REGRESSION ANALYSIS OF SOME SERVICE EXPENDITURES ON THE NIGERIA GROSS DOMESTIC PRODUCT (GDP)

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Abstract

Between 1981 and 2021, this research work looked at the test for equality of regression models employing some service expenditures on the Nigerian GDP. This study has five particular objectives that were created and used. Relevant related literatures were reviewed based on the factors in the objectives. This study used secondary data acquired from the National Bureau of Statistics and the Central Bank of Nigeria statistical bulletin, which included 46 activity sectors. The data was analyzed using multiple regression models. MINITAB 16 and Microsoft Excel 2010 were used for all calculations. The series plot results for each service expenditures indicate an upward trend for the whole plot, implying a linear link between expenditures and Nigeria's total GDP. To find the significant parameters and test for model equality, the Durbin method of estimating a multiple regression model was used; this revealed that all of the models' parameters estimates were not significant at 5%, which appears biased. Model (1), the Military Government Period Model, was found to be the "best" of the three regression models, with the highest R^2 and Adj. R^2 values of 99.8%, the smallest AIC and BIC values of 170.356 and 174.134, and the highest F-value of 4494.669 determined. According to the findings, the government should devote a smaller amount of its budget to recurrent spending and focus more on capital spending, such as agriculture, education, and health, as it is the primary driver of economic growth.

Keywords: *Regression Analysis; Regression Model, Service Expenditures; Gross Domestic Product; Modelling*

1. Introduction

For the economy to function, governments must ensure that systems for contract enforcement, protection of lives and property, development of key infrastructure, and social amenities are in place. According to Mitchel (2005), if these fundamental government tasks are not funded, economic activity will be very low or non-existent. As a result, the importance of government budgetary allocations is highlighted. As a result, the government must be able to spend some money on growth-oriented programs. As a result, the role of government in an economy's growth process is frequently disputed in terms of size. The debate has centered on whether or not increased government spending is compatible with the government's goal of promoting faster economic growth.

The growing trend of government firms being privatized demonstrates that the private sector can deliver services more efficiently (higher quality at a lower cost). Evidence of a negative relationship between government spending and economic growth is presented by Folster and Henrekson (2001), Bassanini et al. (2001), and Chandra (2004). It's also worth noting that when government spending isn't allocated efficiently to growth and development-oriented initiatives, it might lead to inflation and, as a result, growth stifling.

High government spending has a negative impact on economic growth, according to Mitchel (2005), because of costs associated with funding sources, financing of growth-destructive activities such as participation in international organizations (IMF, OECD, etc.) that advocate growth-retarding policies, and subsidizing economically unsustainable decisions such as welfare and unemployment benefits or insurance programs that discourage enterprise and private savings. Economic growth is fueled by the private sector's creative destruction or disruptive innovation. When it comes to funding sources, taxes, for example, have a negative impact on the willingness to labor or produce, whereas borrowing reduces private sector participation in the economy while also raising interest rates and thus inflation.

According to Gupta (1989), the relationship between economic growth and government spending is dependent on how government spending is defined. This theory is supported by Hansson and Henrekson (1994), who found that government consumption spending slows economic growth whereas education spending accelerates it.

Despite the fact that government spending in Nigeria has increased in recent years, there are still public outcries about deteriorating infrastructure. Furthermore, despite its importance for policy decisions, only a few empirical studies have examined the impact of government spending on economic growth holistically. More importantly, determining the influence of public expenditure on economic growth is a method to accelerate Nigeria's economy's growth in its goal to become one of the world's largest economies by 2020.

The Gross Domestic Product (GDP) is one of the most common metrics used to assess a country's economic health. It's also used to figure out what a person's standard of living is in a given economy. Gross Domestic Product, on the other hand, can be defined as the market value of all officially recognized final goods and services produced within a country during a specific time period. This means that instead of simply adding up the quantities of products and services, Gross Domestic Product takes into account the market value of each one. The Gross Domestic Product (GDP) is crucial in an economy since it is used to determine whether a country's economy is growing faster or slower. It's also used to compare the size of different economies around the world. The Gross Domestic Product (GDP) is once again used to compare the relative growth rates of countries around the world. The Federal Reserve in the United States, for example, uses it as one of the indications to determine whether the economy needs to be controlled or stimulated.

Consumption, investment, government expenditure, gross export, and gross import are the components of Gross Domestic Product calculated using the expenditure method. $GDP = C + I + G + (X - M)$. The Value Added (or Production) technique and the Income (or By Type) approach are two more ways to calculate the Gross Domestic Product. To avoid duplicate counting, which could lead to the reporting of an erroneous figure of GDP, neither of the three methodologies includes intermediate items, but solely "new" products (final goods) and services when computing GDP. There are two types of GDP: real GDP and nominal GDP. Where Real GDP is the estimate of a country's economic production minus the influence of inflation, and Nominal GDP is the estimate that does not include price changes.

The term "regression evaluation" refers to a mathematical procedure for determining which variables can have an impact. The significance of regression analysis comes in the fact that it is a powerful statistical tool that allows a company to investigate the relationship between two or more variables. Shalabh (1997) investigated the features of the ratio technique in the presence of measurement mistakes for estimating the population. Regression analysis has numerous advantages: The regression forecasting technique is used for forecasting and determining the causal link between variables, as the name implies. The benefits of linear regression, which is the technique for modeling the value of one variable at the fee(s) of one, are an essential linked, practically similar, principle. Understanding the value of regression analysis, the advantages of linear regression, the advantages of regression evaluation, and the regression approach to forecasting can help a small business, or any business, gain a better understanding of the variables (or elements) that may affect its success in the weeks, months, and years ahead.

The significance of regression analysis is that it is all about data: information in the form of numbers and figures that define your business. The advantages of regression analysis are that it allows you to crunch the facts to assist you make better decisions for your business now and in the future. The regression technique to forecasting entails examining the relationships between data elements, allowing you to make predictions:

- Estimate revenue in the short and long term.
- Recognize the various stages of stock.
- Recognize supply and demand.
- Examine and recognize the impact of unusual variables on all of these factors.
- Companies might utilize regression analysis to figure out things like:
- Why has the number of customer service calls decreased in the last 12 months, or even in the last month?
- Predict how sales will look in the next six months.
- Deciding whether to choose one ad over another.
- Whether or not to expand the company or develop and market a new product.

The advantage of regression analysis is that it can be used to recognize all types of styles seen in records. These new insights are frequently quite useful in determining what can make a difference in your commercial enterprise. Regression analysis, then, is a crucial aspect in business since it is a statistical tool that allows businesses and their managers to make better-informed decisions based on hard data.

It's critical to understand that a regression analysis is essentially a statistical problem. Many facts-based standards have been adopted by businesses since they can be useful in assisting a company in deciding a variety of crucial issues and then making informed, well-researched decisions based on a variety of facts. According to Merriam-Webster, statistics is simply factual statistics (together with measurements or records) used as a foundation for reasoning, discussion, or calculation. Regression analysis makes use of data, particularly two or more variables, to provide some suggestions about where future information factors might be. The benefit of regression analysis is that it allows agencies to glimpse into the future using statistical calculations. The regression technique of forecasting allows groups to apply exact tactics in order for those forecasts, coupled with future income, future labor or supply needs, or possibly future challenging scenarios, to produce meaningful statistics.

