# Federal Government's Recurrent Expenditures and Real Gross Domestic Product: A Disaggregated Approach

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***Abstract***
*This study examined the effect of federal government disaggregated recurrent expenditure on economic growth. Data were sourced from Central Bank of Nigeria Statistical Bulletin.1986-2019. Real gross domestic product was modeled as the function of Federal Government Recurrent on Agriculture, Federal Government Recurrent on Works, Housing and Road Construction, Federal Government Recurrent on Transport and Communication, Federal Government Recurrent Expenditures on Education, Federal Government Recurrent Expenditures on Health and Federal Government Recurrent Expenditures on Defense. The study adopted the ADF Unit Root test, ARDL Bounds Cointegration Test and Autoregressive Distributed Lags (ARDL) was applied for the coefficient estimations. The study found that 99.8% variation in real gross domestic product was traced to recurrent expenditures as modeled. WHR, TRC, HLT have positive impacts while AGR, EDU, and DFE showed negative impacts on RGDP. From the finding, we conclude that recurrent expenditures determine the variation in real gross domestic product in Nigeria. We recommend that Government should sustain spending on WHR, TRC and HLT which have positively contributed to real output. It should commit more funds to AGR, EDU and DFE in order to reverse the adverse impact observed in these sectors. Government should sustain Recurrent funding on EDU and HLT which revealed a positive impact but boost revenue expenditure on AGR, WHR, TRC and DFE which constitute growth-constraints to the economy.*

***Keywords: Federal Government, Recurrent Expenditures, Real Gross Domestic Product, Disaggregated Approach***

## INTRODUCTION

The public sector is concerned with infrastructural investment such as roads, railways, airports, power, communication, manpower development, security and judiciary (law and order) to name but a few. These forms of investment carried out by the public sector have indirect productive capacity effect on the economy. They do not produce themselves, but assist the private or real sector in the efficient production of goods and services. Where these infrastructures are deficient, then the productivity of the private or real sector drops significantly, the GDP of the economy stagnates or grows negatively, dragging down poverty (low income), unemployment, low domestic and foreign investment, high rate of inflation, and all forms of social vices along with it. Without good infrastructure the growth of the private sector (the real sector) cannot be guaranteed. Over the years, capital and revenue expenditure have become a subject of discussion among academia, policy makers, and all shades of economists with particular reference to their contributions to economic growth.

The main purpose of government budget is to ensure adequate expenditure provision for all the strata of the economy. Government expenditure can be for the acquisition of goods and services for current use to directly satisfy individual or collective needs of the members of the community or it can be for acquisition of goods and services intended to create future benefits such as infrastructural investment (Baro & Grilli, 1994). The expenditures can as well represent transfers of money, such as social salaries and cost of administration. Therefore, Government expenditure (like the expenditure of the private sector firms) can be classified into current expenditure and capital expenditure. Recurrent expenditure is expenditure on items that are consumed and only last a limited period of time. They are items that are used up in the process of providing for public goods and services. In the case of the public sector, current or more aptly, recurrent expenditure would include wages and salaries and expenditure on consumables - stationery, writing materials, toiletries, fuel, transport and flight tickets, out-of station allowances, estacodes, hotel expenses, drugs for health services, bandages and so on. By contrast, capital expenditure is spending on assets. It is the purchase of items that will last for a long time and will be used several times in the provision of goods or services. In the case of the government, examples would be the construction of a new hospital, the purchase of new vehicles, aircrafts, ships, trains, computer equipment or networks, provision of new buildings, construction of new roads, airports, seaports and bridges.

Several studies have shown that there exist positive relationships between revenue/capital expenditure and economic growth (Weolebo, 2018, Imoughele & Ismaila, 2013, Chilonda, 2013, Tsadiku, 2012, Bakare & Sanmi, 2011, Okwu & Obiwuru, 2017). Others revealed negative results (Tsadiku, 2012, Loto, 2012, Warren, 2012, Ifionu & Ntegah, 2013, Chilonda, 2013). In Nigeria, with the humongous amount being budgeted annually, it is expected that there should be a comparable achievement in terms of economic growth in Nigeria. In spite of the annual budget is increasing every year, the human development index and other economic indices are continuously showing negative trends (Oluba & Martins, 2008). The above conflict arose as previous writers employed only aggregates of the capital/revenue expenditures. These conflicts would have been avoided had disaggregated components been applied in the analysis to be able to decipher the micro-dynamics of the variables with the aim of developing appropriate strategies to address

adverse outcomes. Furthermore, there appears to be lack of harmony between monetary and fiscal policies as much of the excess liquidity in the economy results from uncontrolled capital and revenue expenditures. Worried by the above challenges, the researcher cannot but investigate the possibility bridging the observed gaps by engaging in an in-depth study of the disaggregated analysis of the various capital/revenue expenditure sub-heads. From the above, this study examined the effect of disaggregated government recurrent expenditure on economic growth.

## LITERATURE REVIEW

### Government Expenditure

The term public expenditure refers to the expenses incurred in the public sector. It is defined as the total government spending for the provision of goods and services (Bhatia, 2006). In a developing economy such as Nigeria, Barro, (1990) explains that public spending or government expenditure has an active role to play in reducing regional disparities, developing social overhead, creation of infrastructure of economic growth in the form of transport and communication facilities, education and training, growth of capital goods, basic and key industries research, and development etc. It has a greater role to play in the form of stimulating savings and capital accumulation. One way in which public expenditure is expected to affect the pace of economic growth and development is the will and capacity of the people to work, save and invest. In this connect the exact effect depends largely on the precise form and magnitude of government expenditure although there are conflicting opinions as to whether public spending motivates and encourages or discourages the will to work. Some welfare expenditures might lead to an effect in either direction. Similarly, the net effect also depends upon economic activity and investment (Barro, 1990). An important way in which public expenditure can accelerate the pace of economic growth and development is by narrowing down the difference between social and private marginal productivity of certain investment. Public expenditure can be used to provide subsidies for those investments which are commonly non-viable but which are very helpful for economic growth. For example, subsidy on agricultural inputs if agricultural production is to be stimulated, or for investment in backward areas to reduce regional disparities and unemployment it can also be used to promote import substitution and at the same time, to keep the prices of necessary inputs of capital goods low (Bhatia, 2006).

### Recurrent expenditure

Mgbanya et al (2018) holds that national recurrent expenditure is defined as government expenditure on purchases of goods and services, payment of wages and salaries, consumption of fixed capital which does not result in the creation of fixed assets. A recurrent expenditure or budget tracks ongoing revenues and expenses that occur on a regular basis, be they monthly, quarterly, semi-annually, or annually. Recurrent expenditure refers to a type of spending that does not result in acquiring fixed assets in a country or business. They are all the regular payments and expenses used to maintain and run a county (Key, 1987). It also refers to all fees, exclusive of capital forms of payment. In this study, recurrent government expenditure will be proxied by recurrent government expenditure on education, agriculture, works and housing, health and

transport/communication. The indicates a reflection of government recurrent expenditure that goes into enhancing economic growth in Nigeria

In Njoku (2009) government expenditure refers to all expenditures which government incurs in the course of performing its functions. Thus, government expenditure has two components namely recurrent expenditure and capital expenditure. While recurrent expenditure encompasses expenditures recurring over the year such as personnel costs, transportation, utility services, telephone services, stationery, hospitality, maintenance of office furniture and equipment all other day to day, month to month or quarterly running expenses funded by the government, capital expenditure involves expenditure on construction, land extension, building and plant and machinery acquisition.

**Agricultural Expenditure**

Ekerete, (2000) noted that agricultural Expenditure are the costs incurred in providing and maintaining agricultural resources, equipment and facilities needed to ensure adequate food supply in the country. It includes costs of seedlings, fertilizers, implements, machineries, and subsidies of agricultural products, as well as the salaries and maintenance of the Ministry's staff and personnel. The costs also cover expenditure in maintaining and regulating adequate water and food supply, dairy products, cash crops and export crops, in sufficient quantity and quality. This expenditure heading is specifically under the Federal Ministry of Agriculture and Water Resources.
In Madubuike (2004), Government agricultural expenditure is the allocation on the agricultural sector which is aimed at productivity and output, thereby inciting economic growth. Government spending in agriculture comprises of expenses on sector policies and programs, construction of flood control, irrigation and drainage systems, operation or support of extension services or veterinary services to farmers, pest control services, crop inspection services, provision of grants and subsidies to farmers, etc. As buttressed by FAO (2016), agricultural investment is an effective way of enhancing real income, reducing food insecurity, alleviating poverty as well as evolving a more sustainable environment.

