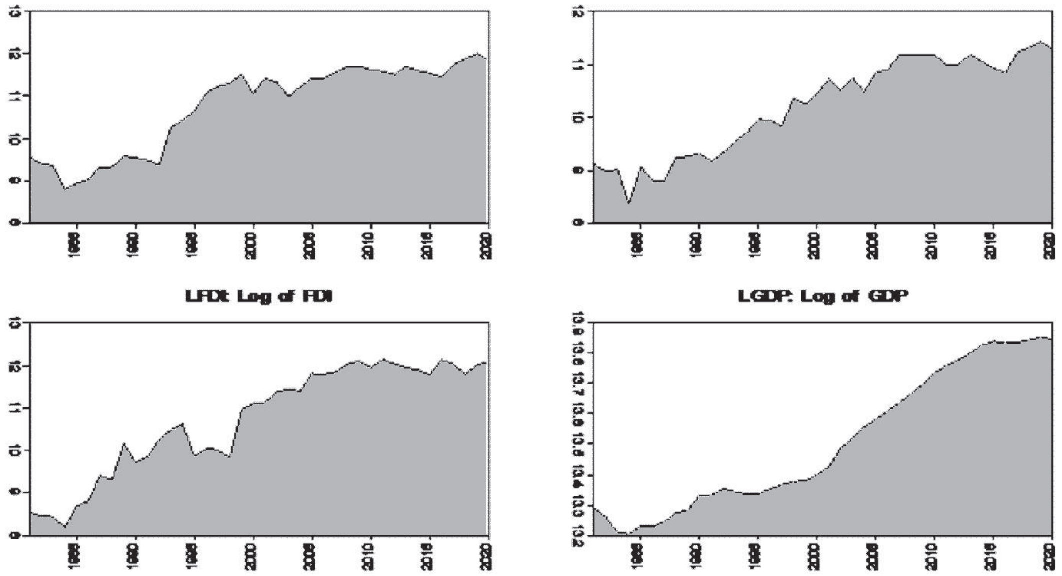
LABOURF_POP: Percentage of Labour Force to Pop



LCEADMIN: Log of Capital Expenditure on Admin



LCES: Log of Capital Expenditure on Services LCESCS: Log of Capital Expenditure on Social and Community Services



Source: Author's extract, 2021

Figure 4.1 Trends of Labour Capital Ratio, Log of Foreign Direct Investment, Capital Expenditure on Administration, Capital Expenditure on Economic Services and Total Capital Expenditure

As shown in Figure 4.1, the percentage of the labour force to population started by falling after 1981, exhibit zigzag shape and fall significantly by the year 2020. Capital expenditure on administration fluctuates right from 1981 to 1988. afterwards, it maintains an increasing trend with a little level of zigzag movement. Capital expenditure on services exhibits an increasing trend with some level of fluctuation in the trend. Also, the trend of capital expenditure on social and community services shows a fluctuating increasing trend. In the case of FDI, its trend fluctuates and exhibit an increasing trend from 1981. The GDP exhibit a falling movement in 1981 and 1983, after which, it continues to increase till 2020.

Table 4.1: Descriptive Statistics of LabourF/ POP, LCEADMIN, LCES, LFDI, LGDP and LTCE

	LABOURF/PO	LCEADMI	LCES	LCESCS	LFDI	LGDP	LTCE
Mean	59.00	10.44	10.76	10.22	10.74	13.51	11.19
Median	60.00	10.71	11.27	10.46	11.11	13.41	11.50
Maximum	61.20	11.77	12.00	11.42	12.14	13.85	12.36
Minimum	53.41	8.42	8.82	8.38	8.18	13.21	9.61
Std. Dev.	2.55	1.05	1.03	0.91	1.29	0.23	0.88
Prob.	0.00	0.13	0.07	0.15	0.14	0.12	0.11
Obs.	40.00	40.00	40.00	40.00	40.00	40.00	40.00

Source: Author’s computation, 2021

Explanatory note: Percentage of the labour force to population (LabourF/Pop), log of capital expenditure on administration (LCEADMIN), log of capital expenditure on services (LCES), log of FDI (LFDI), log of GDP (LGDP) and log of total capital expenditure (LTCE).