In situations where complex sample strategies are used, regression analysis is frequently used in the analysis of survey data. The regression estimation technique, according to Okafor (2002), uses auxiliary facts to improve estimations of population metrics such as the mean and total. He also claimed that when the regression line of y on x does not pass through the origin but produces an intercept along the y-axis, regression estimation is employed to estimate the population.

On the expenditure side of the budget, the Nigerian economy has grown from a million Naira to a billion Naira and is projected to grow to a trillion Naira in the next decade. This is unsurprising if the economy is in a state of surplus or equilibrium in terms of balance of payment data. Even better if there are infrastructures to improve commerce with the system or social facilities to increase the welfare of the economy's ordinary citizen. Despite the fact that none of these are present, we always have a very high predicted spend. This shows that something is wrong, either with the way the government expands its budget or with the methods and methods by which it has traditionally been estimated.

For a resource- and cash-rich country (Nigeria) with nearly 70% of its population living in relative poverty, whose infrastructures are in a state of decay, whose health, education, agriculture, and other growth-promoting and welfare-enhancing institutions are in a state of near-collapse, whose roads (most of them) have become death traps due to their deplorable conditions, whose power sector is moribund, whose unemployment rates are near-unacceptably high. Despite these issues, the government has continued to raise its spending. As a result, one would anticipate Nigeria to attain a comparable level of economic growth, but this has not been the case (Chirwa & Odhiambo, 2016).

This research aims to model a set of expenditures on Nigeria's GDP. The majority of research on a particular set of expenditures have focused on describing the origins, causes, scale, and long-term sustainability of the government spending problem, as well on the country's overall GDP. Ajayi and Oke (2012), as well as Adesola (2012), have focused on the influence of a series of expenditures on economic growth (Nigeria GDP) (2009). Furthermore, studies in Nigeria, Europe, and other developed economies have measured government spending using recurrent expenditure, debt servicing costs, security spending, and education spending, but none have tested the magnitude of the impact that some series of expenditures could have on Nigeria GDP growth.

The problems highlighted above have been there over the years despite various works done by researchers and authors on the field of study. It will be unwise for the researcher of this work to also base the problems of this study on the above stated problems. On this premise, the researcher chooses to look at the problem of data obsolescence, which refers to the last time the research was conducted, the geographical problem, which refers to areas other researches have not covered and which variables among some series of expenditures on the Nigeria GDP component have not been tested, as well as the methodological problem, which informs the study's gaps and also serves as the foundation that piques the researcher's interest. All of these, in one way or another, pose an issue, and they are the motivation for the researcher to conduct this study, which aims to identify the services that have an impact on Nigeria's GDP.

Aim and Objectives of the Study

The goal of this study is to compare the effects of various service expenditures on Nigerian GDP from 1981 to 1999 (military government) and 2000 to 2021 (civil government). There are two types of government: military government and civil government. The study's specific goals are as follows:

1. Obtain the series plots of the various services on the Nigeria GDP.
2. Estimate the descriptive statistics of the series.
3. Compute the model formula and estimation of the model parameters (β_0, β_1, β_2 and β_3) for both models.
4. Obtain the residuals sum of square (RSS), mean sum of square (MSS), R-square value (R^2), adjusted R-square value (Adj. R^2), AIC and BIC of the Models.
5. Test for model equality and Check for significance variables (i.e. compare the result of the two regression methods used).

Scope of the study

The research focuses on simulating some series expenditures on Nigeria's GDP between 1981 and 2021. The research focuses on a multiple linear regression model with only four series of service expenditures (public administration, agricultural spending, health expenditure, and education expenditure) and the growth rate of Nigeria's GDP for over 41 years. The researcher used secondary data from the National Bureau of Statistics and the Central Bank of Nigeria statistical bulletin to focus on the gross domestic product by spending and income - yearly (' Billion). There are 46 activity categories in the implicit fee deflator desk of the rebased GDP data with new classifications; formerly, there were 33 activity sectors. A yearly statistics data of a periodic range of 41 years 1981 – 2021 in Nigeria was utilized to determine an adequate regression model to checkmate if any association existed between the various series expenditure and Nigeria GDP.

2. Literature Review

Khalaf (2013) pointed out that different types of estimators have been proposed as alternatives to the Ordinary Least Squares (OLS) estimator for the estimation of regression coefficients in the presence of multicollinearity in his research paper "A Comparison between Biased and Unbiased Estimators in Ordinary Least Squares Regression." Multicollinearity is known to make statistical inference difficult and may even substantially distort the inference in the general linear regression model, Y = X + e. Ridge regression defines a class of estimators of indexed by a scalar parameter k, as seen above. Simulation approaches are used to evaluate two methods of determining k in terms of Mean Square Error (MSE). Other ridge-type estimators that have been assessed elsewhere are compared. The estimated MSE of the suggested estimators was found to be lower than other ridge parameter estimators and the OLS estimator. The sample size and number of regressions are the other variables that were chosen to be varied. They create models with 25, 50, 100, and 150 observations, as well as two to four explanatory variables. The simulation experiments show that increasing the number of regressors and utilizing non-normal pseudo random numbers to create I e results in a larger estimated MSE, while increasing the sample size results in a lower estimated MSE.

Using the Johansen cointegration approach as a framework of study, Babatunde and Adefabi (2005) investigated the long-run Causal connection between Education and economic growth in Nigeria. According to the findings of the cointegrating technique, there is a long-run relationship between enrolments in elementary and secondary education, as well as the average years of schooling, and output per worker. The study found that a well-educated workforce has a positive and significant impact on economic growth through factor accumulation and overall factor productivity evolution.

In his study, Omotor (2004) looked at the factors that influence federal government spending in the education sector. His research reveals that Nigeria's education spending is in a state of flux, which reflects the state of the government's finances. According to the regression results, government money was the only significant factor of education spending. To change the sector's unstable tendency, the study suggests diversifying the sources of support for education.

In Nigeria, the conventional least squares method is used (OLS) Maku (2009) used time series data to explore the relationship between government spending and economic growth in Nigeria over the previous three decades, using the Ram (1986) model and regression real GDP on private investment and human capital investment. The Error Correction Model (ECM) was utilized to test for the presence of stationary in the variables using the Augmented Dicker Fuller (ADF) unit root test and the cointegration test to establish the long-run link among variables. During the evaluation period, empirical findings revealed that public and private sectors had no major impact on economic growth.

Using time series data from 1975 to 2004, Olorunfemi (2008) investigated the direction and strength of the relationship between public investment and economic growth in Nigeria, finding that public expenditure had a positive impact on economic growth and that there was no link between gross fixed capital formation and GDP. He said that disaggregated study revealed that only 37.1 percent of government spending is spent on capital projects, while 62.9 percent is spent on current projects.

In Nigeria, Shabana et al. (2017) looked into the relationship between government spending, health, and security spending, as well as economic growth. The data was analyzed using the vector error correction model and ordinary least square regression. For the years 2012 to 2015, the study reveals that government expenditure on health, security, and development projects has a short and long term impact on economic growth in South Africa.

Olopade and Olepade (2010) investigate the effects of fiscal and monetary policy on economic growth and development. The goal of their research was to figure out which aspects of government spending contribute to growth and development, which ones don't, and which ones should be removed or reduced to the bare minimum. The study incorporates a statistical framework that includes trends analysis and simple regression, as well as economic models and statistical methodologies. They discover no substantial association between the majority of expenditure components and economic development.

