# Government expenditure and economic growth: evidence from the critical sectors in an emerging economy

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## Abstract

This study examines the impact of government expenditure on education, health, agriculture, pensions and gratuities and public debt servicing on economic growth of Nigeria for forty-year period 1981-2020. The research design is *ex-post facto* withtime series data collected from Central Bank of Nigeria Statistical Bulletin and Nigeria Bureau of Statistics. Using Augmented Dickey-Fuller for unit root test all the variables was stationary at first difference. The Johansen co-integration test revealed a long-run equilibrium relationship among the variables. Analyzing the data with Vector Error Correction Model the results reveal that expenditure on education has long and short run positive and significant impact on economic growth. Expenditure on health and agriculture has positive and significant impact while pensions/gratuities and public debt servicing has negative and non-significant impact on economic growth in the long run but all positive and non-significant in the short run. Government is encouraged to increase funding to education, health, agriculture in order to increase the level of productivity and economic growth, encourage retirees to invest their pensions and gratuities in economic enhancing ventures, and limit its borrowings and seek for debt reduction or forgiveness.

**Keywords:** economic growth, Keynesian theory, Nigeria, real gross domestic product, vector error correction model.

## 1. Introduction

Presently in Nigeria, internal security is in shamble, youth restiveness, hostage taking, armed robbery and kidnapping are the order of the day. Safety of lives and properties of citizens is in a precarious situation in the light of increasing expenditure on critical sectors of the economy. Basic social and community services such as education, health, extension services in agriculture, pension/gratuity, and public debt servicing among others are in very poor state yet the budgeted expenditure on them keep on increasing every year. In the education sector strikes are the order of the day in almost all government-owned tertiary institutions today. The hospitals and healthcare institutions are not well catered for. This situation has led to brain-drain in these two important sectors of the economy (Babalola, Salako, Yusuf, and Egbekunle,

2015). Agricultural and natural resources as well as industry which are the core economic services in the country are begging for attention. Power is epileptic and highly unreliable and as a result low productivity prevails in both the agricultural and industrial sectors. Till today, primitive technology involving the use of hoes and machetes in agriculture, which are energy-sapping, is the order of the day. Hence, low productivity prevails. Domestic and external loan burden as well as interest charges are rising; pensions and gratuities remain a nightmare for retired citizens.

In the literature, expenditure of government to maintain its administration, the society and economy at large remains one potent instrument for influencing the growth of economies all over the world. As the state gets increasingly involved in economic activities its expenditure increases. John Maynard Keynes and his followers (Keynesians) hold that government expenditure could contribute positively to economic growth. And that government could reverse economic downturns by borrowing funds from the private sector and then return such funds to the private sector through various spending programmes. For example, high levels of government spending on consumption are likely to increase employment, profitability and investment through the multiplier effect on aggregate demand. While some recent studies (Abu & Abdullahi, 2010; Guhibet & Tsenba, 2016; Deepti and Deepak, 2020) have argued in favour of it, others (Chude & Chude, 2013; Nwaoha, Onwuka & Ejem, 2017; Jeff-Anyeneh and Ibenta, 2020) have argued against this the case of Nigeria is still shrouded in mystery. In Nigeria since the enthronement of a democratically elected government in 1999 to date public expenditure has maintained an upward trend. The ever-increasing government recurrent expenditure has attracted a lot of criticism and complaints from a good number of Nigerians who argued that the government has been wasteful and that the funds especially the portion spent on servicing the recurring component of government expenditure should have been channeled to capital projects. This gives the impression that recurring expenditure does not increase economic growth. The debate has been waxing on whether the increasing government expenditure supports economic growth in Nigeria. From the foregoing the following research questions are raised. To what extent does government expenditure on education, health, agriculture, transfers on pensions and gratuities, public debt servicing impact on economic growth of Nigeria? Consequently, the general objective of this study is to investigate the impact of government expenditure on economic growth of Nigeria for the period 1981-2020. The specific objectives are to examine the impact of government expenditure on education, health, agriculture, pensions and gratuities, and public debt servicing on economic in Nigeria. Based on the economic situation in Nigeria we hypothesize that government expenditure on education, health, agriculture, pensions and gratuities, and public debt servicing has no significant impact on economic growth in Nigeria. The findings of this work will deepen the knowledge and understanding of government on the impact of some components of public expenditure on the economic growth. They could help greatly in budget preparation and formulation by concerned agencies and institutions of government.

## 2. Literature review

### 2.1. Conceptual review

The efficiency and structure of government expenditures emanate from the determination of the government to provide a

conducive and favourable environment for living and business activities through the provision of public goods that can enhance productivity and growth. As a result, government spends on education, health, agriculture, power, defence, national debts servicing, capital investments, its own maintenance, the society and the economy as a whole (Uremadu & Nwaeze, 2019) and other social services. Government expenditures are classified into recurrent and capital expenditures. Recurrent expenditures are expenses of government incurred on a regular basis if the functions and machinery of government must move on throughout the year (Nwaoha et al., 2017). It includes items such as personnel costs and overhead costs, travel and transportation, utility services, telephone services, stationery, maintenance of office furniture and equipment, entertainment and hospitality. Capital expenditure comprises expenses of government on the acquisition of things of permanent nature. They include expenditure on items such as buildings, road construction, bridges, equipment and all permanent structures and assets (Babalola et al., 2015). Government expenditures are functionally disaggregated into administration, economic services, social and community services and transfers with their recurrent and capital components. expenditure on administration includes internal security and defence, that of economic services include agriculture and natural resources, social and economic services includes education, health while transfers involves public debt, interest charges, capital repayment, external financial obligations, pension and gratuities among others. This study concentrates on education, health, agriculture, pensions and gratuities, and public debt servicing because of their critical role in every nation. Economic growth is the dependent variable while total government expenditure on education, health, agriculture, pensions and gratuities and public debt servicing are the independent variables. According to keynesians (Inimino, tubotamuno and shaibu, 2017) it is hoped that growth is experienced in an economy when government channels appropriately her expenditures through transmission mechanisms such as the education and health institutions, agricultural interventions and institutions; effective pension and gratuity schemes and public debt management.