From Table 4.1, it is shown that the mean of Labour F/Pop is 59.00, which is close to the percentage of the labour force to the population in 2004 while the maximum value is found to be 61.20, which is obtainable in the year 1981, with the minimum value of 53.41 being found in 2020. In the case of LCEADMIN, the mean value is 10.44, which is obtainable in1988, with maximum and minimum values of 11.77 and 8.42 respectively, which are obtainable in 2008 and 1984 in that order. The mean, maximum and minimum values of LCES are 10.76, 12.00 and 8.82 respectively, which can be found in the years 2003, 2019 and 1984 in that order. Considering LCESCS, the value of mean, maximum and minimum are 10.22, 11.42 and 8.38 respectively, which are obtainable in the year 1999, 2019 and 1984 in that order. In the case of LFDI, 10.74, 12.14 and 8.18 are the mean, maximum and minimum values respectively, which are found in the years 1994, 2011 and 8.18 in that order. It is also shown in the table that the mean, maximum and minimum values of LGDP are 13.51, 13.85 and 13.21 respectively, which can be found in the years 2003, 2019 and 1984 in the same order. Lastly, the mean, maximum and minimum values of LTCE are 11.19, 12.36 and 9.61 respectively, which can be found in the years 1995, 2019 and 1984 in the same order. Other characteristics of the series are as shown in the table.

Table 4.2 Pairwise Correlation Matrix of Labour Capita Ratio, Foreign Direct Investment, Capital Expenditure on Administration, Capital Expenditure on Economic Services and Total Capital Expenditure

Probability	LABOURF_POP	LCEADMIN	LCES	LCESCS	LFDI	LGDP	LTCE
LABOURF_POP	1						

LCEADMIN	-0.620941	1					
	0	-----					
LCES	-0.584441	0.78189	1				
	0.0001	0	-----				
LCESCS	-0.639275	0.676239	0.761041	1			
	0	0	0	-----			
LFDI	-0.603214	0.759422	0.701708	0.644371	1		
	0	0	0	0	-----		
LGDP	-0.817055	0.795989	0.740391	0.612919	0.797675	1	
	0	0	0	0	0	-----	
LTCE	-0.618647	0.680584	0.782045	0.769937	0.737421	0.678383	1
	0	0	0	0	0	0	-----

Source: Author's computation, 2021

Explanatory note: Percentage of the labour force to population (LabourF/Pop), log of capital expenditure on administration (LCEADMIN), log of capital expenditure on services (LCES), log of FDI (LFDI), log of GDP (LGDP) and log of total capital expenditure (LTCE).

From Table 4.2, it is shown that labour force has a negative correlation with all the series, while the correlation of LCEADMIN with the rest of the variables is positive except labour force. Also, it is revealed in the table that a positive correlation exists among all the series employed, with

Table 4.3 Augmented Dickey-Fuller Test for the Series

Variables	ADF t-Statistics	Probability
LABOURF_POP	-3.738	0.007
LCEADMIN	-10.432	0.000
LCES	-6.565	0.000
LCESCS	-9.642	0.000
LFDI	-7.952	0.000
LGDP	-3.773	0.000
LTCE	-3.738	0.000

Source: Author's computation, 2021

In addition, the results of the unit test show that all the series are stationary at the first difference (i.e the series are I(1) series), see Table 4.3 above. Since it is found that all the series in the study are stationary at the first difference, it makes the use of the Vector Autoregressive econometrics technique applicable with the Johansen cointegration test. The cointegration test shows that all the 7 equations are cointegrated at a 0.05% level of significance (see Appendix Table1). This implies that all the series have a long relationship.