Obi and Obi (2020) investigated the influence of government spending on education in Nigeria. They said that Nigeria has spent a lot of money over the years to enhance the labor force's educational attainment and productivity, but that the country is still experiencing diminishing real production and poor economic growth. The article examines the impact of education spending on economic growth as a strategy of accomplishing Nigeria's desired socioeconomic reform. Data from 1981 to 2012 is included in the study. The link between GDP and recurrent education expenditure was investigated using Johansen's co-integration analysis and ordinary least square (OLS) econometric approaches. The findings show that, while there is a positive association between education spending and economic growth, there is no long-run relationship across the study period. According to the report, this conundrum is caused by "labor market distortions, workforce redundancy, industrial disputes, and employment discontinuities, as well as leakages in Nigerian society, such as brain drain." To summarize, the findings of the study reveal that the educational sector has not been as productive as projected. The poor quality of graduates, rising occurrences of cultism in schools, and high dropout rates are all proof of this. The paper also recommends that the education system be improved by making better use of public resources through effective governance, accountability, and openness. Additionally, policymakers should make attempts to develop rules that will limit, conserve, and defend the plight of educational capital in other countries.

3. Materials and Methods

3.1 Research Design: This study used a cross-sectional research design, with the goal of modeling various series expenditures on the Nigerian GDP. For this study, the multiple regression model (OLS) methodology was employed, which included two regression models, Military Government and Civil Government model spending on the Nigeria GDP.

3.2 Nature and Source of Study Data: For this study, the researcher used secondary data from the National Bureau of Statistics and the Central Bank of Nigeria statistics bulletin. There are 46 activity categories in the implicit fee deflator desk of the rebased GDP data with new classifications; formerly, there were 33 activity sectors. A yearly statistics data of a periodic range of 41 years 1981 – 2021 in Nigeria was utilized to determine an adequate regression model to checkmate if any association existed between the various series expenditure and Nigeria GDP.

The parameters that make up the models are obtained using the following programs, including MINITAB 16 and Microsoft Excel 2010. The researcher used Microsoft Excel 2010 and MINITAB 16 to help with data analysis. The parameters for multiple regression models (OLS) and multiple interactive regression models were estimated using Microsoft Excel 2010 and MINITAB 16.

3.3 Method of Data Analysis

3.3.1 Model Specification

Suppose we have regression models of the form;

$$y = f(x)$$

$$y = \beta_0 + \beta_1 x + \varepsilon_i = (x'x)^{-1} x'y \qquad (3.1)$$

Equation (3.1) is a simple linear regression model and

$$y = f(x_1, x_2, x_3, x_4)$$

$$y_i = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_k x_k + \varepsilon_i \tag{3.2}$$

$$= (x'x)^{-1} x'y$$

where,

y_i = Response (Nigerian GDP)

x_i = k^{th} predictor (some series expenditures) or independent variables

β_k = k^{th} population regression coefficient

Then, X_i is the matrix of the explanatory variables and is of the form:

$$X = \begin{bmatrix} 1 & x_{11} & x_{12} & x_{13} & \ldots & x_{1k} \\ 1 & x_{21} & x_{22} & x_{23} & \ldots & x_{2k} \\ 1 & x_{31} & x_{32} & x_{33} & x\ldots & {}_{3k} \\ \vdots & \vdots & \vdots & \vdots & & \vdots \\ 1 & x_{n1} & x_{n2} & x_{n3} & \ldots & x_{nk} \end{bmatrix} \tag{3.7}$$

Y and β are of the form:

$$Y = \begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ \vdots \\ y_n \end{bmatrix}, \qquad \beta = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \vdots \\ \beta_n \end{bmatrix}$$

Where

$$x'x = \begin{bmatrix} n & \Sigma x_1 & \Sigma x_2 & \Sigma x_3 & \Sigma x_4 \\ \Sigma x_1 & \Sigma x_1^2 & \Sigma x_1 x_2 & \Sigma x_1 x_3 & \Sigma x_1 x_4 \\ \Sigma x_2 & \Sigma x_1 x_2 & \Sigma x_2^2 & \Sigma x_2 x_3 & \Sigma x_2 x_4 \\ \Sigma x_3 & \Sigma x_1 x_3 & \Sigma x_2 x_3 & \Sigma x_3^2 & \Sigma x_3 x_4 \\ \Sigma x_4 & \Sigma x_1 x_4 & \Sigma x_2 x_4 & \Sigma x_3 x_4 & \Sigma x_4^2 \end{bmatrix} \tag{3.8}$$

$$x'y = \begin{bmatrix} \Sigma y \\ \Sigma x_1 y \\ \Sigma x_2 y \\ \Sigma x_3 y \\ . \\ . \\ . \\ \Sigma x_k y \end{bmatrix} \tag{3.9}$$

The matrix form of the model is giving by:

$$\begin{bmatrix} \Sigma y \\ \Sigma x_1 y \\ \Sigma x_2 y \\ \Sigma x_3 y \\ . \\ . \\ . \\ \Sigma x_k y \end{bmatrix} = \begin{bmatrix} n & \Sigma x_1 & \Sigma x_2 & \Sigma x_3 & \dots \Sigma x_k \\ \Sigma x_1 & \Sigma x_1^2 & \Sigma x_1 x_2 & \Sigma x_1 x_3 & \dots \Sigma x_1 x_k \\ \Sigma x_2 & \Sigma x_1 x_2 & \Sigma x_2^2 & \Sigma x_2 x_3 & \Sigma x_2 x_k \\ & & & & \Sigma x_3 x_k \\ \Sigma x_3 & \Sigma x_1 x_3 & \Sigma x_2 x_3 & \Sigma x_3^2 & . \\ & & & & . \\ \Sigma x_4 & \Sigma x_1 x_4 & \Sigma x_2 x_4 & \Sigma x_3 x_4 & \Sigma x_4^2 \end{bmatrix}^{-1} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ . \\ . \\ . \\ \beta_4 \end{bmatrix}$$

$$\begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} = (x'x)^{-1} x'y = \begin{bmatrix} n & \Sigma x_1 & \Sigma x_2 & \Sigma x_3 & \Sigma x_4 \\ \Sigma x_1 & \Sigma x_1^2 & \Sigma x_1 x_2 & \Sigma x_1 x_3 & \Sigma x_1 x_4 \\ \Sigma x_2 & \Sigma x_1 x_2 & \Sigma x_2^2 & \Sigma x_2 x_3 & \Sigma x_2 x_4 \\ \Sigma x_3 & \Sigma x_1 x_3 & \Sigma x_2 x_3 & \Sigma x_3^2 & \Sigma x_3 x_4 \\ \Sigma x_4 & \Sigma x_1 x_4 & \Sigma x_2 x_4 & \Sigma x_3 x_4 & \Sigma x_4^2 \end{bmatrix}^{-1} \begin{bmatrix} \Sigma y \\ \Sigma x_1 y \\ \Sigma x_2 y \\ \Sigma x_3 y \\ \Sigma x_4 y \end{bmatrix}$$

and $$v(\hat{\beta}_{iv}) = MSE(x'x)^{-1} x'y \tag{3.10}$$

If n is odd, then the middle observation can be deleted. Using this approach, the estimators are constant but likely to have large variance which is the limitation of this Method.