**Housing**

Housing can also be viewed as a complex product that is crucial for national development in terms of both an economy and welfare of the people (Chatterjee, 1981), because it is an important source of national capital formation, employment generation, improvement in health and income generation. Houses serve a number of economic purposes such as; shelter, cottage factory for production, warehouse, shop for selling and income generation through rents. Some early economists, such as Howenstine, did not just look at the concept of housing and its contribution to growth and development, but also introduced the concept of better housing and how it might impact on productivity in other sectors of the economy. It was this concept of better housing that informed the decision of governments and organisations to build houses for their staff (Harris & Arku, 2006).

Howenstine (1957) argued that better housing might lead to higher productivity, by improving health and reducing absenteeism. He evaluated the concept from an economic point of view, noting

that, investments should be made in housing only where they were clearly necessary; as an adjunct to the success of other industrial projects. The author further stated that, even when unemployment rates fall, priority should be given to those workers whose contribution to national productivity could be expected to benefit most from better housing (Howenstine, 1957). This explains why several governments and companies' housing projects sprang up.

**Electricity**

Electricity in its usefulness and applicability is directly needed in industries in the production of output. Existing industries in Nigeria complain of inadequate electricity supply for their machines and technologies to produce physical goods. Solow model which listed the core components of growth as capital, labour and technological progress under which electricity falls (Matthew, Fasina, Olowe & Adegboye, (2010); Adeniran, Adetiloye, Fakintoye, Ibidapo & Osabohien, (2018) ; Osuma, Ikpefan, Osabohien, Ndigwe & Nkwodimmah, (2018); Alege & Osabuohien, 2015). Matthew, Osabohien, Fagbeminiyi & Fasina, 2016), explains that when there is poor electricity power supply or in general energy sources, human capacities in the area of physical production remains just an idea. This study is built on the argument that, as observed in literature and following the study of Jahan (2017), globally, approximately 1.2 billion individuals have limited access to electricity, out of these people, about one billion of them depend on solid fuel, like wood, coal and charcoal as an alternative source of energy, these alternative sources of energy have caused noxious indoor air pollution for cooking. The United Nations sustainability on energy has three goals for 2030 which are; to attain worldwide admittance to cleaner energy, ensure energy supply adequacy and increment in the proportion of renewable energy in the international energy mix (Matthew et al., 2010; Alege & Osabohien, 2015).

**Road Construction**

Road infrastructure is the underlying structures that support economic activities by moving goods and people, including the delivery of inputs to places of production, goods and services to customers, and customers to marketplaces (Timilsina & Dulal, 2011). Road networks in this study refer to all rural roads, highways, and feeder roads that connect cities, villages, and national capital.

Road infrastructural development is undertaken to improve accessibility at a state or federal level and to relieve traffic congestion in these areas. Roads play a vital role in urban development. In particular, roads enable accessibility to raw materials and semi- finished or finished goods and services as well as various other forms of land uses (Aderemola, 2003). To this end, an urban area can only function efficiently when there is adequate distribution of roads as well as good transport facilities. It is also in this regard that communities often clamour for the construction of their roads.

**Transportation and Communication**

This expenditure heading in the national budget falls into two ministries: the Ministry of Transport and the Ministry of Communication. Transportation, according to Encyclopaedia Britanica, is the movement of goods and persons from place to place and the various means by which such movements are accomplished. The growth of the ability, and the need to transport large quantities

of goods or numbers of people over long distances at high speed in comfort and safety has been an index of development and civilization, and in particular, of technological progress (Laudau, 1983). Thus, In Nigeria we have rail, air, road and water transportation and there has always been budget provisions to sustain its availability and efficiency. However, in Nigeria, air transportation falls under the Ministry of Aviation.

**Education**

Hallak (1969) adopting UNESCO's 1967 classification, conceptualized educational expenditure by nature as comprising of recurrent, capital and debt service. It was further exposed that it is theoretically possible to estimate the amount of expenditure, that is, the money cost, taking care, of course, to avoid any duplication. However, its practical application comes up with a number of difficulties. This stems from the need to ascertain the type, level and nature of expenditure.

According to Alfred Marshall, "the most valuable of all capital is that invested in human beings." In theory, education expenditure, school enrollment and educational attainment are known basic proxies for human capital. Human capital itself refers to investment in human persons that improves productivity and growth. Schultz (1961) conceptualized education expenditure as an investment. From the foregoing, it is obvious that both school enrollment and educational attainment are greatly influenced by educational expenditure.

**Health**

Health is a dynamic concept with multiple meanings that are dependent on the context in which the term is used. Health is a fundamental driver of economic growth and development (Ewurum, Mgbemna, Nwogwugwu & Kalu, 2015). In the same vein, Grossman (1972), termed health as a durable stock producing healthy workforce as an output for both market and non-market activities that give utility and income respectively. The WHO Constitution of 1948 defined health as a state of complete physical, social, and mental well-being, and not merely the absence of disease or infirmity. Health is, therefore, seen as a resource for everyday life, not the objective of living. Barro (1996) defined health as an engine of economic growth and productive capital. Hence, a country benefits more from healthy citizens, because a healthy population brings about higher output and growth rate in the economy than the other way round. Furthermore, health is a factor that determines growth potentials in a country. This study aligns with Barro (1996) which sees health as an engine of economic growth and productive asset in the form of human capital.

**Defense**

Defense comprises all measures adopted by the government at all levels to maintain peace and order within the territorial boundary of the country. It involves maintenance of its internal and external security, and to safe-guard her from all or any external aggression (Wolde-Rufael, 2008). Akpan (2008) explains that in Nigeria, Ministry of Defense overseas the activities of all the areas of the armed forces while Ministry of Interior oversees others, including the police force. In the country's annual budget and for the purposes of this study, the expenditure allocated to defense includes all appropriations to the police, Nigerian Civil Defense Corps, the prisons service, the

Immigration service, the Directorate of State Service, the armed forces and other military and paramilitary operations. Recurrent defense expenditure are concerned with salaries and other overheads necessary to run the day to day administration of the concerned ministries while capital defense expenditure are concerned with purchase of military assets, construction of buildings, provision of defense infrastructure, and investments in military and defense hardware equipment.

**Works, Housing and Road Construction (WHR)**

In Nigeria, the Ministry of Works, Housing and Urban Development is responsible for the construction of federal roads and bridges, and provision of mass housing units in the country, Orji, Onyeze et tal, (2014). It is also responsible for the regulation and provision of the country's electricity needs. The expenditure on this budget heading is intended to provide the infrastructure and the regulatory framework necessary for national industrial and economic development. In COFOG classification, it is also under Economic Affairs.

**Gross Domestic Product**

There are different types of GDP which are calculated through the application of established intervals. Examples include GDP at current market prices; GDP at constant prices, GDP at factor costs and GDP in real terms (real GDP). For the purpose of the study in question, real gross domestic product will be applied.

Economists of various persuasions agree that the best version of GDP for a study of this nature is the real GDP that is GDP at current market price (GDP with built-in inflation) and deflated with an appropriate price index.

Real GDP is a deflated GDP at current market price applying consumer price index:

GDP (constant market prices)/Consumer Price Index (or it can be deflated using the deflation rate) X GDP.

According to Orji, Onyeze and Edeh (2014), real Gross Domestic Product is a macroeconomic measure of the value of economic output adjusted for price changes. This adjustment applying the appropriate price index transforms the money-value measure, that is nominal GDP by way of deflation into the real value, that is, real Gross Domestic Product (rGDP). The formula to compute the Real Gross Domestic Product, rGDP, is as follows:

$$R = N/D,$$

Where,

R = real GDP,
N = nominal GDP, and
D = GDP deflator.

**Government Expenditure and Economic Growth**

There is an important link between the amount of government expenditure and the quantum of economic growth (Loto, 2011). According to him, this is because the lesser the amount generated from the economic activities of a country, the lesser the amount allocated in terms of revenue to government expenditure, and the higher the amount generated from economic activities, the higher the amount available for allocation to government expenditure through tax and other revenue sources.

The relationship between government expenditure (current and capital) and economic growth has continued to generate series of controversies among scholars in economic literature over the years, the size, structure and growth of government expenditure have increased tremendously and become increasingly complex (Sampson, 2003). Not only has recent political development engendered expenditure growth, the challenge of raising additional and identifying alternative sources of revenues to meet the ever increasing needs of government has made it more imperative to take a more focused look at government activities especially its expenditure.