Table 4.4 F-Stat. and Prob. of Auto-correlation, Heteroscedasticity and Ramsey Reset Tests

Tests	F-Statistics	Probabili
Serial Correlation	0.213	0.809
Heteroscedasticit	1.121	0.375
Ramsey Reset	1.085	0.285

Source: Author's computation, 2021

Considering diagnostic tests, it is revealed from the Bruesch-Godfrey serial correlation test that the F-statistics is 0.2132 with a p-value of 0.8093 (Table 4.4), which suggest that the error terms in the model are free from serial correlation problem. In the case of the heteroscedasticity problem, it is revealed in the Bruesch-Pagan-Godfrey test that F-statistics is 1.121 with a p-value of 0.3751 (see Table 4.4), which implies that the F-statistics is not statistically significant and as such, the model is free from heteroscedasticity problem. Considering the normality of the residuals test, it is revealed from the test that the Jarque-Bera value is 2.7406 with a p-value of 0.2540 (see Appendix, Figure 1). This implies that the error terms are normally distributed. The results for the Ramsey Reset test revealed that F-statistics is 1.088 with a p-value of 0.285 (see Table 4.4), which implies that the F-statistics is not statistically significant at a 5% significance level. Therefore, the model is stable. The foregoing is supported by the CUSUM Test result, in which the blue line is in-between the two red lines at a 5% significance level. As shown in Appendix, Figure 3, the impulse response function graph shows that all the explanatory variables respond positively to anyone standard deviation shock in GDP in the long run. Also, the coefficient of determination, R^2, which is 0.997 in the VAR regression results below indicate that 99% of the total variation in economic growth is being explained by the explanatory variables in the model.

Table 4.5: VAR REGRESSION RESULTS

Variables	LGDP	LABOURF	LCEADMIN	LCES	LCESCS	LFDI	LTCE
LGDP(-1)	1.048	0.068	1.318	1.435	1.733	4.872	0.327
Std. Error	0.205	6.495	2.445	2.732	2.567	3.109	1.522
t-Stat.	5.12	0.011	0.539	0.525	0.675	1.567	0.215
LGDP(-2)	-0.244	5.893	1.76	0.827	1.357	6.109	0.285
Std. Error	0.174	5.513	2.076	2.319	2.179	2.639	1.292
t-Stat.	1.407	1.069	0.848	0.357	0.623	2.315	0.221
LABOURF_POP(-1)	0.008	1.138	0.008	0.034	0.002	0.01	0.035
Std. Error	0.006	0.189	0.071	0.079	0.075	0.09	0.044
t-Stat.	1.381	6.039	0.107	0.434	0.026	0.115	0.784
LABOURF_POP(-2)	0.390	0.006	0.034	0.026	0.006	0.032	0.043
Std. Error	0.170	0.005	0.064	0.072	0.067	0.082	0.04
t-Stat.	2.286	1.033	0.524	0.368	0.094	0.393	1.083
LCEADMIN(-1)	0.069	0.436	0.022	0.111	0.084	0.046	0.11
Std. Error	0.021	0.663	0.25	0.279	0.262	0.317	0.155
t-Stat.	3.305	0.658	0.086	0.397	0.321	0.145	0.706
LCEADMIN(-2)	0.082	0.2	0.218	0.275	0.21	1.26	0.242
Std. Error	0.021	0.668	0.252	0.281	0.264	0.32	0.157
t-Stat.	3.886	0.3	0.869	0.98	0.794	3.94	1.545
LCES(-1)	0.116	0.243	0.159	0.414	0.17	0.274	0.011
Std. Error	0.024	0.75	0.282	0.315	0.296	0.359	0.176
t-Stat.	4.907	0.325	0.563	1.313	0.573	0.764	0.06
LCES(-2)	0.006	0.396	0.035	0.023	0.272	1	0.037
Std. Error	0.024	0.746	0.281	0.314	0.295	0.357	0.175
t-Stat.	0.262	0.531	0.125	0.073	0.923	2.799	0.211
LCESCS(-1)	0.111	0.669	0.174	0.022	0.157	0.387	0.071
Std. Error	0.019	0.591	0.222	0.248	0.233	0.283	0.138
t-Stat.	5.965	1.134	0.782	0.089	0.672	1.369	0.513
LCESCS(-2)	0.046	0.498	0.08	0.514	0.137	0.107	0.451
Std. Error	0.020	0.637	0.24	0.268	0.252	0.305	0.149
t-Stat.	2.316	0.781	0.333	1.919	0.543	0.352	3.022
LFDI(-1)	0.012	0.226	0.159	0.081	0.23	0.344	0.025
Std. Error	0.011	0.339	0.128	0.143	0.134	0.162	0.08
t-Stat.	1.167	0.665	1.244	0.568	1.715	2.12	0.313
LFDI(-2)	0.004	0.201	0.13	0.24	0.036	0.194	0.162
Std. Error	0.011	0.351	0.132	0.148	0.139	0.168	0.082
t-Stat.	0.330	0.572	0.982	1.621	0.259	1.153	1.972
LTCE(-1)	0.084	0.289	0.546	0.579	0.071	0.274	0.709
Std. Error	0.031	0.996	0.375	0.419	0.394	0.477	0.233
t-Stat.	2.669	0.29	1.457	1.382	0.18	0.574	3.04
LTCE(-2)	0.092	0.078	0.094	0.311	0.102	0.972	0.122
Std. Error	0.035	1.107	0.417	0.465	0.437	0.53	0.259
t-Stat.	2.636	0.07	0.226	0.669	0.233	1.834	0.469
C	2.435	87.853	6.982	6.957	1.654	15.643	2.721
Std. Error	-1.022	32.461	12.222	13.653	12.831	15.538	7.608
t-Stat.	2.383	2.706	0.571	0.51	0.129	1.007	0.358
R-squared	0.997	0.974	0.976	0.97	0.966	0.973	0.987
Adj. R-squared	0.995	0.958	0.961	0.952	0.946	0.957	0.979
Sum sq. resids	0.006	6.303	0.894	1.115	0.985	1.444	0.346
S.E. equation	0.016	0.523	0.197	0.22	0.207	0.251	0.123
F-statistic	501.188	61.87	65.814	53.942	47.345	59.821	122.628
Log-likelihood	111.624	19.784	17.334	13.127	15.487	8.212	35.349
Akaike AIC	-5.085	1.831	0.123	0.099	0.026	0.357	1.071
Schwarz SC	-4.439	2.477	0.524	0.745	0.621	1.004	0.425
Mean dependent	13.519	58.882	10.535	10.83	10.277	10.853	11.268
S.D. dependent	0.227	2.566	0.996	1.01	0.891	1.208	0.841