3.4 Model Selection Criteria

The model choice criterion is used to determine the optimal manufacturing feature. The excellent model is the one that minimizes the criterion. Several criteria for selecting various models have been developed in recent years, and it takes the form of residual sum of squares errors (SSE) compounded by a penalty factor that relies on the model's complexity. Some of these criteria are mentioned further down:

3.4.1 Akaike Information Criteria (AIC)

Akaike (1974) devised a method known as Akaike Information Criteria. The format of this data is as follows:

$$AIC = n \ln\left[\frac{SSE}{n}\right] + 2(k) \tag{3.11}$$

Where;

- N = Sample size
- K = Number of parameter and
- SSE = Sum of square error.

3.4.2 SCHWARZ Bayesian Information Criterion (BIC)

Craven and Wahba (1978) proposed the SCHWARZ (BIC) criteria, which is now widely used. This method's format is as follows:

$$BIC = n \ln\left[\frac{SSE}{n}\right] + k \ln(n) \tag{3.12}$$

If there are at least eight observations, the charge for SCHWARZ (BIC) will also be reduced (Ramanathan, 1995).

3.4.3 Coefficient of Determination (R^2)

R^2 is one of the most important statistical parameters for decision-making and statistical judgments. It's a method for determining the proportion of one or more variables' outcomes that outnumber the others. This procedure takes the following form::

$$R^2 = \frac{SSR}{SST} \tag{3.13}$$

Where; SSR= Sum of square Residual

SST= Sum of Square Total

3.4.4 Sum of Squares (SS)

The total of distances squared. SS The entire variation in the data is the total variation in the data. The portion of the variation explained by the model is referred to as SS Regression, whereas the fraction not explained by the model and attributed to error is referred to as SS Error. The calculations are completed:

Sources of variation	**Sum of squares (SS)**
SS Regression	$(\hat{y}_i - \bar{y})^2$
SS Error	$(y_i - \hat{y}_i)^2$
SS Total	$(y_i - \bar{y}_i)^2$

3.4.5 Degrees of freedom (DF)

To calculate the sum of squares, the number of independent pieces of information including the answer data is needed. The degrees of freedom for each model component are as follows:

Sources of variation	**DF**

Regression	P
Error	n - p -1
Total	n - 1

Notation

n = number of observations

p = number of terms in the model

3.4.6 MS Regression

The formula for mean square regression is:

$$MS_{\text{Regression}} = \frac{SS_{\text{Regression}}}{DF_{\text{Regression}}} = \frac{\sum(\hat{y}_i - \bar{y})^2}{P}$$

3.4.7 MS Error

Mean square error, which is the variance around the fitted regression line. MS Error = s^2. The formula is:

$$MSE = \frac{SS_{Error}}{DF_{Error}} = \frac{\sum(y_i - \hat{y}_i)^2}{n-p-1}$$

3.4.8 MS Total

The formula for mean square total is:

$$MS_{Total} = \frac{SS_{Total}}{DF_{Total}} = \frac{\sum(y_i - \bar{y})^2}{n-1}$$

3.4.9 F-value (F)

At least one of the coefficients is not equal to zero if the estimated F-value is bigger than the F-value from the F-distribution. The p-value is calculated using the F-value. The formula for calculating the F-value is as follows:

$$\frac{\text{MS Regression}}{\text{MS Error}}$$

3.4.10 p-value (P)

Used in hypothesis tests to determine if a null hypothesis should be rejected or not. If the null hypothesis is true, the p-value is the probability of getting a test statistic that is at least as extreme as the actual computed value. The 0.05 cut-off number for the p-value is often employed. You reject the null hypothesis if the estimated p-value of a test statistic is less than 0.05, for example.

4. Results and Discussion

The results for series plots of various services on the Nigeria GDP, descriptive statistics of the series, estimation of the model parameters (β_0, β_1, β_2 and β_3), residuals sum of square (RSS), mean sum of square (MSS), R-square value (R^2), adjusted R-square value (Adj. R^2), AIC and BIC of the Models, and discussion of findings are all covered in this section. However, significant variables were also checked (by comparing the results of the two regression methods utilized).

4.2.1 Series Plots of the Various Services on the Nigeria GDP

The yearly average GDP by expenditures and series plots (expenditures on Gross Domestic Product) were examined in this part to see whether there were any correlations, trend components, or seasonality effects, if they were present in the data sets.

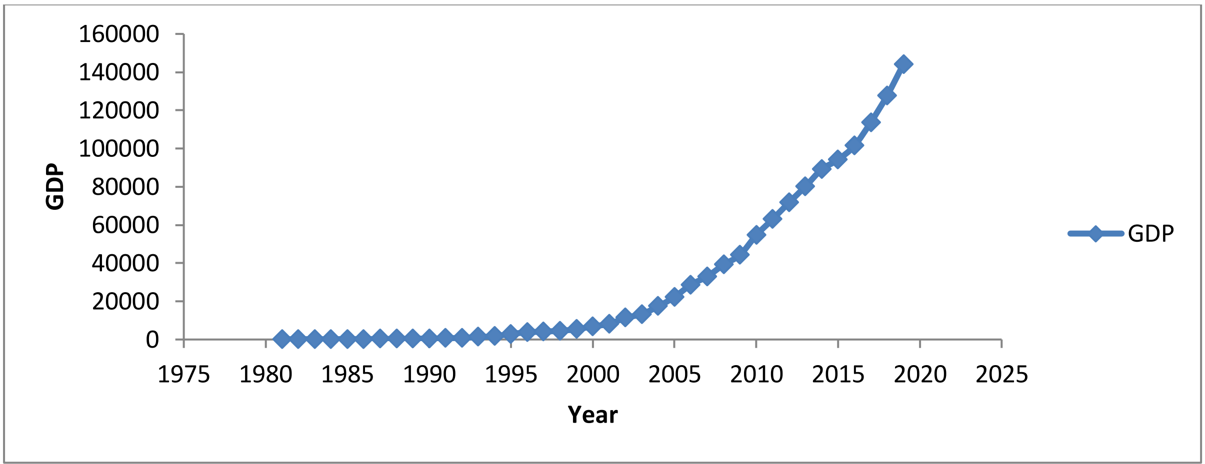

Figure 1: Series Plot of the general GDP of Nigeria (Yearly)