## 2.2. Theoretical review

There are two major opposing views on the relationship between public expenditure and economic growth which are the Wagner view and Keynesian view. Wagner view that the public expenditure is an endogenous factor as it is propelled by economic growth and not a cause of economic growth. The **Wagner increasing state activities theory** also called the functional theory argues that as government activities increase it is inevitable that its expenditure will be on upward trend. Thus there is a functional relationship between the growth of an economy and the growth of government activities and the later grows faster than that of the economy. Wagner argued that the development of the industrial sector would bring a structural change which would compel government to spend more money in carrying out its functions. The Keynesian view is in contrast to the Wagner view. The Keynesian view states that public expenditure is an exogenous factor that influences economic growth and can be used as policy instrument. **Keynes** argues that public expenditure is a fundamental determinant of economic growth. That an increase in the government consumption was likely to lead to an increase in employment, profitability and investment through multiplier effects on aggregate demand. As a result, government expenditure augmented the aggregate demand, which provokes an increased output depending on expenditure multipliers. This implies that expenditure on education, health, agriculture, pensions and gratuities and public debt servicing will improve productivity and development by raising the quality of the labour force and have multiplier effect on the economy. This study is hinged on Keynesian theory.

## 2.3. Empirical review

A number of empirical evidence on this topic is discussed below. Attahir (2016) reported a long run negative and significant impact of recurrent transfer payment (RTP), capital social-economic expenditure (CSE) and openness (OPP) on economic growth, while recurrent administration spending (RAD) has negative and insignificant impact. Capital administrative expenditure (CAD), investment (INV) and labour (LAB) exert a long-run positive and significant impact on economic growth. In the short-run dynamics of the model RAD and OPP showed a positive and significant impact while RTP provides negative and significant impact on economic growth. Other variables are statistically insignificant. The speed of adjustment term showed that about 41 percent correction towards long-run equilibrium is completed in a year. Impulse Response Function (IRF) showed the response of GDP to shock in RAD and INV to be positive all through the period considered, while the response to RTP, CAD, CSE and OPP was negative. The response to shock in LAB was almost zero though marginally negative.

Tajudeen and Ismail (2013) investigated the impact of public expenditure on economic growth in Nigeria for the period 1970-2010 making use of annual time series data. The study employed the bound testing (ARDL) approach to examine the long-run and short-run relationships between public expenditure and economic growth in Nigeria. The bounds tests suggested that the variables of interest put in the framework were bound together in the long-run. The associated equilibrium correction was also significant confirming the existence of long-run relationships. Findings indicated that the impact of total capital public spending on growth was negative. Recurrent expenditure however was found to have insignificant positive impact on growth. Therefore, government should increase its spending on infrastructure, social and economic activities. Iheanacho (2016) variance decomposition confirms the collective contribution of public expenditure on economic growth for the period 1986-2014. Johansson cointegration and VECM results show that recurrent expenditure is the major driver of economic growth and it coexists with a positive short-run relationship highlighting the dual effects of recurrent expenditure on economic growth. Capital expenditure has negative and significant long-run effects on economic growth. Abu and Abdullahi (2010) results revealed a negative effect of government total capital expenditure, total recurrent expenditure and education on economic growth while expenditure on transport, communication and health has positive impact for the period 1970-2008. Jelilov and Musa (2016) with OLS found that government expenditure has a positive and significant impact on economic growth for 1981-2012. Ogunmuyiwa and Adelowokan (2015) affirmed that public expenditure has a positive and significant impact on economic growth for 1970-2000. Recurrent expenditure exhibits a positive impact on growth at 10 percent significance level while capital expenditure has a positive and insignificant impact on growth.

Acikgoz and Cinan (2017) investigated the effects of public spending on economic growth based on Cobb-Douglass production function with ARDL and Dynamic Fixed Effect (DFE) for 21 developed countries (High-Income OECD countries) for the period 1990-2013 and found that public spending has an important role for economic growth. Dan, Mihai, Ana and Michael (2018) using quarterly data for the period 1995-2015 examined the importance of various categories of public expenditure on GDP growth using ARDL and showed that expenditures on education and healthcare have a

positive impact on the economy, while expenditures on defence, economic affairs, general public services and social welfare have negative impact on selected Central and Eastern European countries that joined the European Union. Dimitrios, Christian and Loannis (2018) found support for Wagner's and Keynesians hypotheses when they examined the validity of Wagner's law on UK Public spending expansion for the period 1850-2010. Wagner's Law is that economic development is the key determinant to public sector growth. The cointegration and the Granger Causality tests, indicated presence of a long-run relationship between national income and government spending while the causality is bi-directional. Driton and Lirim (2017) disagree with Wagner and Keynesian theories when they examined the impact of public expenditure on economic growth of Kosovo for the period 2000-2016 indicating that none of the public expenditure categories in Kosovo had any impact on economic growth of Kosovo. They concluded that public expenditure in Kosovo for the period 2000-2016 was characterized by unproductive public expenditure as they had no necessary and reasonable impact on achieving the economic target in Kosovo.

Edmund, Choong and Lau (2017) used a panel data of 25 Sub-Saharan African low income countries spanning from 2002-2015 obtained from World Development Indicators (WDI) database studied the impact of government expenditure on economic growth of Sub-Saharan African low income countries. Using Im-Pesaran-Shin and Fisher ADF Test for unit root tests, Pedroni test for cointegration tests, Generalized Method of Moments (GMM) demonstrated no evidence for government efficiency in accelerating economic growth of low income countries in Sub-Saharan Africa. Edward (2009) examined aggregated and disaggregated expenditure on economic growth in Ghana for the period 1970-2004. Expenditure on education and health represented human capital development while expenditure on roads and waterways captured infrastructural development. He revealed that the aggregated government expenditure retarded economic growth while that on education has no significant impact in the short-run. The expenditures on health and infrastructure promote economic growth. The political economy variable proxy by nature of governance (democracy) and political instability (years of changes in government and military dictatorship) proved significant in explaining Ghana's economic growth over the study period.