Source: Author’s computation, 2021

Explanatory note: Percentage of the labour force to population (LabourF/Pop), log of capital expenditure on administration (LCEADMIN), log of capital expenditure on services (LCES), log of FDI (LFDI), log of GDP (LGDP) and log of total capital expenditure (LTCE).

4.2 Discussion of Findings

The results of the Vector Autoregressive (VAR) in column 2 of Table 4.5show that the coefficient value of percentage of the labour force to population (i.e LabourF/Pop (-2)) is 0.0390 with t-statistics of 2.286, which is greater than 2 and portends that the coefficient value is positive and statistically significant. So, it implies that the labour force has a positive impact on economic growth. This is in line with findings by studies such as Aschauer (2000), Aschauer (2000), Fan and Rao (2003), Ram (2006), Lotto (2011), Nwaolisa and Ifeoma (2017) etc.

Considering capital expenditure on administration (LCEADMIN), it is shown in column 2 of the result in Table 4.5 that the coefficient of capital expenditure on administration is 0.069 and 0.082 in lag1 and lag2 respectively with t-statistics of 3.305 and 3.886 in the same order, which signifies that the coefficient values are positive and statistically significant. It implies that capital expenditure on administration has a long-run positive impact on economic growth. Therefore, the higher the capital expenditure on administration, the higher the economic growth and vice versa. The finding supports the ones by Ram (2006), Lotto (2011), Frank and Kereotu (2020), Bappahyaya et al. (2020) etc.