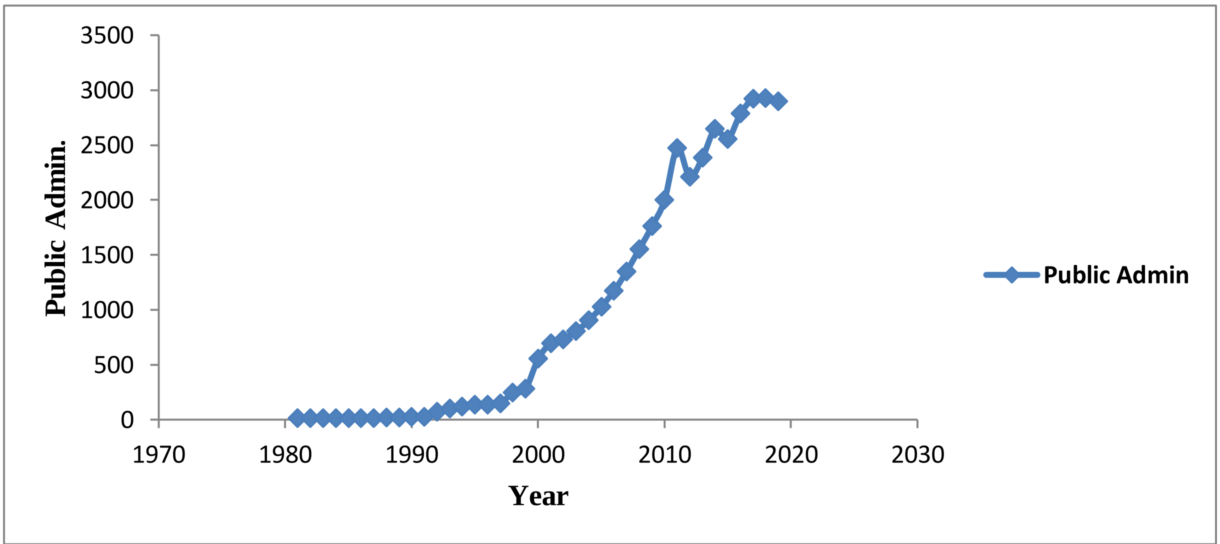

Figure 2: Series Plot of the Expenditure on Public Administration (Yearly)

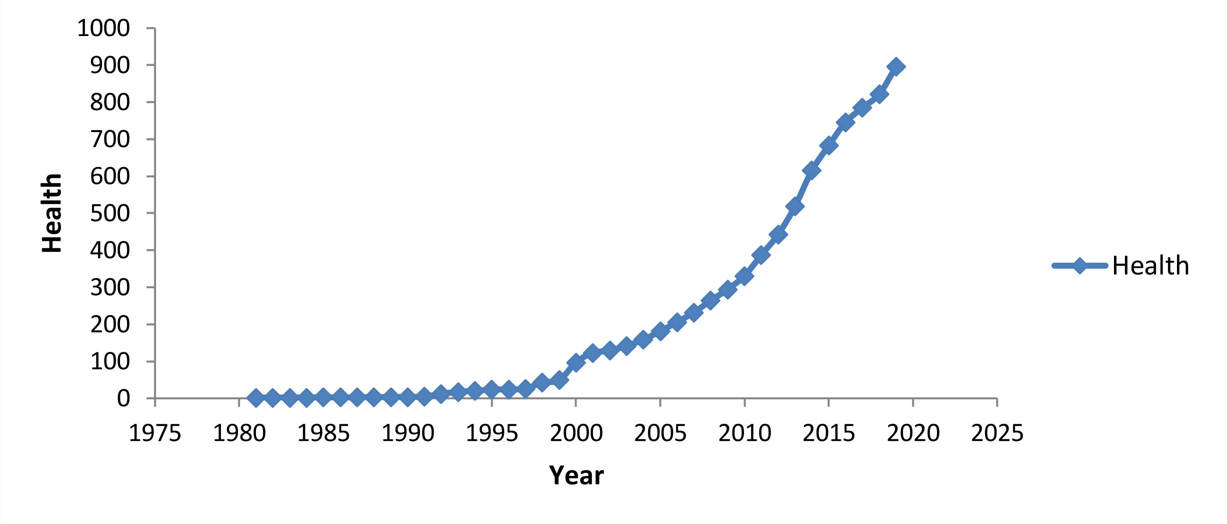

Figure 3: Series Plot of the Expenditure on Health (Yearly)

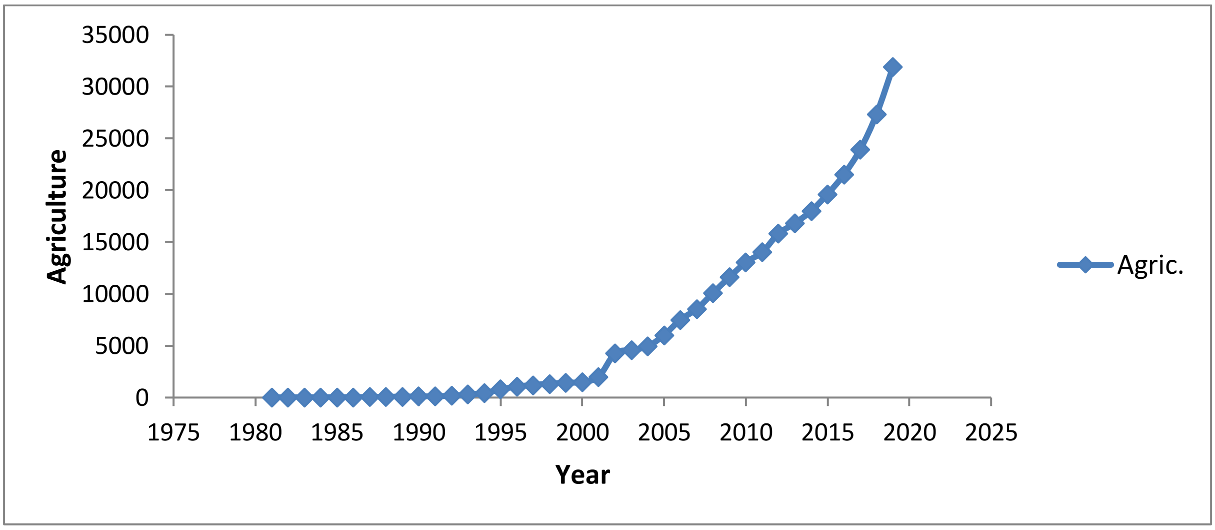

Figure 4: Series Plot of the Expenditure on Agriculture (Yearly)

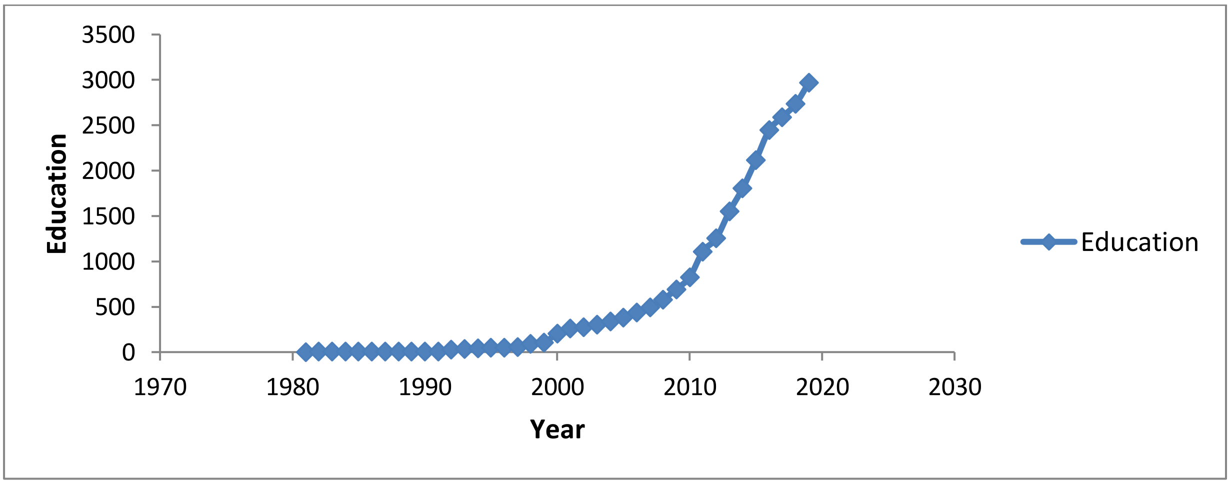

Figure 5: Series Plot of the Expenditure on Education (Yearly)

Figure 1 depicts the annual expenditure behavior of Nigeria's GDP, with the highest rate in 2019 and the lowest rate in 1981. However, the annual GDP statistics show an increase from 1981 to 2019 (or a swing upward). Figure 2 depicts the yearly expenditure behavior of public administration, with the highest peak in 2018 and the lowest expenditure rate in 1981. The annual public administration series, on the other hand, shows a gain from the start (or swing higher); 1981 to 2010, and a varied increase and fall from 2011 to 2019.