Komain and Tantatape (2013) found no cointegration between government expenditure and economic growth in Thailand using the Granger Causality test and a unidirectional causality from government expenditures to economic growth exists. The results from the least square method with lagged variable of economic growth, government expenditure and money supply show strong positive impact of government spending on economic growth. Laszio and Bekzod (2017) tested Wagner's Law in Australia for the period 1901-2008 by studying the relationship between real per capita income and composite variables of state activity that takes both financial and legislative activities of the federal government into account. Although this composite variables still falls short of capturing all levels and sorts of state or government activities, it is a few more comprehensive measures than any of its components used individually in earlier studies. The results based on this composite measure provide no empirical evidence in favour of Wagner's Law in Australia. Leke and Alban (2017) used quarterly time series data spanning 2004-2016 to test Keynesian view versus Wagner view on the relationship between public expenditure and economic growth in Kosovo using public expenditure (G), GDP, foreign direct investment (FDI), export (EXP) and total budget revenue (TRtax). The Johansen co-integrated test was used to investigate the long-run relationship between public expenditure and economic growth, while the Granger Causality test

was used to know the direction of flow between variables. This study discovered a unidirectional causality between government expenditures and economic growth, bidirectional causality between total budget revenue and public expenditure, bidirectional causality between export and economic growth in Kosovo which support the Keynesian view. There is a positive and statistical significant effect of public expenditures and exports on economic growth. Total budget revenue has a positive impact on economic growth but this has not been proved to be significantly significant. FDI is also found to be negative and insignificant.

Lingxiao, Adelina and Handuo (2016) examined the relationship between public expenditure and economic growth from the perspectives of Keynes and Wagner's Law in Romania using annual time series data for the period of 1991-2014. A unidirectional long-term relationship from government expenditure to economic growth in Romania was observed. ARDL and bounds test based on Unrestricted Error Correction Model (UECM) estimation were used. Ojewumi and Oladimeji (2016) examined the effect of government funding on the growth of education in Nigeria from 1981 to 2013 and showed negative impact of both capital and recurrent expenditure on educational growth. The study blamed this situation on high level of corruption prevalent in the educational sector. Shashi (2010) used co-integration and error-correction models to analyze the causal relationship between public expenditure and economic growth in Nepal and provided strong evidence rejecting the Keynesian view. The cointegration analysis provides positive evidence for the existence of a long-run relationship between public expenditure and Real GDP. The long run causality test based on the standard t-test statistics for the Error Correction Model (ECM) indicates a unidirectional causality from real GDP to public expenditure, not vice versa thereby supporting Wagner's view. The short run causality test based on F-test statistics from the ECM indicates no causality between real GDP to public expenditure. The pair-wise Granger Causality text confirms the absence of the short run causality between real GDP to public expenditure. Thus, the results support the Wagner's hypothesis which states that the growth of public expenditure can be explained by increase in economic activity.

Yusuph and Nerima (2012) analyzed an empirical relationship between healthcare expenditure and economic growth in Uganda using Vector Error Correction Model (VECM) and found a positive and significant long-run impact of healthcare expenditure on GDP. Ezema (2019) examined the responsiveness of economic growth (RGDP) to government expenditure on pensions and gratuities in Nigeria for the period 1981-2016 employing OLS and Error Correction Mechanism (ECM) technique as the analytical tool. Findings showed that pensions and gratuities expenditure of government had a positive and significant response on economic growth in the long run. Shakirat (2018) investigated the effect of government spending on infrastructure for 1980-2016 in Nigeria and found that government spending on transport and communication, education and health infrastructure has significant effect on economic growth. Spending on agriculture and natural resources infrastructure recorded a significant inverse effect on economic growth in Nigeria.

Shih-Ying, Jenn-Hong and Eric (2010) examined the causal relationship between government expenditure and economic growth by conducting the panel Granger Causality test for 182 countries for the period 1950-2004. The results strongly support both Wagner's Law and the hypothesis that government spending is helpful to economic growth regardless of how we measure the government size and economic growth. When the countries are disaggregated by income levels and the degrees of corruption, their results also confirmed a bi-directional causality between government activities and economic growth for the different subsamples of countries, with the exception of the low income countries. It is suggested

that the distinct feature of the low-income countries is likely owing to their inefficient government and inferior institutions.

In the literature, there are differences in findings in previous studies based on the type of data, variables chosen, type of design, type of econometric model specification and analysis tools adopted. Majority of the studies disaggregated their variables into administration, economic services, social and community services and transfers and adopted GDP in absolute terms as the dependent variable measuring economic growth. In extending the debate this study adopted government expenditure on education, health, agriculture, pensions and gratuities and public debt servicing as critical expenditure variables and percentage change in real GDP as a better measure of economic growth rather than using absolute real GDP. This study brings to currency the topic of discussion considering the period of study (1981-2020). Augmented Dickey-Fuller (ADF) test dominates for unit root test (Attahir, 2016; Usman et al., 2011; Ogunmuyiwa and Adelowokan, 2015), Johansen cointegration test dominates for long-run association, ARDL bounds testing approach and VECM were used for analysis (Attahir, 2016; Ogunmuyiwa and Adelowokan, 2015; Tajudeen and Ismail, 2013).

## 3. Data and methods

### 3.1. Data

The study adopted *ex-post facto* research design, relying on already existing secondary data. Time series data obtained from the CBN Statistical Bulletin and the NBS were used. The data are real GDP, total government expenditure on education, health, agriculture, pensions and gratuities, and public debt servicing. Economic growth as the dependent variable is proxy Real GDP. The RGDP is the total money value of all goods and services produced within a country at any given period of time (usually one year). Thus, this study used RGDP growth rate as the measure for economic growth. The major explanatory variables are total government expenditure on education, health, agriculture, pensions and gratuities and public debt servicing. The total government expenditure on education, health, agriculture, pensions and gratuities and public debt servicing includes aggregate expenses of government made on educational and related institutions in the country for developing human resources, on hospitals and other health facilities and institutions for processing and development of human resources, on agriculture and natural resources to ensure food security, on pensions and gratuities as financial obligations of government on senior citizens of a country, on the debt interest servicing as financial obligations of government to its creditors.