Considering capital expenditure on services (LCES), it is shown from the result, column2 in Table 4.5 that the coefficient value of lag1 of capital expenditure on services is 0.116 with t-statistics of 4.902, which is statistically, which signifies that the coefficient value is statistically significant. This suggests that capital expenditure on services has a long-run positive impact on economic growth. Therefore, the higher the capital expenditure on services, the higher the economic growth and vice versa. The finding is in tandem with the ones by Paymaster and Ram (2006), Lotto (2011), Frank and Kereotu (2020) and Bappahyaya et al. (2020).

The results in column1 of Table 4.5show that the coefficient value of capital expenditure on social and community services (LCESCS) is 0.111 for lag1 and 0.046 for lag2 with t-statistics of 5.965 and 2.316 for lag1 and lag2 respectively. This signifies that the coefficient value of capital expenditure on social and community services (LCESCS) is statistically significant as the t-statistics is greater than the tabulated value. It implies that capital expenditure on social and community services has a positive impact on economic growth. This is in line with findings by studies such as Aschauer (2000), Aschauer (2000), Fan and Rao (2003), Ram (2006), Lotto (2011), Frank and Kereotu (2020), Bappahyaya et al. (2020), etc. The results show that an increase in capital expenditure on social community services (LNCESCS) leads to an increase in economic growth and vice versa.

It is also shown in the result that the coefficient value of LFDI is 0.011 with t-statistics of 1.167 which is statistically insignificant. This result shows that FDI does not have an impact on impact on economic growth in Nigeria.

Finally, it is revealed in the table above that the coefficient values of LCET are 0.084 for lag1 and 0.092 for lag2 with t-statistics of 2.669 and 2.636 for lag1 and lag2 respectively. This indicates that the coefficient value is statistically significant as the t-statistics is greater than the tabulated t-statistics. This implies that aggregated capital expenditure has a positive impact on economic growth. This is in line with the findings of extant studies such as Aschauer (2000), Fan and Rao (2003), Ram (2006), Lotto (2011), Frank and Kereotu (2020), Bappahyaya et al. (2020) e.t.c.,

5.0 Conclusion and Recommendation

This chapter provides a conclusion and recommendations of the study based on the results of the study.

5.1 Conclusion

Based on the findings discussed above, it is noted that the percentage of the labour force to population has a positive impact on economic growth just like capital expenditure on administration, services, social and community services. It can be concluded based on our findings that capital expenditure in aggregated form has an impact on economic growth as well. However, foreign direct investment is found not to have an impact on economic growth.

5.2 Recommendations

- Government should put in place policies that will enable the private sector to employ more labour, such as tax holidays, to increase their level of output and thereby increase economic growth.
- Government can increase the components of capital expenditure such as capital expenditure on administration, services, social and community services in a bid to increase economic growth in Nigeria.
- Likewise, in a bid to drive economic growth in Nigeria, the government should increase the capital expenditure in totality.

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Appendix

Table 1 Co-integration Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.888970	234.3076	125.6154	0.0000
At most 1 *	0.790910	152.9832	95.75366	0.0000
At most 2 *	0.625372	95.07869	69.81889	0.0001
At most 3 *	0.514559	58.75133	47.85613	0.0034
At most 4 *	0.332896	32.01149	29.79707	0.0274
At most 5 *	0.236327	17.03357	15.49471	0.0291
At most 6 *	0.173661	7.057774	3.841466	0.0079

Figure 1 Normality of Residuals Test

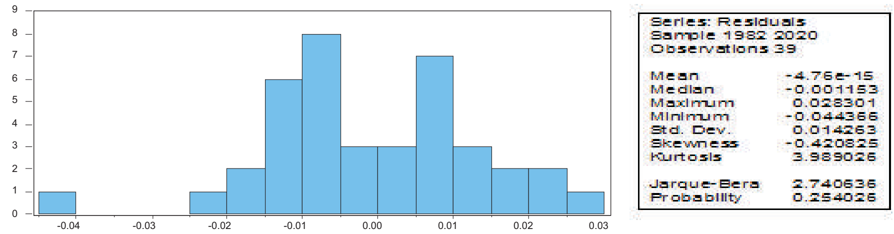

Figure 2 CUSUM Test of Stability of Models