Figure 3 depicts the yearly expenditure behavior of Health, with the highest rate in 2019 and the lowest rate in 1981. However, the annual health data show an increase from 1981 to 2019 (or a tilt upward). Figure 4 depicts the yearly expenditure behavior of Agriculture, with the highest rate in 2019 and the lowest rate in 1981. However, the annual agricultural series shows an increase from 1981 to 2019 (or a swing upward). Figure 5 depicts the annual expenditure behavior of education, with the highest rate in 2019 and the lowest rate in 1981. However, from 1981 to 2019, the annual schooling series shows a gain (or swing upward).

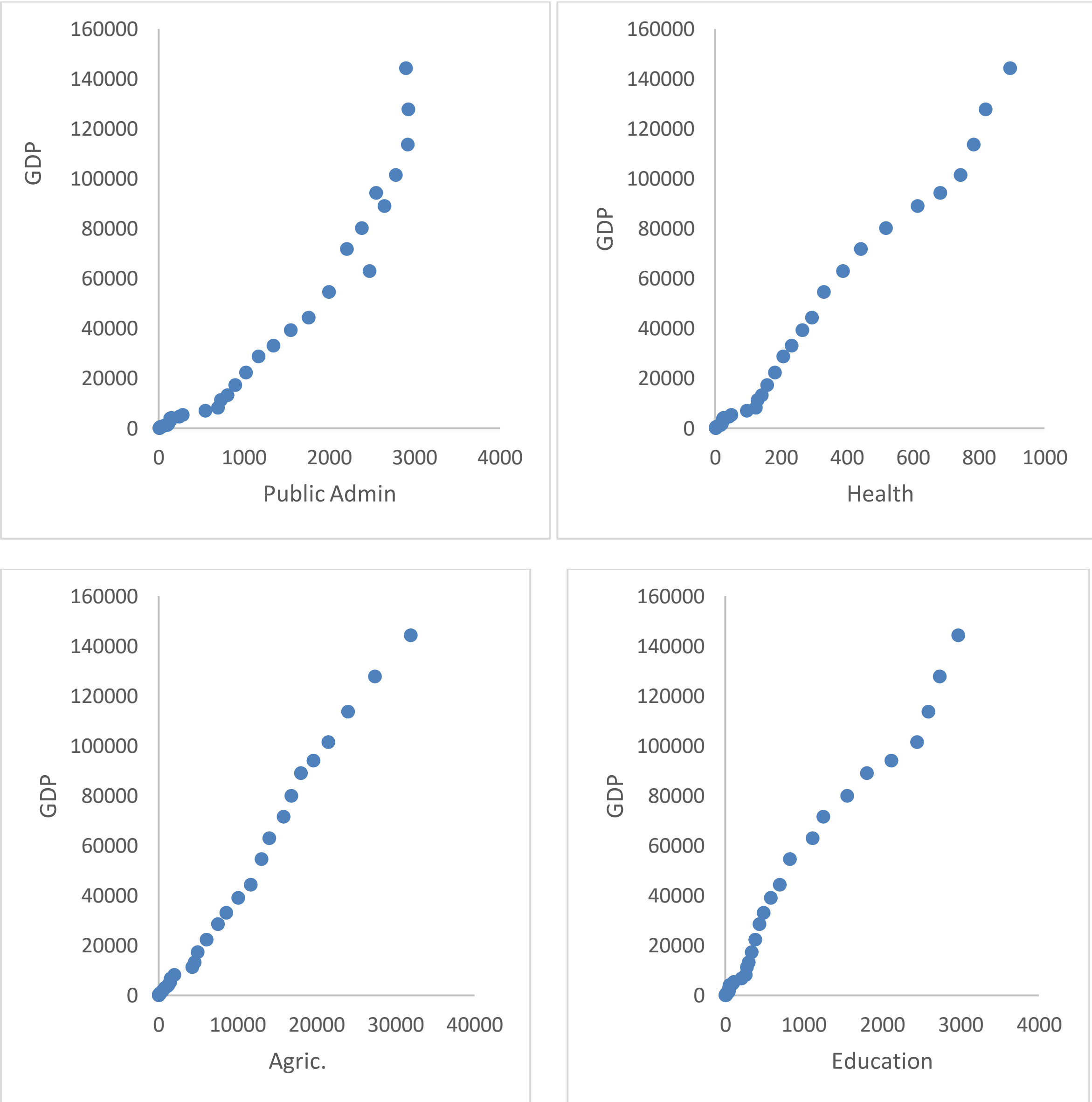

Figure 6: Scatter Plot of the Expenditures against Total GDP of Nigeria

The entire figure in Figure 6 demonstrates an upward trend. These findings point to a linear link between expenditures and Nigeria's total GDP. To select the significant parameters and test for model equality, the Durbin method of estimating a multiple regression model was used. Following that, the data was split into two models: military government and civil government.

4.2.2 Descriptive Statistics of the Various Services on the Nigeria GDP

This section focuses on descriptive statistics of the various services on the Nigeria GDP; Public Administration, Health, Agriculture, Education and general GDP.

Table 1: **Descriptive Statistics of the Various Services on the Nigeria GDP**

Variable	Mean	SE Mean	St.Dev	Minim.	Q1	Median	Q3	Maximum.	Skewness	Kurtosis
Health (x_1)	212.8	43.7	273.0	1.6	3.9	97.2	331.0	896.2	1.29	0.42
Agric. (x_2)	6939	1427	8911	17	107	1508	13049	31904	1.26	0.61
Edu (x_3)	612	142	886	3	8	206	827	2969	1.55	1.17
PA (x_4)	967	172	1072	9	22	551	1998	2926	0.74	-1.05
GDP (y)	30560	6670	41655	145	500	6897	54612	144210	1.34	0.66

Table 1 shows the average of the various service series of expenditure on the Nigeria GDP, with projected values of 212.8 for Health, 6939 for Agriculture, 612 for Education, 967 for Public Administration, and 30560 for Total Nigeria GDP.

4.2.3 Regression Analysis

The researcher will divide the data into two parts in this section: values for various service expenditures on the Nigeria GDP from 1981 to 1999, and values for various service expenditures on the Nigeria GDP from 1981 to 1999. (2000-2021). The first regression model (Military Government period model) was built using data from 1981 to 1999, whereas the second regression model was built using data from 2000 to 2021. (Civil Government period model). A pooled regression model was created once more. All of the model parameters, accuracy assessments, model equality tests, and significance variable checks were completed here.