### 3.2. Methods

In order to obtain a reliable model to capture the impact of government expenditure on economic growth in Nigeria, diagnostic tests on unit root to make sure the variables are stationary and co-integration to establish the existence of a long run equilibrium relationship among the variables were conducted. Augmented Dickey-Fuller (ADF) test was adopted for the unit root test, and Johansen co-integration test. The Johansen co-integration test relies on two test statistics, namely: Trace statistic and Max-Eigen statistic. These test statistics enable the researcher to identify the number of co-

integrating equations among these variables. Where there is no co-integrating equation, it simply means that the variables do not have any long run equilibrium relationship and may not be suitable in carrying out the regression analysis. The Johansen co-integration test, in literature permits more than one co-integrating relationships (Izedonmi, 2016).

Decision Rule

If the calculated trace and Maximum Eigen values are greater than the critical values, then, the null hypothesis of no co-integration is rejected and it is concluded that there is existence of long-run relationship between the variables in the model and vice versa.

VECM is a system having a vector of two or more variables. All the variables in VECM are considered endogenous and none is taken as exogenous. Among the criteria to be met before VECM is employed as an analytical technique include: (i) Variables must all be integrated at order 1 [I (1)], (ii) From the Johansen co-integration test, it must be seen that there exist long run equilibrium relationship among the variables. If the unit root test result is I (1) but there is no evidence of long run relationship, Value At Risk (VAR) technique is employed. VECM is constructed with (P − 1) lag lengths for all the variables in the system. VECM can be specified as: $\Delta Y = \alpha_o + \Sigma\alpha_1 \Delta Y_{t-1} + \Sigma\alpha_2 \Delta X_{t-1} + \Sigma\alpha_3 \Delta Z_{t-1} = \beta_1 (Y - X - Z)_{t-1} + \mu$……eqn 1

Where: Y, X and Z represent the set of variables used in the study. $\Delta$ is the first difference operator; $\alpha_o$ is the constant intercept term; $\alpha_1$ to $\alpha_3$ are the short run coefficient while $\beta_1$ is the error correction mechanism that measures the speed of adjustment from short run disequilibrium to long run standing-state equilibrium. $\mu$ is the error term assumed to be distributed as white noise (Izedonmi, 2016).

The model adopted to suit the objective of this study is specified thus:

$RGDP = \beta_0 + \beta_1 GEXEDU + \beta_2 GEXHLT + \beta_3 GEXAGR + \beta_4 GEXPGR + \beta_5 GEXPDS + \mu$ -----eqn 1

Where: $\beta_0$ = Constant (intercept) term, $\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$ $\beta_5$ = Coefficient parameters of the explanatory variables, $\mu$ = Stochastic term or error term. Apri ori, $\beta_0 > 0$, $\beta_1 > 0$, $\beta_2 > 0$ and $\beta_3 > 0$, $\beta_4 > \beta_5 > 0$. **Table 1** shows the variables and expected signs based on theory intuition (Apri ori expectations).

**Table 1.** Apri ori expectations

| Variables | Theory Intuition | Expected Sign |
|---|---|---|
| Education | Increased government expenditure on education is expected to induce positively productivity in the sector | + |
| Health | Higher government expenditure on health services is expected to translate to a healthy workforce to engage in productive activities which positively enhances growth. | + |
| Agriculture | Government expenditure on agriculture and allied services is expected to increase business activities leading to enhanced economic growth. | + |
| Pensions and Gratuities | As government regularly pay pensions and gratuities to retirees, it is expected that their welfare as well as domestic output will rise which will in turn drive economic growth positively. | + |
| Public Debt Servicing | As government services its debt interest charges, it will be in a position to secure more productive debts as the need arises and thus help to enhance growth of the economy. | + |

*Source: Researchers' compilation, 2021*

## 4. Results and discussion

Table 2 shows the values of real GDP (RGDP), government expenditure on education (GEXEDU), government expenditure on health (GEXHLT), government expenditure on agriculture (GEXAGR), government expenditure on pension and gratuity (GEXPGR) and government expenditure on public debt (GEXPDS) in billions of Naira (N'Billions).

**Table 2.** Nominal values of RGDP, GEXEDU, GEXHLT, GEXAGR, GEXPGR and GEXPDS (N'Billions)

| YEAR | RGDP | GEXEDU | GEXHLT | GEXAGR | GEXPGR | GEXPDS |
|---|---|---|---|---|---|---|
| 1981 | 15258.00 | 0.93 | 0.47 | 0.41 | 0.27 | 1.3 |
| 1982 | 14985.08 | 0.76 | 0.37 | 0.29 | 0.39 | 1.92 |
| 1983 | 13849.73 | 0.79 | 0.36 | 0.26 | 0.24 | 1.15 |
| 1984 | 13779.26 | 0.34 | 0.17 | 0.09 | 0.43 | 2.12 |
| 1985 | 14953.91 | 0.93 | 0.45 | 0.12 | 0.51 | 2.49 |
| 1986 | 15237.99 | 0.65 | 0.31 | 0.14 | 0.73 | 3.57 |
| 1987 | 15263.93 | 0.59 | 0.21 | 0.29 | 0.2 | 4.46 |
| 1988 | 16215.37 | 2.47 | 0.9 | 0.32 | 1.12 | 10.01 |
| 1989 | 17294.68 | 4.09 | 1.1 | 0.59 | 1.11 | 15.25 |
| 1990 | 19305.63 | 3.63 | 1.08 | 0.65 | 1.69 | 28.45 |
| 1991 | 19199.06 | 2.13 | 1.03 | 0.56 | 2.03 | 32.48 |
| 1992 | 19620.19 | 1.54 | 0.74 | 0.72 | 20.87 | 28.39 |
| 1993 | 19927.99 | 10.98 | 4.86 | 3.84 | 4.14 | 88.38 |
| 1994 | 19979.12 | 10.3 | 3.47 | 4.19 | 3.56 | 58.35 |
| 1995 | 20353.2 | 15.15 | 5.86 | 6.3 | 5.38 | 67.58 |
| 1996 | 21177.92 | 16.57 | 5.41 | 14.67 | 4.37 | 74.38 |
| 1997 | 21789.1 | 18.89 | 5.79 | 20.89 | 2.66 | 81.53 |
| 1998 | 22332.87 | 27.28 | 11.19 | 25.19 | 3.02 | 79.15 |
| 1999 | 22449.41 | 53.72 | 21.4 | 95.24 | 6.98 | 64.95 |