In Anyanwu, Andrew and Erhijakpo (2009), economic growth simply defined, refers to the increase, over time, of a country's or an economy's capacity to produce those goods and services needed to improve the well-being of the citizens in increasing numbers and diversities, as discussed in passing at the beginning of Chapter 2.

**Theoretical Review**

**The Endogenous Growth Model**

The endogenous growth model unlike the neoclassical growth model disagreed that technological progress is exogenous, but they believe that it is endogenous, and went further to concentrate on the factors that can cause technological progress. Romer (1990) remarked that technological progress is the outcome of knowledge accumulation. This process is considered to be the core element that drives economic growth in the long run. Thus, an economy with knowledge accumulation experiences positive externalities and increasing returns to scale. One of the main postulations of Romer is that in the long-run, the society that has developed science and technology will grow faster than the one that has not. Proponents of the Endogenous growth model recognized the role of human capital investment in the growth process.

According to Lucas (1988) and Romer (1990), higher investment in human capital will engender higher growth rate of per capita income (Rolle and Uffie, 2015; Umoru, 2013). Therefore, growth was driven by accumulation of the factor of production, while accumulation in turn was the result of investment in the private sector. This implied that the only way a government can affect economic growth, at least in the long run, was via its impact on investment in capital (physical and human), and productivity of labour which will increase production, increase taxable capacities and increase revenue generation for further expansion

## Adolph Wagner's Theory of Increasing State Activities

The earliest of all theories of economic growth is Wagner's Law of Increasing State Activity. This theory posits a relationship linking industrialization, urbanization and road construction to the expansion of the public sector (Bird, 1971). The activities of the different tiers of government (federal, state and local) increase both intensively and extensively arising from increasing demand for public utilities. Wagner advanced the theory of rising public expenditure by analysing trend in the growth of government expenditure and in the size of government expenditure. Wagner's law postulates that: (i) the extension of the functions of the states leads to an increase in public expenditure on administration and regulation of the economy; (ii) the development of modern industrial society would give rise to increasing political pressure for social progress and call for increased allowance for social consideration in the conduct of industry (iii) the rise in public expenditure will be more than proportional increase in the national income (income elastic wants) and will thus result in a relative expansion of the public sector. So it is the economic growth that determines government size.

## Musgrave's Theory of Public Expenditure Growth

The Musgrave's theory of public expenditure and growth explained that, at low level of per capita income, the demand for public services tend to be very low, arguing that such income is devoted to satisfying primary needs and it is only when the per capita income starts to rise above these level of low income that the demand for services provided by the public sector such as road construction, health, and transports starts to rise, thereby forcing government to increase expenditure on them. The theory observed that with high per capita income typical in the developed nations, the rate of public spending falls as most basic wants are being satisfied. Therefore the theory suggested in connection to Wagner that as progressive nations become more industrialized, the share of public sector in the national economy grows continually (Musgrave, 1988). Iyoha stated five stages of expenditure growth; "Traditional society, preconditions for take-off, the take-off; the drive to maturity and the eye of high mass consumption." What determines the accepted expenditure-growth depends critically on the assumption of the type of economy, that is, whether it is a free market economy, a mixed economy or a command economy (Iyoha, 2002).

## Wiseman-Peacock Hypothesis

Peacock-Wiseman (1961) is another thesis put forth by Peacock and Wiseman in their study of public expenditure in the UK. It explained the reason of increasing public expenditure from the social-political perspective. It argues that Government expenditure will increase as income increases but because the leaders want re-election into political offices, additional infrastructures must be provided in order to convince the electorate that their interests are being catered for by the people voted into power. However, the citizens of the country are less willing to pay tax. The resistance provokes the government to step up its care in the form of increased spending to avoid social crises in the economy. The resistance to pay tax by the people will make the state to have low revenue hence the cost of providing more facilities is borne by the government, making government expenditure to increase rapidly.

**Empirical Review**

Megbowon, Ngaram, Etim and Popoola (2019) studied the impact of government expenditure on agricultural productivity in South Africa using annual time series data from 1983 to 2016. The Bounds Co-integration test and ARDL model were used in this study. The study found government expenditure on agriculture to be of significant effect on agricultural productivity. It showed that there is a long-run positive relationship between government expenditure on agriculture and agricultural productivity.

Dkhar and De (2018) examined the impact of public expenditure on agriculture on economic growth in Meghalaya. Annual time series data for the period 1984 to 2014 were obtained. OLS, ADF unit root test and granger causality methods were used for data analysis. Regression results show that there is a significant positive impact of expenditure through crop husbandry on GSDP and a significant negative impact of expenditure through forestry and irrigation. The expenditure on dairying and agricultural research does not have a significant impact.

Chandio et al. (2016) studied the impact of Government expenditure on agricultural sector and economic growth in Pakistan with time series data covering the period between 1983and 2011 which were collected from Pakistan Statistical Year Books and Economic Survey of Pakistan 2015. The study applied Augmented Dickey–Fuller (ADF) and Phillip Perron unit root tests, Johansen Co-integration test and Ordinary Least Square (OLS) technique. The Johansen Co-integration test revealed that there is a long-run relationship between Government expenditure on agriculture, agricultural outputs and economic growth. The results of the regression analysis discovered that agricultural outputs and Government expenditure have significant impact on economic growth.

Weolebo (2018) examined the impact of agricultural expenditure on economic growth of sub Saharan Africa region. The study used annual panel data sourced from the World Bank reports, UNDP, and IMF publications for the period between 1990-2015.The study employed OLS regression and Panel Fixed effect model. The findings revealed that expenditure on agriculture. Public spending on agriculture was strong in stimulating economic growth in Sub-Saharan Africa, because agriculture is a primary economic base for many African countries. Lawal (2011) examined the amount of federal government expenditure on agriculture using time series data from 1979 to 2007 which were obtained from Central Bank of Nigeria. The study made use of vector auto regression. The analysis showed that government spending does not follow a regular pattern and that the contribution of the agricultural sector to the GDP is in direct relationship with government funding to the sector.

Okezie, Nwosu and Njoku. (2013) analyzed the relationship between Nigeria government expenditure on the agricultural sector and its contribution to economic growth using annual time series data from 1980 to 2011, collected from the Central Bank of Nigeria, Journal of Food Research and Federal Office of Statistics. The study employed the Engle-Granger two step model (EGM),Error Correction Model and Granger Causality tests. The analysis showed that agricultural contributions to GDP and government expenditure on agriculture are co-integrated. The results of

granger causality indicated very weak causality between the GDP and government expenditure on agriculture.

Ademola, Olaleye, Olusuyi and Edun, (2013) analyzed the impact of government expenditure on agricultural sector on economic growth in Nigeria using times series data from 1981 to 2010. The study used the OLS method, unit root test and co integration test to evaluate the significance or non-significance of the agricultural sector to economic growth. The results show that there is a significant relationship between (GDP) and agricultural output and government expenditure variables, and also a positive relationship between government expenditure and the agricultural sector.

Weolebo (2018) in his work the effects of government budgetary allocation to agricultural output in Nigeria covering the periods between 1995-2009 show that the percentage, degree or amount of budgetary allocation to agricultural sector has a positive relationship with the total agricultural production in the country. This implies that the more the government spends on agricultural sector, the more the improvements in the performance of the agricultural sector. Therefore, budgetary allocation to agriculture has a large impact on agricultural output.

Oluwatoyese, Applanaidu, Abdul-Razak, (2015) examined some macroeconomic variables influencing agriculture in Nigeria, using annual time series data from 1981 to 2013 which were obtained from World Bank Database and Central Bank of Nigeria. The ADF and Phillips Perron unit root tests, vector error correction model (VECM), granger causality test and co-integration tests were adopted for data analysis. The results showed that commercial bank loan on agriculture, interest rate and food import valve are significant variables that influence agricultural output, while exchange rate, inflation rate and unemployment rate are insignificant.

Mathew and Mordecai (2016) studied the impact of public agricultural expenditure on agricultural output in Nigeria from 1981 to 2014 with annual time series data collected from the Central Bank of Nigeria. The study made use of Augmented Dickey-Fuller test, Johansen Co-integration test, Error Correction Method (ECM) and Granger Causality test. The Johansen Co-integration test discovered that there is a long-run relationship between agricultural output, public agricultural expenditure, commercial bank loans to the agricultural sector and interest rates. The results of the ECM model indicated that public agricultural expenditure has a significant but negative impact on agricultural output whereas commercial bank loans to the agricultural sector and interest rate have insignificant positive impacts on agricultural output in Nigeria.