4.2.3.1 Regression Model (1)

n_1=19, Σx_1=246.13, Σx_2=7368.334, Σx_3=521.77, Σx_4=1395.91, Σy_1=27726.604, $\Sigma x_1 x_2$ =221931.512, $\Sigma x_1 x_3$=14873.0264, $\Sigma x_1 x_4$=39790.1959, $\Sigma x_2 x_3$=470485.7088, $\Sigma x_2 x_4$ =1258702.02, $\Sigma x_3 x_4$=84352.6054, Σx_1^2=7015.7957, Σx_2^2=7438922.79, Σx_3^2=31529.8405, Σx_4^2 =225670.7285, $\Sigma x_1 y_1$=802420.2088, $\Sigma x_2 y_1$=26594428.45, $\Sigma x_3 y_1$=1701091.642, $\Sigma x_4 y_1$ =4550976.63.

$$x'x = \begin{bmatrix} 19 & 246.13 & 7368.334 & 521.77 & 1395.91 \\ 246.13 & 7015.7957 & 221931.512 & 14873.0264 & 39790.1959 \\ 7368.334 & 221931.512 & 7438922.79 & 470485.7088 & 1258702.02 \\ 521.77 & 14873.0264 & 470485.7088 & 31529.8405 & 84352.6054 \\ 1395.91 & 39790.1959 & 1258702.02 & 84352.6054 & 225670.7285 \end{bmatrix}$$

$$x'y_1 = \begin{bmatrix} 27726.604 \\ 802420.2088 \\ 26594428.45 \\ 1701091.642 \\ 4550976.63 \end{bmatrix}$$
,

$$x'y_1 = \begin{bmatrix} 27726.604 \\ 802420.2088 \\ 26594428.45 \\ 1701091.642 \\ 4550976.63 \end{bmatrix} = \begin{bmatrix} 19 & 246.13 & 7368.334 & 521.77 & 1395.91 \\ 246.13 & 7015.7957 & 221931.512 & 14873.0264 & 39790.1959 \\ 7368.334 & 221931.512 & 7438922.79 & 470485.7088 & 1258702.02 \\ 521.77 & 14873.0264 & 470485.7088 & 31529.8405 & 84352.6054 \\ 1395.91 & 39790.1959 & 1258702.02 & 84352.6054 & 225670.7285 \end{bmatrix}^{-1} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix}$$

$$\begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} = (x'x)^{-1} x'y_1 = \begin{bmatrix} 19 & 246.13 & 7368.334 & 521.77 & 1395.91 \\ 246.13 & 7015.7957 & 221931.512 & 14873.0264 & 39790.1959 \\ 7368.334 & 221931.512 & 7438922.79 & 470485.7088 & 1258702.02 \\ 521.77 & 14873.0264 & 470485.7088 & 31529.8405 & 84352.6054 \\ 1395.91 & 39790.1959 & 1258702.02 & 84352.6054 & 225670.7285 \end{bmatrix}^{-1} \begin{bmatrix} 27726.604 \\ 802420.2088 \\ 26594428.45 \\ 1701091.642 \\ 4550976.63 \end{bmatrix}$$

$$\begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} = (x'x)^{-1} x'y_1 = \begin{bmatrix} 0.100853 & -1.11727 & 9.33E-05 & 1.288408 & -0.28574 \\ -1.11727 & 7244.442 & 0.042527 & -1852.44 & -585.152 \\ 9.33E-05 & 0.042527 & 2.74E-06 & -0.01358 & -0.00244 \\ 1.288408 & -1852.44 & -0.01358 & 6530.53 & -2114.33 \\ -0.28574 & -585.152 & -0.00244 & -2114.33 & 893.4977 \end{bmatrix} \begin{bmatrix} 27726.604 \\ 802420.2088 \\ 26594428.45 \\ 1701091.642 \\ 4550976.63 \end{bmatrix}$$

$$\begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} = (x'x)^{-1} x'y_1 = \begin{bmatrix} 76.80086222 \\ 5059.821971 \\ 3.00599524 \\ -8913.12769 \\ 2442.383008 \end{bmatrix}$$

Table 2: Descriptive Statistics of the Model (1)

Model (1)	Parameter $\pm$SE	t-test	P	Remark
β_0	78.842$\pm$ 24.772	3.183	0.006**	Significant
β_1	5059.82$\pm$21.122	0.385	0.706	Not Significant
β_2	3.006$\pm$ 0.123	24.110	0.000**	Significant
β_3	-8913.128$\pm$-134.770	-1.277	0.221	Not Significant
β_4	2442.383$\pm$0.752	4.118	0.001**	Significant

Footnote: **= Significant at p< 0.05

The required estimated model is

$$\hat{y}_1 = 76.801 + 5059.822x_1 + 3.006x_2 - 8913.128x_3 + 2442.383x_4 \quad (4.1)$$

For health expenditure, agriculture expenditure, education expenditure, public administration expenditure, and total Nigeria GDP, table 2 summarized parameter estimates, t-test, p-value, and standard error of the Durbin method, accordingly. Similarly, the findings of the acquired parameters revealed that not all of the parameters are significant at 5%.

4.2.3.2 Regression Model (2)

n_2=20, Σx_1=8053.23, Σx_2=263246.15, Σx_3=23365.71, Σx_4=36328.1, Σy_2=1164094.166, Σx_1x_2=148992731.5, Σx_1x_3=14196905.08, Σx_1x_4=18729818.38, Σx_2x_3=459389440.7, Σx_2x_4 =612103558.7, Σx_3x_4=56745354.58, Σx_1^2=4591304.371, Σx_2^2=4887544274, Σx_3^2 =44400972.35, Σx_4^2=79939238.91, Σx_1y_2=682668795.6, Σx_2y_2=22300003276, Σx_3y_3 =2116591702, Σx_4y_2=2779839684.

$$x'x = \begin{bmatrix} 20 & 8053.23 & 263246.2 & 23365.71 & 36328. \\ 8053.23 & 4591304 & 1.49E+08 & 14196905 & 18729818.4 \\ 263246.2 & 1.49E+08 & 4.89E+09 & 4.59E+08 & 612103559 \\ 23365.71 & 14196905 & 4.59E+08 & 44400972 & 56745354.6 \\ 36328.1 & 18729818 & 6.12E+08 & 56745355 & 79939238.9 \end{bmatrix}$$

$$x'y_1 = \begin{bmatrix} 1164094.166 \\ 682668795.6 \\ 22300003276 \\ 2116591702 \\ 2779839684 \end{bmatrix}$$