| | | | | | |
|---|---|---|---|---|---|
| 2000 | 23688.28 | 74.35 | 22.94 | 18.72 | 19.89 | 144.97 |
| 2001 | 25267.54 | 71.14 | 39.24 | 35.89 | 34.7 | 178.17 |
| 2002 | 28957.71 | 99.56 | 49.58 | 33.89 | 57.08 | 163.81 |
| 2003 | 31709.45 | 97.44 | 48.65 | 18.42 | 34.22 | 363.51 |
| 2004 | 35020.55 | 94.13 | 42.49 | 29.88 | 73.16 | 387.19 |
| 2005 | 37474.97 | 124.62 | 75.36 | 45.75 | 84.75 | 397.39 |
| 2006 | 39995.5 | 165.13 | 83.97 | 47.03 | 102.81 | 257.16 |
| 2007 | 42922.41 | 239.21 | 123.56 | 72.26 | 107.55 | 220.6 |
| 2008 | 46012.52 | 235.15 | 140.22 | 121.38 | 138.96 | 386.36 |
| 2009 | 49856.1 | 222.05 | 130.2 | 78.61 | 208.53 | 314.39 |
| 2010 | 54612.26 | 259.73 | 140.99 | 73.97 | 187.12 | 433.45 |
| 2011 | 57511.04 | 390.21 | 257.43 | 84.09 | 144.18 | 589.02 |
| 2012 | 59929.89 | 435.48 | 224.78 | 68.92 | 163.32 | 758.54 |
| 2013 | 63218.72 | 481.08 | 222.69 | 95.57 | 149.75 | 877.05 |
| 2014 | 67152.79 | 408.97 | 226.7 | 80.37 | 185.78 | 956.23 |
| 2015 | 69023.93 | 373.82 | 280.6 | 79.98 | 217.86 | 1108.01 |
| 2016 | 67931.24 | 379.6 | 219.81 | 67.26 | 194.41 | 1473.13 |
| 2017 | 68490.98 | 502.21 | 291.46 | 110.44 | 203.37 | 1884.54 |
| 2018 | 69799.94 | 584.5 | 352.58 | 142.63 | 214.79 | 2244.49 |
| 2019 | 71387.83 | 784.44 | 461.42 | 180.63 | 334.15 | 2584.85 |
| 2020 | 72975.72 | 912.38 | 570.26 | 218.63 | 453.51 | 2925.21 |

*Source: CBN Statistical Bulletin (Various)*

**Table 3.** Percentage changes of RGDP, GEXEDU, GEXHLT, GEXAGR, GEXPGR and GEXPDS for the Period 1981 – 2020

| YEAR | RGDP1 | GEXEDU1 | GEXHLT1 | GEXAGR1 | GEXPGR1 | GEXPDS1 |
|---|---|---|---|---|---|---|
| 1981 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1982 | -1.7887 | -18.2796 | -21.2766 | -29.2683 | 44.44444 | 47.69231 |
| 1983 | -7.57654 | 3.947368 | -2.7027 | -10.3448 | -38.4615 | -40.1042 |
| 1984 | -0.50882 | -56.962 | -52.7778 | -65.3846 | 79.16667 | 84.34783 |
| 1985 | 8.524768 | 173.5294 | 164.7059 | 33.33333 | 18.60465 | 17.45283 |
| 1986 | 1.899704 | -30.1075 | -31.1111 | 16.66667 | 43.13725 | 43.37349 |
| 1987 | 0.170232 | -9.23077 | -32.2581 | 107.1429 | -72.6027 | 24.92997 |
| 1988 | 6.233257 | 318.6441 | 328.5714 | 10.34483 | 460 | 124.4395 |
| 1989 | 6.656092 | 65.58704 | 22.22222 | 84.375 | -0.89286 | 52.34765 |
| 1990 | 11.62756 | -11.2469 | -1.81818 | 10.16949 | 52.25225 | 86.55738 |
| 1991 | -0.55202 | -41.3223 | -4.62963 | -13.8462 | 20.11834 | 14.1652 |
| 1992 | 2.193493 | -27.6995 | -28.1553 | 28.57143 | 928.0788 | -12.5924 |
| 1993 | 1.568792 | 612.987 | 556.7568 | 433.3333 | -80.1629 | 211.3068 |
| 1994 | 0.256574 | -6.19308 | -28.6008 | 9.114583 | -14.0097 | -33.9783 |

| | | | | | | |
|------|----------|----------|----------|----------|----------|----------|
| 1995 | 1.872355 | 47.08738 | 68.87608 | 50.358 | 51.1236 | 15.81834 |
| 1996 | 4.052041 | 9.372937 | -7.67918 | 132.8571 | -18.7732 | 10.06215 |
| 1997 | 2.88593 | 14.00121 | 7.02403 | 42.39945 | -39.1304 | 9.612799 |
| 1998 | 2.495606 | 44.41503 | 93.26425 | 20.58401 | 13.53383 | -2.91917 |
| 1999 | 0.521832 | 96.92082 | 91.24218 | 278.0865 | 131.1258 | -17.9406 |
| 2000 | 5.518497 | 38.40283 | 7.196262 | -80.3444 | 184.957 | 123.2025 |
| 2001 | 6.666841 | -4.31742 | 71.05493 | 91.72009 | 74.45953 | 22.90129 |
| 2002 | 14.60439 | 39.9494 | 26.35066 | -5.57258 | 64.49568 | -8.05972 |
| 2003 | 9.502616 | -2.12937 | -1.87576 | -45.6477 | -40.0491 | 121.9095 |
| 2004 | 10.442 | -3.39696 | -12.6619 | 62.21498 | 113.7931 | 6.514264 |
| 2005 | 7.008514 | 32.39137 | 77.35938 | 53.11245 | 15.84199 | 2.634366 |
| 2006 | 6.725903 | 32.50682 | 11.42516 | 2.797814 | 21.30973 | -35.2878 |
| 2007 | 7.318098 | 44.86162 | 47.14779 | 53.64661 | 4.610446 | -14.2168 |
| 2008 | 7.199293 | -1.69725 | 13.48333 | 67.97675 | 29.20502 | 75.14053 |
| 2009 | 8.353335 | -5.57091 | -7.14591 | -35.2364 | 50.06477 | -18.6277 |
| 2010 | 9.539775 | 16.96915 | 8.28725 | -5.90256 | -10.2671 | 37.87016 |
| 2011 | 5.307929 | 50.23678 | 82.58742 | 13.68122 | -22.9478 | 35.89111 |
| 2012 | 4.205888 | 11.60145 | -12.6831 | -18.0402 | 13.27507 | 28.78001 |
| 2013 | 5.487796 | 10.4712 | -0.9298 | 38.66802 | -8.30884 | 15.62343 |
| 2014 | 6.222951 | -14.9892 | 1.80071 | -15.9046 | 24.0601 | 9.027992 |
| 2015 | 2.786392 | -8.59476 | 23.77592 | -0.48526 | 17.26774 | 15.87275 |
| 2016 | -1.58306 | 1.546199 | -21.6643 | -15.904 | -10.7638 | 32.95277 |
| 2017 | 0.82398 | 32.29979 | 32.59633 | 64.19863 | 4.608816 | 27.92761 |
| 2018 | 1.911142 | 16.38558 | 20.97029 | 29.14705 | 5.615381 | 19.10015 |
| 2019 | 2.274916 | 34.20701 | 30.86959 | 26.64236 | 55.57056 | 15.16425 |
| 2020 | 2.224315 | 16.30972 | 23.58805 | 21.03748 | 35.72048 | 13.1675 |