Uremadu, Ariwa and Uremadu (2018) studied the effect of government agricultural expenditure on agricultural output using time series data from 1981 to 2014. The data was analyzed using co-integration test and vector error correction model. The Johansen co-integration tests revealed that there is a long-run relationship between agricultural output and government agricultural expenditure. The vector error correction model results indicated that agricultural output adjusted rapidly to changes in total government agricultural expenditure, real exchange rate, banking system credit to agriculture, average annual rainfall and population growth rate.

Ayunku and Etale (2015) investigated the effects of agriculture spending on economic growth in Nigeria over a period of 34 years between 1977 and 2010. The study employed Augmented Dickey Fuller and Phillip Perron unit root tests, Johansen Co-integration and Error Correction Model tests. They found that economic growth (GDP) was mainly influenced by changes in agricultural expenditure, inflation, interest rate and exchange rate. These variables stimulate economic growth in Nigeria both in the short-run and long-run.

Ewubare and Eyitope (2015) examined the effects of government spending on the agricultural sector in Nigeria. The study employed annual time series data between 1980 and2013 which were generated from Central Bank of Nigeria and National Bureau of Statistics. The ordinary least square method, ADF and Phillip Perron unit root tests, Johansen co-integration technique, and the error correction model were used for the analysis. The results showed that government expenditure and gross capital formation have positive and significant impact on agricultural output. However, there was positive but insignificant relationship between deposit money bank loan to agriculture and agricultural output.

Shuaib, Igbinosun, and Ahmed (2015) studied the impact of government agricultural expenditure on the growth of the Nigerian economy from 1960 to 2012. The study employed secondary data sourced from National Bureau of Statistics and Central Bank of Nigeria. The results revealed that government agricultural expenditure has a direct relationship with economic growth. It also revealed that inflation rate and interest rate have negative relationship with economic growth.

Ewetan, Fakile, Urhie, and Odunatan (2017) investigated the long-run relationship between agricultural output and economic growth in Nigeria for the period 1981 to 2014 using annual time series data obtained from Central Bank of Nigeria, National Bureau of statistics, International Monetary Fund and World Bank Development Index. Phillip Perron unit root test, Johansen Co-integration test, Vector error correction model and granger causality testing were adopted for data analysis. The co-integration results showed that there is a long run relationship between agricultural output and economic growth. The long run parameters for agricultural output, inflation rate and exchange rate show statistically significant relationship with economic growth but interest rate-has no significant relationship with economic growth.

**Research Gap**

A review of the existing literature indicated some gaps.

They employed several independent variables for their analysis which constituted a model gap. Similarly, there were conflicts in their research findings. While some showed positive impact, others showed negative impact. Some of the reviewed studies were carried out in other countries outside Nigeria thereby creating a location gap. It is also worthy of note that none of the known previous studies covered the time frame and scope to 2019 but this study did. This study attempted to address all the observed gaps in order to achieve a more balanced research result.

## METHODOLOGY

This research methodology embraces the *ex-post facto* research design in analyzing the effects of Federal Government's capital and recurrent expenditure on the real gross domestic product of

Nigeria. For this investigation, the data from the National Bureau of Statistics and the Central Bank of Nigeria's Annual Statistical Bulletins will be the sources of the data to be applied for the study. The data used for the analysis cover the period 1986-2019.

**Model Specifications**

The Models are first specified in functional forms and secondly in logged econometric equation forms as follows:

$RGDP = (AGR, WHR, TRC, EDU, HLT, DFE)$ (1a)

$RGDP = ao + a_1LAGR + a_2LWHR + a_3LTRC + a_4LEDU + a_5LHLT + a_6LDFE + ut_1$ (1b)

*Meaning of Notations:*

*RRGD = Real Gross Domestic Product*
*AGR = Total Federal Government Recurrent on Agriculture*
*WHR = Total Federal Government Recurrent on Works, Housing and Road Construction*
*TRC = Total Federal Government Recurrent on Transport and Communication*
*RTRC = Federal Government Recurrent Expenditures on Transport and Communication*
*REDU = Federal Government Recurrent Expenditures on Education*
*RHLT = Federal Government Recurrent Expenditures on Health*
*RDFE = Federal Government Recurrent Expenditures on Defense Construction*
*ao, bo, co, do, eo, fo, go, ho, io = Regression constant or the Intercept*
$a_1$-$a_6$; $b_1$-$b_6$; $c_1$-$c_6$, $d_1$-$c_6$; $d_1$-$d_2$; $e_1$-$e_2$; $f_1$-$f_2$; $g_1$-$g_2$; $i_1$-$i_2$ *= Regression parameters or slope coefficients*
$ut_1$-$ut_7$ *= stochastic error*

**A priori Expectation**

It is the presumption of the Study that expenditure on Agriculture; Works/Housing/Road Construction; Transport and Communication; Education; Health and Defense would contribute significantly to the growth of the Nigeria Economy, which goes in addendum with the alternative hypothesis that was proposed in Chapter one of this study. In order to achieve the objective of the study, the linear regression model is adopted to estimate the impact of government expenditure on real gross domestic product. It is stated as follows:

*A-priori expectations:* $a_1$-$a_6$; $b_1$-$b_6$; $c_1$-$c_6$, $d_1$-$c_6$; $d_1$-$d_2$; $e_1$-$e_2$; $f_1$-$f_2$; $g_1$-$g_2$; $i_1$-$i_2$ $> 0$

**Estimation and Validation**

The ordinary least square (OLS) estimation technique used in the study is only valid as an efficient estimator based on the Gauss-market theory which states that OLS is the best linear estimator (BLUE) of all the unbiased and linear estimators. The Ordinary Least Square (OLS) estimation method would also be employed in obtaining the numerical estimates of the coefficients in the model using E-View 7.0 Output Statistical Software.

## Method of Data Analysis

The data met the requirements for the study and so the study proceeded to investigate the relationship between the independent variables and the dependent variable applying the E-view technique. Some diagnostic tests were also conducted on the time series data to attest to their stationarity by applying the ADF technique. Unit root exists in most macroeconomic time series data as posited by Nelson and Plosser, (1982). Ugbaje and Ugbaje (2014), postulated that Time Series data with unit root produce spurious results which may lead to inconsistency in parameter estimates. However, Time series data becomes stationary if it is detrended, to make it become predictable for forecasting. Finally the Autoregressive Distributed Lags (ARDL) was applied for the coefficient estimations.

The long-run relationship between two variables Y and X will be explained using the ARDL approach. This approach involves first estimating the conditional Error Correction Model (ECM) of the following specification as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \sum_{t=1}^{p} \alpha_1 \Delta Y_{t-i} + \sum_{k=0}^{p} \alpha_m \Delta X_{t-i} + \delta_m X_{t-1} + \varepsilon_t ; t = 1 \quad \text{.....(12)}$$

Where $Yt$ is the dependent variable, $Xt$ is the vector of observations of included explanatory variables in equation (4), $\Delta$ is the first difference operator, $m$ is the number of regressors and $\varepsilon t$ is the error term. The test of the null hypothesis of no co-integration shall be the second step. This shall be done by restricting the coefficients of the lagged level variables equal to zero $H_0 = \partial_1 = 0 = \partial_m = 0$ against the alternative hypothesis that $H_1 = \partial_1 = 0 = \partial_m \neq 0$ using an F-test by estimating equation (1) by OLS. The asymptotic distribution of the F-statistic follows a non-standard distribution under the null of no co-integration as reported by Pesaran, Shin & Smith (2001), provides two stochastic simulations; the lower and the upper critical values. The lower and upper critical values assume that all variables are I(0) and I (1) respectively. If the estimated F-statistic appears larger than the upper bound of critical value, then the null hypothesis of no co-integration is rejected, which suggests that the variables included in the model are cointegrated. If the estimated F-statistic is smaller than the lower bound of critical value, then the decision of the null hypothesis is accepted. Again, if the F-statistic falls between the lower and upper critical value, the decision is inconclusive regarding the null hypothesis of no co-integration (Hoque, Mia &Alam, 2019). The second step is to estimate the elasticity of the long run relationship and determine their values.

## Descriptive Statistics

Descriptive statistics are introductory statements which describes, summarizes and arrange the time series data in a manner that it could be easily understood at a glance. Quantitative measures such as the mode, mean, median, maximum, minimum, standard deviation, skewness, kurtosis, Jarque Bera statistics and probability, sum and sum square deviation and number of observations are applied in the descriptive statistics. A standard deviation greater than one (1) invalidates the assumption of normality considered crucial for OLS regression analysis. Skewness is a measure

of asymmetry of the distribution of the series around its mean. Kurtosis measures the peakiness or flatness of the distribution of the series. If the kurtosis exceeds 3, the distribution is peaked (leptokurtic) relative to the normal but if the kurtosis is less than 3, the distribution is flat (platykurtic) relative to the normal. Data that come from normal distribution should have a skew equal to zero (0) and kurtosis equal to three (3). Jacque-Bera is a test statistic for testing whether the series is normally distributed. The null hypothesis is that the variable is normally distributed. The decision rule is to reject when p-value is less than 0.05 level of significance.

**Stationarity Test**

The statistical analysis of time series data in some respect differ from that of cross- sectional data, especially due to the effect of time and other variables on the time series data. Stationarity test has to be carried out on the data first to determine whether or not the time series data were stationary. If a variable is integrated of order zero. i.e 1(0), then it is stationaryat level. Thus, test for stationarity is also called test for integration. It is also called unit root test. Stationarity denotes the non-existence of unit root. (Omotor and Gbosi, 2007). Various methods are available for testing the stationarity condition of series. The most widely used are: (1) dickey-Fuller (DF) test; (2) Augmented Dickey-Fuller (ADF) test; and (3) Philip Perron (PP) test. The ADF test which is very widely used will be applied for this study.

**Augmented Dickey Fuller (ADF) Test**

The ADF technique tests the null variables of the model for non stationarity or for the presence of unit root.

Ho: The time series is non-stationary (i.e there is unit root).

**Decision Rule**

$t\text{-}ADF_{(absolute\ value)} > t\text{-}ADF_{(critical\ value)}$ :Reject $H_o$

Note that each variable will have its own ADF test value. If the variables are stationary at level, then they are integrated of order zero i.e 1(0). Note that the appropriate degree of freedom is used. If the variables are stationary at level, it means that even in the short run they move together. The unit root problem earlier mentioned can be explained using the model:

$Y_i = Y_{t-1} + \mu_1$…… …….(a)

Where $Y_t$ is the variable in question; $\mu_1$ is stochastic error term.

Equation (a) is termed first order regression because we regress the value Y at time "t" on its value at time (t-l). If the coefficient of Yt-l is equal to l, then we have a unit root problem (non-stationary situation). This means that if the regression

$Y_t = L\ Y_{t-l} + \mu_1$…… …….(b)

is solved and L (lag time) is found to be equal to l then the variables $Y_t$ has a unit root (random work in time s cxeries econometrics).

If a time series has a unit root, the first difference of such time series are usually stationary. Therefore to solve the problem, take the first difference of the time series. The first difference operation is shown in the following model.

$\Delta Y_i=(L-l)\ Y_{t-l} +\mu_t$…… ……...(c)

$\_\_Y_{t-l}+\mu_t$…… .....(d) .

(Note: = l-l=0; Where L = l; ^Yt= Yt – $Y_{t-l}$)

**Integrated of order 1 or1 (1)**

If the original (random walk) series is differenced once and the differenced series becomes stationary, the original series is said to be integrated of order 1(1)

**Integrated of Order 2 or 1(2)**

If the original series is differenced twice before it becomes stationary (i.e. the first difference of the first difference), then the original series is integrated or order 2 or 1 (2). Therefore if a time series has to be differenced Q times before becoming stationary it said to be integrated of order Q or 1(q).

Co-integration test k (the Johansen's test)

It has already be warned that the regression of a non-stationary time series on another non stationary time series may yield a spurious regression. The important contribution of the concept of unit root, co-integration, etc. is to force us to find if the regression residual are stationary. Thus, a test for co-integration enables us to avoid spurious regression situation. if there are k regressors in a regression model, there will be k co-integrating parameters. Specifically, co-integration means that despite being individual non stationary, a linear combination of two or more time series can be stationary. Thus co-integration of two (or more) time series suggests that there is a long- run or equilibrium relationship between them

**Reliability/Diagnostic Tests**

In compliance with the **Classical Linear Regression Model Assumptions (CLRMA),** the following Reliability tests are conducted, namely, Normality test, Heteroscedasticity test, multicollinearity test, and stability test.

**Residual Normality test**

The residual normality test is a multivariate extension of the Jarque-Bera Normality test. The essence of this test is to check if the error term follows the normal distribution. A multivariate extension of the JarqueBera test of normality was used. Jarque-Bera compares the shape of a given

distribution (skewness and kurtosis) to that of a normal distribution. Acceptable values of skewness (a measure of the shape of the distribution) falls between -3 and +3 while kurtosis ( a measure of the peak and flatness of the distribution) is appropriate from a range of -10 to +10. In general, a large Jarque-Bera values indicates that entire dataset is not normally distributed. For instance, a result of 1 (one) means that null hypothesis has been rejected at 5% significance level and that errors term series do not come from normal distribution. Jarque-Bera hypothesis is as follows:

H0: the error term does not follow a normal distribution
H1 the error term follows a normal distribution
Decision Rule; If the probability of Jarque-Bera is less than 5%, we reject the null hypothesis, and conclude that the error term does not follow a normal distribution otherwise accept and conclude that the error terms are normally distributed.

**Heteroscedasticity**

White heteroscedasticity (no cross terms) was conducted to verify whether the variance of the error term is a constant variance (or homoscedastic). The hypothesis is
H0: Homoscedasticity
H1: Heteroscedasticity
Decision, reject the null hypothesis if the probability is less than 5% level of significance.

**Autocorrelation**

Autocorrelation test is used to check if in a regression model disturbance term relating to any observation is influenced by the disturbance term relating to any other observation or whether they are time-dependent. In this study, Breusch-Godfrey Serial Correlation LM test was conducted in fulfilment of the condition of Classical Linear Regression Model assumption in consonant with econometrics modelling. The decision rule here is that if the probability of Chi-Square calculated is less than the 5% level of significance, were reject the null hypothesis and if otherwise, we accept. While in the Durbin Watson statistic, we accept absence of autocorrelation if it falls into the threshold of 1.6 to 2.4.

**Stability test**

In an attempt to ensure that the ARDL model is well fitted, the study employs Cumulative Sum of Recursive Residuals (CUSUM) test developed by Durbin, Brown, and Evans (1975). The test decision is that, if the plotted CUSUM statistics lies within 5% significance level, the co-efficient estimates are accepted. This shows that the model is stable and not spurious.

**Impulse Response**

Impulse Response Test was developed by Davis and Hertlein (1987). This test method was traditionally used for the integrity assessment of pile foundations. In this study, the essence of impulse-response test is to determine how economy reacts over time to exogenous impulse which economists usually refer to as shocks and is often modeled in the context of a vector auto regression. In the context of this study, impulse-response test is used to determine the impact of different shocks to broad money supply components in the period under review.

**Multicollinearity test**

Multicollinearity test is carried out here to test the assumption that no independent variable is a linear function of one or more independent variable is not violated. Multicollinearity occurs whenever an independent or predictor variable in a regression model is highly correlated with one or more of the other independent variables in a multiple regression equation. Multicollinearity is a problem because it undermines the statistical significance of an independent variable. The stronger the correlation, the more difficult for the model to estimate the relationship between the dependent variable and the independent variable independently because the independent variables tend to change in unison or combined. Multicollinearity makes it hard to interpret the regression coefficient and it reduces the explanatory power of the model to identify independent variables that are statically significant. Correlation matrix table is used to carry out the test. According to Gujarati (2003), if the pair-wise correlation coefficient between two explanatory variables is in excess of 0.95, then multicollinearity is present.

**T-Test**

This is a test of significance of the regression coefficients (Gujarati, 2003).
Generally speaking, the test-of-significance is a test of statistical hypothesis. A test of significance is a procedure which uses sample results to verify the truth or falsity of a null hypothesis (Ho). T-Test assumes that Ho: $\beta_1 = 0$ (i.e statistically insignificant). Where $\beta_1$ = the coefficient of the model.
The T-Test tests if the coefficients of the variables of the model are significant.