*Source: Author's Computation, 2021.*

It could be seen from Table 3 that economic growth in Nigeria had fluctuated largely from 1981 to 2020. Overall, it could be argued that Nigeria's economy had recorded more positive growths than negatives in the years under review. Growth rate of total government expenditure on education has varied across the years under review. From 2001 to 2020, it continued to have positive values in some years and negative values in others until it stood at 16.31 percent in 2020. Growth rate of total government expenditure on health continued to record years of increases and years of decreases such that as of 2020 it stood at 23.59 percent in 2020. Growth rate of government expenditure on agriculture continued to increase and decrease even as it stood at 21.03 percent in 2020. Following the adoption of the Structural Adjustment Programme (SAP) in 1986, government expenditure on public debt servicing grew at 24.93 percent in 1987 compared to 43.4 percent in 1986. This might be attributed to the salutary effect of adoption of SAP which came with some level of

debt forgiveness. In the years that followed, government expenditure on public debt servicing had continued to grow in different dimensions and values such that by 2020 it stood at 13.17 percent.

**Table 4.** Descriptive Statistics

| Variable | Mean | Std. Deviation | Skewness | Kurtosis |
|----------|---------|----------------|-----------|----------|
| RGDP | 4.076842 | 4.298419 | 0.0055959 | 3.299473 |
| GEXEDU | 38.07234 | 111.8810 | 3.9219270 | 19.47262 |
| GEXHLT | 38.57964 | 106.2675 | 3.5161360 | 16.43061 |
| GEXAGR | 36.00746 | 88.18387 | 2.7920340 | 12.57312 |
| GEXPGR | 55.00178 | 165.6064 | 4.1426740 | 21.30405 |
| GEXPDS | 29.05149 | 50.02143 | 1.5859990 | 6.056361 |

*Source: Authors' computation (2021) from STATA 13 software package*

From Table 4, the skewness which measure the symmetry of the distribution of the variables values shows that RGDP is positively skewed (0.0055959) which indicates that it is characterized by recurring small number of percentage decreases and large numbers of percentage increases thereby making the large percentage increases in RGDP to cancel-out the small number of percentage decreases. Similarly, government expenditure on education, health, agriculture, pension and gratuities and public debt servicing has a positive skewness of 3.9219270, 3.5161360, 2.7920340, 4.1426740 and 1.5859990, respectively which is an indication of large number of percentage increases and small number of decreases over the years.

As Kurtosis measures volatility (risk), a large value of kurtosis indicates high level of volatility and a low kurtosis indicates a low volatility. RGDP has a Leptokurtic (kurtosis of 3.299473) distribution which is above the kurtosis of a normal distribution of 3, giving a positive excess kurtosis (3.299473 –3 = 0.299473). This is an indication that Nigeria's RGDP is characterized by extreme values and as such considered volatile. In this same way, government expenditure on education, health, agriculture, pension and gratuities and public debt servicing has a leptokurtic distribution which is a representation of a positive excess kurtosis of 13.47262, 13.43061, 9.57312, 18.30405, and 3.056361, respectively indicating volatility in all the aforementioned government expenditures. They experience extreme returns and therefore considered volatile.

## 4.2. Test of Stationarity

### 4.2.1. Lag Order Selection Criteria

**Table 5.** Optimal Lag Selection Criteria

| Lag | AIC | HQIC | SBIC |
|-----|-----|------|------|
| 0 | 61.5555 | 61.6476 | 61.8194* |
| 1 | 60.6107 | 61.2555 | 62.4581 |
| 2 | 60.5374 | 61.7349 | 63.9684 |
| 3 | 59.9186 | 61.6688 | 64.9331 |
| 4 | 57.4447* | 59.7476* | 64.0427 |

*Source: Author's computation (2021) from STATA 13 software package*Indicates optimal lag

Since the research adopted annual data set, it is important to select the appropriate lag structure for the unit root test and co-integration test. In the study, Akaike Information Criterion (AIC), Hannan and Quinn's Information Criterion (HQIC), and Schwartz Information Criterion (SBIC) were adopted to determine the optimal lag length. In all the information criteria, the lag length with the lowest SBIC, AIC and HQIC values were considered the best. From the results in Table 5, the lag length with the lowest SBIC, AIC was indicated at lag 4 (AIC = 57.4447*and HQIC = 59.7476*) hence lag 4 was selected as the best optimal lag length to carry out the unit root test and co-integration test to determine the stationarity of the variables and existence of long run equilibrium relationship among the variables, respectively.