**Decision Rule**

The decision rule for the T-test of significance is:
$T_{calculated} > t_{(critical\ value)}$: Reject Ho (if otherwise accept $H_1$)
Note: df=n-k where n=No. of observations
K=No. of parameter estimates
ta/2 =t 0.025

**F-test:**

F-test tests the overall significance of the models. The F-test determines the overall significance of an estimated model. i.e. it test the goodness of fit of the model (Patterson and Okafor, 2007). Thus, the f-statistic tests how the overall model fits the relationship between the variables. According to Gujarati (2003), the F-statistic tests the overall significance of a multiple regression.

**Decision Rule**

Given the k- variable regression model:
$Yi = \beta_1 + \beta_2 X_{2i} + \beta_3 x_{3i+\ldots\ldots+} \beta_k x_{ki} + \mu_1$
To test the hypothesis:
Ho: $\beta_2 = \beta_3 = \ldots = \beta_k = 0$
(i.e all slope coefficients are simultaneously zero) versus
Hi: not all slope coefficients are simultaneously zero
(Such that if

$F_{cal} > F_{a(k-l, n-k)}$: Reject Ho (otherwise accept $H_1$)
Where:
$Fa_{(k-l, n-k)}$= critical f value at the level of significance and (k-l) numerator degree of freedom (DF) and (n-k) denominator DF. Alternatively, if the p value of F-cal is sufficiently low, Ho can be rejected. It should be noted that k is the number of variables (both y and x variables) in the regression. If Ho is accepted it means that the model is not satisfactory or no well specified or not a good fit. On the other hand, if Hi is accepted (i.e. Ho is rejected) it means that the overall significance of the model is good enough. Note that F statistic can be computed thus:

$$F = \frac{ESS/df}{RSS/df} = \frac{ESS/(kl)}{RSS/n-k)}$$

Where: ESS=Explained sum of squares; RSS=Residual sum of squares K-l = numerator df; n-k = denominator df; k =No. of variables in the regression.

**$R^2$ (Coefficient of Determination)**

$R^2$ is the multiple coefficient of determination (Gujarati 2003). It is conceptually akin to $r^2$ (the same coefficient of determination used for only the two-variable model. $R^2$ is used where the variables –both Y and X – are more than two. $R^2$ gives the proportion or percentage of the total variation in the dependent variable y that is accounted for by the single explanatory variable x). Similarly, $R^2$ gives the proportion of the variation in y explained by the variables $X_2$ $X_3$etc jointly. The higher the $R^2$ values the better. It lies between 0 and l. If it is l, the fitted regression line explains any of the variation in Y. If it is 0, the model does not explain any of the variation in Y. The fit of the model is "better" the closer $R^2$ is to l.

**Autoregressive Distributed Lag (ARDL) Approach**

This study employed the Autoregressive Distributed Lag(ARDL) bounds test approach proposed by Pesaran, Shin, and Smith(2001) based on unrestricted error correction model. Compared to other co-integration procedures such as Engle and Granger (1987) and Johansen and Juselius (1990), the bounds test approach appears to have gained popularity in recent times for a number of reasons. First, the endogeneity problems and inability to test hypotheses on the limited coefficients in the long run associated with Engle-Granger method are avoided, that is, it has superior statistical properties on small samples as it is relatively more efficient in small sample data sizes evident in most developing countries. Second, the long run and short run parameters of the model are estimated simultaneously. Third, all the variables are assumed to be endogenous. Fourth, it does not require unit root testing usually employed to determine the order of integration of variables. Lastly, whereas all the other methods require that the variables in a time series regression are integrated of order one, *I*(1), only that of Pesaran, Shin, and Smith(2001) could be used regardless of whether the underlying variables are *I*(0), *I*(1) or fractionally integrated.

**Causality test**

In order to complement this study, a causality test is conducted to establish the direction of

causality between money supply variables and economic growth. Although regression analysis deals with dependence of one variable on the other, it does not imply causation (Kendall and Stuart, 1961 and Zellner, 1979). According to Granger (1968), a variable say *y* is said to granger cause another variable say *x* if past and present values of *y* help to predict *x*. This is the traditional Granger Causality (based on a bi-variate relationship). Granger Causality test recognizes the following types:

**Unidirectional Causality:** This is a case where X granger-causes Y or Y granger-causes X but not the reverse in each case. This means the causality either runs from X to Y (X→Y) or from Y to X (Y→X) but without the reverse occurring in each case.

**Feedback (Bilateral) Causality:** In this case the causality runs on both sides but on the condition that the coefficients of the set (variables) are statistically and significantly different from zero in both cases, that is, (X↔Y) and (X↔Y).

**Independence:** This is the case where the coefficients of the set (X and Y) are statistically insignificant in both regressions. In this case, neither X granger-cause Y nor Y granger-cause X. Y and X represents the dependent and independent variables respectively.

## ANALYSIS AND DISCUSSION OF FINDINGS

**Table 1: Descriptive Statistics (Recurrent Expenditures)**

| | RAGR | RWHR | RTRC | REDU | RHLT | RDFE |
|---|---|---|---|---|---|---|
| Mean | 60.40647 | 130.0803 | 62.13538 | 128.3338 | 78.77941 | 107.9768 |
| Median | 32.99000 | 70.65500 | 26.29350 | 70.65500 | 37.41000 | 61.15000 |
| Maximum | 242.7000 | 390.4200 | 279.7200 | 390.4200 | 279.7200 | 330.5900 |
| Minimum | 0.020000 | 0.230000 | 0.052000 | 0.230000 | 0.040000 | 1.050000 |
| Std. Dev. | 67.52289 | 144.5365 | 86.15016 | 143.6280 | 91.18987 | 121.8208 |
| Skewness | 0.834274 | 0.754837 | 1.309233 | 0.746392 | 0.871887 | 0.812730 |
| Kurtosis | 2.773193 | 1.902420 | 3.271931 | 1.884387 | 2.264063 | 1.954091 |
| Jarque-Bera | 4.016949 | 4.935376 | 9.817936 | 4.920080 | 5.074996 | 5.292732 |
| Probability | 0.134193 | 0084781 | 0.007380 | 0.085432 | 0.079064 | 0.070908 |
| Sum | 2053.820 | 4422.730 | 2112.603 | 4363.350 | 2678.500 | 3671.210 |
| Sum Sq. Dev. | 150458.2 | 689396.4 | 244921.1 | 680757.2 | 274414.5 | 489729.9 |
| Observations | 34 | 34 | 34 | 34 | 34 | 34 |

Source: Researcher's Computation with E-Views

The descriptive statistics result in Table 1 shows that RAGR, RWHR, RTRC, REDU, RHLT and RDFE have mean and standard deviations (in parenthesis) of N60.4 (N67.5b), N130.1b (N144.5b), N62.1b (N86.2b), N128.3 (N143.6b), N78.8b (N91.2b) and N108b (N121.8b), respectively, whereas RGDP has a mean and standard deviation of N37.7tr. All the variables have higher standard deviations, which also indicates a wider spread in the data and are also asymmetrical. In terms of skewness and kurtosis, all the variables have values less than 1 and 3 (respective "rule of thumb" benchmarks), except RTRC, which has a skewness and kurtosis of 1.31 and 3.27, respectively. A combination of the skewness and kurtosis characteristics of a data is usually

employed in determining the normality of a given data. Thus, all the data could be termed as normally distributed, except RTRC. Lastly, the Jarque-Bera (JB) statistics lend support to the earlier skewness and kurtosis statistics. The decision rule for JB is to accept normality if the p-value id greater than 0.05, otherwise reject. Thus, all the variables are normally distributed except RTRC.

**Table 2: Augmented Dickey-Fuller (ADF) Unit Root Test**

| Variables | | t-statistic | Critical value (0.05) | Prob. | Order Of Integration |
|---|---|---|---|---|---|
| LRAGR | Level | -2.028160 | -2.954021 | 0.2739 | *I*(1) |
| | 1st Diff | -7.763549 | -2.957110 | 0.0000 | |
| LRWHR | Level | -2.674228 | -2.971853 | 0.0910 | *I*(1) |
| | 1st Diff | -7.280119 | -2.957110 | 0.0000 | |
| LRTRC | Level | -1.589805 | -2.954021 | 0.3145 | *I*(1) |
| | 1st Diff | -6.832073 | -2.957110 | 0.0002 | |
| LREDU | Level | -3.172227 | -2.981038 | 0.0334 | I(0) |
| LRHLT | Level | -1.625115 | -2.954021 | 0.4589 | *I*(1) |
| | 1st Diff | -9.545414 | -2.957110 | 0.0000 | |
| LRDFE | Level | -1.284019 | -2.954021 | 0.6252 | *I*(1) |
| | 1st Diff | -6.887066 | -2.957110 | 0.0000 | |

Source: Researcher's Computation with E-Views

The result in Table 2 indicates that all the variables are stationary at their first differences, except LEDU and LREDU, which are stationary at level. From the results in Table 4.7, none of the variables employed in the model has unit roots; and as such can be employed for further econometric analysis.

**Table 3: ARDL Bounds Cointegration Test**

| Model Estimated | Test Statistic | Degree of Freedom | Critical value | | Decision |
|---|---|---|---|---|---|
| | | | I(0) | I(1) | |
| 1 | 3.924513 | | | | |
| 2 | 10.50894 | | | | |
| 3 | 6.699618 | | | | |
| 4 | 6.278465 | | 10%=2.63 | 3.35 | There is co-integration |
| 5 | 8.829502 | 6 | 5% =3.1 | 3.87 | |
| 6 | 7.400323 | | 1% =4.13 | *5* | |
| 7 | 8.245123 | | | | |
| 8 | 10.236885 | | | | |
| 9 | 9.477702 | | | | |

Source: Researcher's Computation with E-Views

In table 3, the F-statistics result of 3.92, 10.51, 6.70,6.28, 8.82, 7.40, 8.26, 10.24, and 9.48 are greater than the 5%critical values of 3.1 and 3.87 at the *I*(0) and *I*(1) bounds, respectively. Thus, the null hypothesis of no co-integration is rejected. Therefore, there is co-integration between

government total, recurrent as well as capital expenditures and real GDP (Models 1, II, III) in Nigeria.

## Normality and Reliability Tests

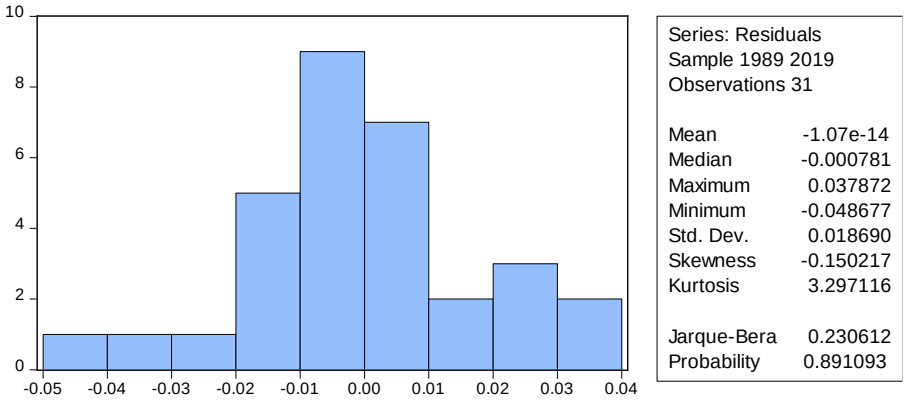


**Figure 1: Histogram Normality Test (Model 1)**
Source: Researcher's Computation with E-Views

**Table 4: Serial Correlation and Heteroskedasticity Tests (Model 1)**

| | | | |
|---|---|---|---|
| Breusch-Godfrey Serial Correlation LM Test: | | | |
| F-statistic | 0.474787 | Prob. F(3,15) | 0.7045 |
| Obs*R-squared | 2.688394 | Prob. Chi-Square(3) | 0.4422 |
| Heteroskedasticity Test: Breusch-Pagan-Godfrey | | | |
| F-statistic | 0.976622 | Prob. F(12,18) | 0.5034 |
| Obs*R-squared | 12.22443 | Prob. Chi-Square(12) | 0.4278 |
| Scaled explained SS | 4.733725 | Prob. Chi-Square(12) | 0.9663 |

Source: Researcher's Computation with E-Views

**Table 5: Ramsey RESET Test (Model 1)**

| | Value | df | Probability |
|---|---|---|---|
| t-statistic | 1.515163 | 19 | 0.1462 |
| F-statistic | 2.295719 | (1, 19) | 0.1462 |
| F-test summary: | | | |
| | Sum of Sq. | df | Mean Squares |
| Test SSR | 0.001718 | 1 | 0.001718 |
| Restricted SSR | 0.015934 | 20 | 0.000797 |
| Unrestricted SSR | 0.014216 | 19 | 0.000748 |

Source: Researcher's Computation with E-Views

In Figure 5, the Histogram Normality Test indicates skewness and kurtosis of -0.15 and 3.3, respectively. Furthermore, the JB statistic and p-value were 0.23 and 0.89. Given that the p-value

is greater than 0.05, it is concluded that the residuals of the model are normally distributed. Similarly, the p-values of the Breusch-Godfrey and Breusch-Pagan-Godfrey F-statistics of 0.7045 and 0.5034, respectively, in Table 5 show that the residuals are neither serially correlated nor heteroskedastic. More so, the Cusum and Cusum of Squares tests in Figures 1 reveal that the model estimates are stable across the period. Lastly, the result of the Ramsey Reset test in Table 5 revealed t and F-statistics of 1.515 and 2.296, respectively, each with a p-value of 0.1462. Since the p-value is greater than 0.05, we conclude that there are no misspecifications errors in the model, thus suitable for analysis.

**Table 6: ARDL Short Run Test**

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| LRGDP(-1) | 1.257194 | 0.202487 | 6.208772 | 0.0000 |
| LRGDP(-2) | 0.213009 | 0.360527 | 0.590827 | 0.5620 |
| LRGDP(-3) | -0.528318 | 0.208354 | -2.535676 | 0.0207 |
| LAGR | 0.000605 | 0.009199 | 0.065759 | 0.9483 |
| LAGR(-1) | -0.020776 | 0.011884 | -1.748154 | 0.0975 |
| LWHR | 0.150152 | 0.059019 | 2.544143 | 0.0203 |
| LTRC | 0.037819 | 0.010182 | 3.714467 | 0.0016 |
| LEDU | -0.125895 | 0.048700 | -2.585132 | 0.0187 |
| LHTE | -0.008881 | 0.026546 | -0.334564 | 0.7418 |
| LHTE(-1) | 0.016875 | 0.012311 | 1.370740 | 0.1873 |
| LDFE | 0.002695 | 0.016290 | 0.165430 | 0.8704 |
| LDFE(-1) | -0.036468 | 0.020049 | -1.818888 | 0.0856 |
| C | 1.404330 | 0.727860 | 1.929395 | 0.0696 |
| R-squared | 0.998649 | Mean dependent var | | 31.19132 |
| Adjusted R-squared | 0.997749 | S.D. dependent var | | 0.508588 |
| S.E. of regression | 0.024129 | Akaike info criterion | | -4.315685 |
| Sum squared resid | 0.010480 | Schwarz criterion | | -3.714336 |
| Log likelihood | 79.89312 | Hannan-Quinn criter. | | -4.119661 |
| F-statistic | 1109.163 | Durbin-Watson stat | | 1.874062 |
| Prob(F-statistic) | 0.000000 | | | |

Source: Researcher's Computation with E-Views

From the result in Table 6, total government expenditures on the six components determine 99.8% of the variations in RGDP. The F-statistic of 1109.2 and p-value of 0.000 indicates that the model has a very high goodness of fit. More so, the t-statistics indicates that WHR, TRC and EDU as well as the one and three-period lags of RGDP have significant impacts on RGDP. Furthermore, AGR, WHR, TRC and DFE exert positive impacts on RGDP while EDU and HLT impact negatively on RGDP in the short run.

**Table 7: ARDL Long Run Test**

Levels Equation
Case 3: Unrestricted Constant and No Trend

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LAGR | -0.347087 | 0.275837 | -1.258304 | 0.2244 |
| LWHR | 2.583746 | 1.880343 | 1.374082 | 0.1863 |
| LTRC | 0.650774 | 0.338359 | 1.923325 | 0.0704 |
| LEDU | -2.166342 | 1.585786 | -1.366101 | 0.1887 |
| LHLT | 0.137560 | 0.569604 | 0.241501 | 0.8119 |
| LDFE | -0.581145 | 0.455413 | -1.276084 | 0.2181 |

EC = LRGDP - (-0.3471*LAGR + 2.5837*LWHR + 0.6508*LTRC -2.1663*LEDU + 0.1376*LHTE -0.5811*LDFE + 9.4131)

Source: Researcher's Computation with E-Views

Estimated Coefficients:

**RGDP = 9.4131 – 0.347LAGR + 2.584LWHR + 0.651LTRC – 2.166LEDU + 0.138LHLT – 0.581LDFE + μ**

Table 7 and Estimate Equation above show that none of the variables significantly influences RGDP in the long run, given the respective p-values of their t-statistics; apart from TRC, which is weakly significant at 10%. Furthermore, WHR, TRC and HLT have positive impacts on RGDP while AGR, EDU and DFE exert negative impacts in the long run.