## 4.3. Unit Root Test

| Table 6. ADF Unit Root Test Result | | | | | |
|---|---|---|---|---|---|
| Variable | ADF Values | | 0.05 Critical Values | | Order of Integration |
| | Level | 1$^{st}$ Difference | Level | 1$^{st}$ Difference | |
| RGDP | -1.630 | -3.504 | -2.972 | -2.964 | I (1) |
| GEXEDU | -2.039 | -10.397 | -2.972 | -2.964 | I (1) |
| GEXHLT | -2.061 | -11.398 | -2.972 | -2.964 | I (1) |
| GEXAGR | -2.583 | -11.668 | -2.972 | -2.964 | I (1) |
| GEXPGR | -2.381 | -11.342 | -2.972 | -2.964 | I (1) |
| GEXPDS | -2.110 | -12.468 | -2.972 | -2.964 | I (1) |

*Source: Authors' computation (2021) from STATA 13 software package*

Time series data are naturally considered unstable and using them in their unstable nature leads to spurious regression results (Iyeli, 2010). Augmented Dickey-Fuller (ADF) unit root test was employed to determine the stationarity of the variables. From the result in table 6, there is evidence that none of the variables was stationary at level given that the ADF values (in absolute terms) for RGDP, GEXEDU, GEXHLT, GEXAGR, GEXPGR and GEXPDS which were 1.630, 2.039, 2.061, 2.583, 2.381 and 2.110, respectively were less than the test significant level at 5 percent (2.972). At first difference,

the ADF values (in absolute terms) for the variables 3.504, 10.397, 11.398, 11.668, 11.342 and 12.468 for RGDP, GEXEDU, GEXHLT, GEXAGR, GEXPGR and GEXPDS, respectively were greater than the test significant level at 5 percent (2.964). Thus, the variables are adjudged stationary at first difference and integrated at order I (1). With this outcome, cointegration test was carried out to determine the existence or otherwise of long run equilibrium relationship amongst the variables.

## 4.4. Cointegration Test

**Table 7.** Johansen Cointegration Test Result

| Maximum Rank | Trace Statistic | 0.05 Critical Value (Trace) | Max Statistic | 0.05 Critical Value (Max) |
|---|---|---|---|---|
| R = 0 | 182.2571 | 94.15 | 67.4491 | 39.37 |
| R = 1 | 114.8079 | 68.52 | 49.3437 | 33.46 |
| R = 2 | 45.4642* | 47.21 | 26.1763* | 27.07 |
| R = 3 | 18.2879 | 29.68 | 16.9370 | 20.97 |
| R = 4 | 11.3509 | 15.41 | 13.8289 | 14.07 |
| R = 5 | 7.5220 | 3.76 | 7.5220 | 3.76 |

*Source: Author's computation (2021) from STATA 13 software package*

Based on the Johansen cointegration test result in table 7, the Trace statistic indicated that there exist two (2) cointegrating equations at five percent level of significance. From the result, the Trace statistic at 45.4642* (at the second rank) was less the critical value 47.21 and this indicated that the variables are related in the long run. Similarly, the Max statistic indicated that there exist two (2) cointegrating equations at five percent level of significance given that the Max statistic 26.1763* (at the second rank) was less the critical value 27.07 thereby indicating that the variables are related in the long run. Having determined that the variables were integrated of order 1(1)) and that there exist long run equilibrium relationship among the variables from the Johansen cointegration test, the study employed vector error correction modeling (VECM) technique.

## 4.5. Vector Error Correction Modeling (VECM) Results

**Table 8.** VECM Result (Dependent variable: RGDP)

| Short run estimates | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | z-statistic | P > /z/ |
| $\theta ECT_{-1}$ | -0.0697022 | 0.0266274 | -2.62 | 0.006* |
| $\Delta RGDP_{-1}$ | 0.1602921 | 0.1907280 | 0.84 | 0.401 |
| $\Delta GEXEDU_{-1}$ | 0.0523284 | 0.0253840 | 2.06 | 0.027* |
| $\Delta GEXHLT_{-1}$ | 0.0128149 | 0.0315464 | 0.41 | 0.685 |
| $\Delta GEXAGR_{-1}$ | 0.0094883 | 0.0088203 | 1.08 | 0.282 |
| $\Delta GEXPGR_{-1}$ | 0.0004137 | 0.0031722 | 0.13 | 0.896 |
| $\Delta GEXPDS_{-1}$ | 0.004005 | 0.0120720 | 0.33 | 0.740 |
| C | 0.1215042 | 0.7046159 | 0.17 | 0.863 |
| R-squared = 0.6092 $Pr > Chi^2 = 0.0000$ | | | | |

Source: Author's computation (2021) from STATA 13 software package

*(**) indicate significant at 5% level

Δ = change indicator

The result of the short run estimation could be specified as:

$$\Delta RGDP_t = 0.1215042 + 0.1602921\Delta RGDP_{t-1} + 0.0523284\Delta GEXEDU_{t-1} + 0.0128149\Delta GEXHLT_{t-1} +$$
$$0.0094883\Delta GEXAGR_{t-1} + 0.0004137\Delta GEXPGR_{t-1} + 0.004005\Delta GEXPDS_{t-1} - 0.0697022ECT_{t-1}$$

From the short-run result presented in **Table 8**, evidence showed that the adjustment term (-0.0697022) is statistically significant at the 5% level, suggesting that previous year's deviation from long run equilibrium is corrected for within the current year at a convergence speed of 6.97%. The result showed a positive and significant relationship between government expenditure on education and real gross domestic product in Nigeria. That is, 1 percent increases in government expenditure on education in previous year led to 5.23 percent increase in current year's real gross domestic product in the short run. There is a positive and insignificant relationship between government expenditure on health, agriculture, pension and gratuities, public debt servicing and real gross domestic product in Nigeria. For example, 1 percent increases in government expenditure on health in previous year led to 1.28 percent increase in current year real gross domestic product in Nigeria. The coefficient of determination ($R^2$) of 0.6092 showed that about 61 percent of variations in RGDP in Nigeria were due to changes in lagged one year of RGDP, and lagged one year government expenditure on education, health, agriculture, pension and gratuities and public debt servicing. The remaining 39 percent changes in RGDP are due to other factors not included in the model. The probability chi-square (0.0000) was less than the significant level (0.05) and this indicated that the model was significant and reliable and appropriate for sound policymaking in Nigeria.