**Table 8: ARDL Error Correction Regression**

ECM Regression
Case 3: Unrestricted Constant and No Trend

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 1.404330 | 0.229160 | 6.128154 | 0.0000 |
| D(LRGDP(-1)) | 0.315309 | 0.132652 | 2.376965 | 0.0288 |
| D(LRGDP(-2)) | 0.528318 | 0.150478 | 3.510919 | 0.0025 |
| D(LAGR) | 0.000605 | 0.005037 | 0.120100 | 0.9057 |
| D(LHLT) | -0.008881 | 0.006187 | -1.435440 | 0.1683 |
| D(LDFE) | 0.002695 | 0.011742 | 0.229507 | 0.8211 |
| CointEq(-1)* | -0.058114 | 0.009602 | -6.052172 | 0.0000 |
| R-squared | 0.734275 | Mean dependent var | | 0.047812 |
| Adjusted R-squared | 0.667844 | S.D. dependent var | | 0.036258 |
| S.E. of regression | 0.020897 | Akaike info criterion | | -4.702782 |
| Sum squared resid | 0.010480 | Schwarz criterion | | -4.378979 |
| Log likelihood | 79.89312 | Hannan-Quinn criter. | | -4.597230 |
| F-statistic | 11.05316 | Durbin-Watson stat | | 1.874062 |
| Prob(F-statistic) | 0.000006 | | | |

Source: Researcher's Computation with E-Views

The result in Table 8 reveals that the model adjusts itself with a speed of 5.8% per period to correct its long run disequilibrium annually. However, the explanatory variables remain insignificant;

which upholds the long run result in Table 4.12. Given that the residuals are normally distributed, it then implies that the present level of government expenditure is incapable of stimulating any appreciable level of real economic growth in the country.

**Table 9 Granger Causality Test**

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|---|---|---|
| LAGR does not Granger Cause LRGDP | 31 | 3.07169 | 0.0470 |
| LRGDP does not Granger Cause LAGR | | 0.13991 | 0.9351 |
| LWHR does not Granger Cause LRGDP | 31 | 1.52885 | 0.2326 |
| LRGDP does not Granger Cause LWHR | | 2.31615 | 0.1012 |
| LTRC does not Granger Cause LRGDP | 31 | 1.78115 | 0.1776 |
| LRGDP does not Granger Cause LTRC | | 0.94055 | 0.4365 |
| LEDU does not Granger Cause LRGDP | 31 | 1.30531 | 0.2956 |
| LRGDP does not Granger Cause LEDU | | 2.89889 | 0.0558 |
| LHLT does not Granger Cause LRGDP | 31 | 2.79552 | 0.0619 |
| LRGDP does not Granger Cause LHLT | | 1.67288 | 0.1994 |
| LDFE does not Granger Cause LRGDP | 31 | 3.22450 | 0.0404 |
| LRGDP does not Granger Cause LDFE | | 0.11951 | 0.9477 |

Source: Researcher's Computation with E-Views

The result in Table 9 shows the causal relationships between the disaggregated components of government expenditure and real GDP. First, the causality relationship, running from AGR to RGDP and from RGDP to AGR, were tested which revealed F-statistics and p-values (in parenthesis) of 3.07169 (0.0470) and 0.13991 (0.9351). Given that the p-value of 0.0470 is less than Alpha (0.05), the null hypothesis of no causality between AGR and RGDP is rejected, implying that there is a uni-causality running from AGR to RGDP. Thus, AGR granger-causes RGDP. On the other hand, the p-value of 0.9351 is greater than alpha, which implies that there is no causality from RGDP to AGR. Thus, RGDP does nor granger-cause AGR.

Second, the causality results for WHR and RGDP indicates F-statistics and p-values of 1.52885 (0.2326) and 2.31615 (0.1012). Since the p-values are greater than 0.05, the null hypothesis in either case is accepted. That is, no causality relationship exists from WHR to RGDP and from RGDP to WHR. Therefore, there is independence between the pair; as neither WHR granger-causes RGDP nor RGDP granger-causes WHR. Similarly, there is absence of causality between TRC and RGDP, EDU and RGDP, as well as HLT and RGDP, given that the p-values of their F-statistics, in either case, are greater than 0.05. Consequently, there is independence between TRC and RGDP, EDU and RGDP, as well as between HLT and RGDP; although there is weak causality that runs from RGDP to EDU and from HLT to RGDP, since the null hypothesis can be rejected at 10% (0.10) level of significance. Lastly, the causality test of the relationship between DFE and RGDP reveals F-statistics and p-values of 3.22450 (0.0404) and 0.11951 (0.9477) for causality running from DFE to RGDP and RGDP to DFE, respectively. Thus, the null hypothesis is rejected in the first instance (from DFE to RGDP) but that of the later (RGDP to DFE) is accepted. This implies that there is a uni-directional causality running from DFE to RGDP but not from RGDP to DFE. Thus, DFE granger causes RGDP but RGDP does not granger-cause DFE.

### Discussion of Finding

The study aimed to investigate the impacts of Federal Government's aggregate recurrent and capital expenditures on Agriculture; Works, Housing and Road Construction; Transport and Communication; Education; Health and Defense on the real gross domestic product of Nigeria.

The result of long-run estimation indicates that WHR, TRC, HLT have positive impacts while AGR, EDU, and DFE showed negative impacts on RGDP. None of the independent variables is significant. The results of WHR, TRC and HLT conform to *a priori* expectation and consistent with the findings of Oladinrin, Ogunsemi, &Aje (2012) and Okwu, Ngoepe-ntsoane, Tochukwu & Obiwuru (2017), which assessed the relationship between the housing sector and economic growth in Nigeria and their results suggested that the growth of the housing sector has a positive impact on output expansion. Njoku (2005) investigated the effects of transportation infrastructure spending on economic growth in Nigeria. He found that works, housing and general administration have positive impact on the GDP. These variables stimulate economic growth in Nigeria both in the short-run and long-run while AGR, EDU, and DFE which showed negative impacts on RGDP and not in conformity with the *a priori* expectation was in line with the findings of Mathew and Mordecai (2016) who studied the impact of public agricultural expenditure on agricultural output in Nigeria from 1981 to 2014. The results of the ECM model indicated that public agricultural expenditure has a negative impact on agricultural output in Nigeria. Taylor *et al* (1980) found out that increases in defense spending had a negative impact on economic growth for all developing countries and for separate regional groupings. Loto et al (2012) investigates the growth effect of government expenditure on economic growth in Nigeria for the period 1980 to 2008, with a particular focus on five sectoral expenditure including security, health, education, transportation communication and agriculture. Expenditure on agriculture was found to be negatively correlated to economic growth. Also, Ebong, Ogwumike, Udongwo and Ayodele (2016) as well as Babatunde (2018), found negative effects of government agricultural expenditure on economic growth. This result suggests that the agricultural subsector has a huge potential to stimulate economic growth in Nigeria but lacks adequate attention of the government. More so, a greater bulk of the expenditure on the subsector does not reach the targeted farmers.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The study has proved that output to public expenditure function conforms to Keynesian Multiplier theory that increase in private-public expenditures raises total Gross Domestic Product and incorporated ideas of other well-known theories. Pairwise Granger Causality in corroborating these theories, revealed that all the exogenous factors of money supply act as growth-drivers. The study has further established that a disaggregated FGN expenditure provides a more robust analysis of their impacts on Nigeria's economic growth.

**Recommendations**

i. Government should sustain spending on WHR, TRC and HLT which have positively contributed to real output. It should commit more funds to AGR, EDU and DFE in order to reverse the adverse impact observed in these sectors
ii. Government should sustain Recurrent funding on EDU and HLT which revealed a positive impact but boost revenue expenditure on AGR, WHR, TRC and DFE which constitute growth-constraints to the economy.
iii. The level of Capital expenditure on AGR and WHR should be maintained while Capital expenditure on TRC, EDU, HLT and DFE should be increased to improved contribution to the economy
iv. While recurrent expenditure on AGR should be sustained, Capital expenditure on the sub-head needs to be further boosted to make a positive contribution to the economy.

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