**Table 9.** VECM Result (Dependent variable: RGDP)

| Long run estimates | | | | |
| --- | --- | --- | --- | --- |
| Variable | Coefficient | Std. Error | z-statistic | P > /z/ |
| GEXEDU | 1.404725 | 0.1928976 | 7.28 | 0.000* |
| GEXHLT | 1.994609 | 0.2000607 | 9.97 | 0.000* |
| GEXAGR | 0.360802 | 0.0617755 | 5.84 | 0.000* |
| GEXPGR | -0.048638 | 0.0311028 | -1.56 | 0.118 |
| GEXPDS | -0.151603 | 0.1100778 | -1.38 | 0.168 |

*Source: Authors' computation (2021) from STATA 13 software package*

*indicates significant at 5% level

From the long run result presented in**Table 9**, the study showed a positive and significant relationship between government expenditure on education, health, agriculture, pension and gratuities, public debt servicing and RGDP in Nigeria. For instance, 1 percent increases in government expenditure on education led to 1.40 percent increase in RGDP in Nigeria. There is a negative and insignificant relationship between government expenditure on pension and gratuities, public debt servicing and RGDP. For instance, 1 percent increases in government expenditure on pension and gratuities led to 0.05 percent decrease in RGDP.

## 4.6. Discussion

With respect to the test of the hypotheses raised in this study, null hypotheses one, two, three are rejected and the conclusion is that government expenditure on education, health, agriculture have a significant impact on economic growth in Nigeria. This positive and significant outcome in the long run is in conformity with theoretical expectation of Keynesians because with increasing government expenditure on education there will be skilful workforce to engineer productivity; on health it translates to a healthy workforce which is encouraged to improve productivity and thus, enhance economic growth; on agriculture it increases economic and business activities leading to growth in food security, employment generation. This finding corroborates Acikgoz and Cinan (2017) which found a positive and significant effect of education and health expenditure on economic growth. This finding on health contrasts Omodero (2016) which found a negative and insignificant effect of government expenditure on health on economic growth in Nigeria. However, this finding corroborates Yusuph and Nerima (2012) which found existence of a positive and significant long term impact of healthcare expenditure on gross domestic product in Uganda. This finding might be attributed to the fact that Nigeria remains amongst the 20 African countries whose total government health expenditure per capita exceeded US$44 (Piabuo and Tieguhong, 2017). With such feat, coupled with all other policies, programmes and efforts put in place by the Nigerian government on emergency planning and preparedness, disease prevention and control and promotion of health of Nigerian citizens; it is not surprising that government expenditure on health had positive and significant impact on economic growth in Nigeria. This finding on agriculture is inconsistent with Shakirat (2018) and Asmau (2020) which found a negative and significant effect of government agriculture expenditure on economic growth in Nigeria. Perhaps, this outcome might be attributed to

the diversification efforts of the government which has increased government funding in the agricultural sector and the various agricultural programmes and initiatives embarked by the government in recent years. Examples include the Presidential Economic Diversification Initiative (PEDI), Youth Farm Lab and Food Security Council, MSME Survival Fund and Creative Industry Finance Initiative (CIFI).

The study accepted the null hypotheses four and five that there is no significant impact of government expenditure on pensions and gratuities, public debt servicing on economic growth in Nigeria. The outcome that government expenditure on pensions and gratuities, public debt servicing contrasts with theoretical expectation of Keynesians, may be because these expenditures are channeled into non-productive sectors. May be the retirees are tired to engage in various business activities that can create economic growth. Ezema (2019) found that pension and gratuities expenditure had positive and significant effect on economic growth in Nigeria; our finding here is in contrast to this. This output might be attributed to delays in pension and gratuities payment as well as existence of accumulated pension arrears, which has resulted in decrease in aggregate demand, decrease in consumption and decrease in economic activities thereby leading to decrease in Nigerian economic growth.

The expectation has been that as government services its debt well, it gains good credibility from its creditors and thus stand a good chance of securing more productive debts in the future if need be, to improve its critical infrastructures. This will encourage economic activities and thus induce growth in the economy. This finding is in contrast with this belief but consistent with Sasmal and Sasmal (2017) which found a negative and insignificant impact of public debt servicing on economic growth. Nigerian government has over the years resorted to borrowing in order to finance infrastructural expenditure. Unfortunately and in many cases, the infrastructural expenditure for which the funds borrowed are invested in failed to generate sufficient income to settle or service such debts. Again, corruption in debt servicing has also negatively affected Nigeria's economic growth.

## 5. Conclusion

The study investigates the effect of government expenditure on economic growth of Nigeria and concludes that in the long run, total government expenditure on education, health and agriculture helps strongly to improve economic growth in Nigeria while total government expenditure on pension and gratuities and public debt servicing aids the deterioration in the economic growth of Nigeria. The study encourages the government to continue to increase its funding on education, health, and agriculture in order to increase the level of productivity and welfare of workforce, enhance food security, employment generation and economic and business activities in the agro-allied sector. All these will help improve growth of the economy. There is the need for government to encourage retirees to invest their pensions and gratuities in productive ventures that can enhance economic growth. Nigerian government should limit its borrowing so as not to devote so much in servicing debts. The results of this study have provided further empirical evidence on the impact of government expenditure on critical sectors of the economy such as education, health, agriculture, pensions and gratuities and public debt servicing on economic growth in Nigeria for the most recent period 1981–2020. It is the most recent study and has clearly brought out the destabilizing effect of government expenditure on pensions and gratuities and public debt

servicing on economic growth of Nigeria, which actually reflects the reality on ground. The only defect of this study is that the findings will only be useful in Nigerian context. As a result it is recommended that a comparative study of the impact of government expenditure on selected African countries will add good flavor to this topical issue.

## Declarations

**Disclosure statement:** The authors report there are no competing interests to declare.

**Data availability statement:** The data that support the findings of this study are available from the corresponding author upon reasonable request.

**Ethical Statement:** This study includes no human subjects, human data or tissue, or animals that warrant approval from any agency. The authors report no conflicts of interest.

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