,

$$x'y_1 = \begin{bmatrix} 1164094.166 \\ 682668795.6 \\ 22300003276 \\ 2116591702 \\ 2779839684 \end{bmatrix} = \begin{bmatrix} 20 & 8053.23 & 263246.2 & 23365.71 & 36328. \\ 8053.23 & 4591304 & 1.49E+08 & 14196905 & 18729818.4 \\ 263246.2 & 1.49E+08 & 4.89E+09 & 4.59E+08 & 612103559 \\ 23365.71 & 14196905 & 4.59E+08 & 44400972 & 56745354.6 \\ 36328.1 & 18729818 & 6.12E+08 & 56745355 & 79939238.9 \end{bmatrix}^{-1} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix}$$

$$\begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} = (x'x)^{-1}x'y_1 = \begin{bmatrix} 20 & 8053.23 & 263246.2 & 23365.71 & 36328. \\ 8053.23 & 4591304 & 1.49E+08 & 14196905 & 18729818.4 \\ 263246.2 & 1.49E+08 & 4.89E+09 & 4.59E+08 & 612103559 \\ 23365.71 & 14196905 & 4.59E+08 & 44400972 & 56745354.6 \\ 36328.1 & 18729818 & 6.12E+08 & 56745355 & 79939238.9 \end{bmatrix}^{-1} \begin{bmatrix} 1164094.166 \\ 682668795.6 \\ 22300003276 \\ 2116591702 \\ 2779839684 \end{bmatrix}$$

$$\begin{bmatrix}\beta_0\\ \beta_1\\ \beta_2\\ \beta_3\\ \beta_4\end{bmatrix} = (x'x)^{-1}x'y_1 = \begin{bmatrix} 0.922117 & -0.01252 & 3.82E-05 & 0.003051 & 5.6406E-05 \\ -0.01252 & 0.000358 & -1E-06 & -8E-05 & -1.395E-05 \\ 3.82E-05 & -1E-06 & 2.28E-08 & 1.06E-07 & -3.007E-08 \\ 0.003051 & -8E-05 & 1.06E-07 & 1.88E-05 & 3.0956E-06 \\ 5.64E-05 & -1.4E-05 & -3E-08 & 3.1E-06 & 1.2891E-06 \end{bmatrix}\begin{bmatrix}1164094.166\\ 682668795.6\\ 22300003276\\ 2116591702\\ 2779839684\end{bmatrix}$$

$$\begin{bmatrix}\beta_0\\ \beta_1\\ \beta_2\\ \beta_3\\ \beta_4\end{bmatrix} = (x'x)^{-1}x'y_1 = \begin{bmatrix}-8038.840431\\ 34.92868969\\ 2.821846089\\ 5.371642797\\ 4.823534303\end{bmatrix}$$

Table 3: Descriptive Statistics of the Model (2)

Model (2)	Parameter $\pm$ SE	t-test	P	Remark
β_0	-8038.840 $\pm$ 2078.533	-3.868	0.002**	Significant
β_1	34.929 $\pm$ 40.956	0.853	0.407	Not Significant
β_2	2.822 $\pm$ 0.327	8.642	0.000**	Significant
β_3	5.372 $\pm$ 9.387	0.572	0.576	Not Significant
β_4	4.824 $\pm$ 2.458	1.963	0.069**	Not Significant

Footnote: **= Significant at p< 0.05

The required estimated model is

$$\hat{y}_2 = -8038.840 + 34.928x_1 + 2.8218x_2 + 5.3716x_3 + 4.8235x_4 \quad (4.2)$$

For health expenditure, agriculture expenditure, education expenditure, public administration expenditure, and total Nigeria GDP, table 3 summarized parameter estimates, t-test, p-value, and standard error of the Durbin method, accordingly. Similarly, the findings of the acquired parameters revealed that not all of the parameters are significant at 5%.

4.2.3.3 Pooled Regression Model

n_p = 39, Σx_1=8299.36, Σx_2=270614.484, Σx_3=23887.48, Σx_4=37724.01, Σy_p=1191820.77, Σx_1x_2=149214663, Σx_1x_3=14211778.1, Σx_1x_4=18769608.58, Σx_2x_3=459859926.4, Σx_2x_4 =613362260.7, Σx_3x_4=56829707.19, Σx_1^2=4598320.167, Σx_2^2=4894983197, Σx_3^2 =44432502.19, Σx_4^2=80164909.64, Σx_1y_p=683471215.8, Σx_2y_p=22326597704, Σx_3y_p =2118292794, Σx_4y_p=2784390661.

$$x'x = \begin{bmatrix} 39 & 8299.36 & 270614.5 & 23887.48 & 37724.01 \\ 8299.36 & 4598320 & 1.49E+08 & 14211778 & 18769609 \\ 270614.5 & 1.49E+08 & 4.89E+09 & 4.6E+08 & 6.13E+08 \\ 23887.48 & 14211778 & 4.6E+08 & 44432502 & 56829707 \\ 37724.01 & 18769609 & 6.13E+08 & 56829707 & 80164910 \end{bmatrix},$$

$$x'y_p = \begin{bmatrix} 683471215.8 \\ 22326597704 \\ 2118292794 \\ 2784390661 \\ 4550976.63 \end{bmatrix}$$

$$x'y_p = \begin{bmatrix} 683471215.8 \\ 22326597704 \\ 2118292794 \\ 2784390661 \\ 4550976.63 \end{bmatrix} = \begin{bmatrix} 39 & 8299.36 & 270614.5 & 23887.48 & 37724.01 \\ 8299.36 & 4598320 & 1.49E+08 & 14211778 & 18769609 \\ 270614.5 & 1.49E+08 & 4.89E+09 & 4.6E+08 & 6.13E+08 \\ 23887.48 & 14211778 & 4.6E+08 & 44432502 & 56829707 \\ 37724.01 & 18769609 & 6.13E+08 & 56829707 & 80164910 \end{bmatrix}^{-1} \begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix}$$

$$\begin{bmatrix} \beta_0 \\ \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \end{bmatrix} = (x'x)^{-1} x'y_1 = \begin{bmatrix} -550.213 \\ -65.739 \\ 3.123 \\ 29.959 \\ 5.253 \end{bmatrix}$$

Table 4: Descriptive Statistics of the Pooled Model

Pooled Model	**Parameter $\pm$ SE**	**t-test**	**P**	**Remark**
β_0	-550.213 $\pm$ 475.377	-1.157	0.255	Not Significant
β_1	-65.739 $\pm$ 28.458	-2.310	0.027**	Significant
β_2	3.123 $\pm$ 0.291	10.739	0.000**	Significant
β_3	29.959 $\pm$ 6.179	4.849	0.000**	Significant
β_4	5.253 $\pm$ 2.264	2.320	0.026**	Significant

Footnote: **= Significant at $p < 0.05$

The required estimated model is

$$\hat{y}_p = -550.213 - 65.739x_1 + 3.123x_2 + 29.959x_3 + 5.253x_4 \quad (4.3)$$

For health expenditure, agriculture expenditure, education expenditure, public administration expenditure, and total Nigeria GDP, table 4 summarized parameter estimates, t-test, p-value, and standard error of the Durbin method, respectively. Similarly, the obtained parameter results revealed that all parameters are significant at 5% except the constant term, which is not significant.

4.2.3.4 Computation of the Model Selection Criteria

4.2.3.4.1 Akaike Information Criteria (AIC) for the Three Models

$$AIC_1 = 19\ln\left[\frac{97683.941}{19}\right] + 2(4) = 170.356$$

$$AIC_2 = 20\ln\left[\frac{70277996.699}{20}\right] + 2(4) = 309.445$$

$$AIC_{pooled} = 39\ln\left[\frac{135770143.894}{39}\right] + 2(4) = 595.454$$

4.2.3.4.2 SCHWARZ Bayesian Information Criterion (BIC) for the Three Models

$$BIC_1 = 19\ln\left[\frac{97683.941}{19}\right] + 4\ln(19) = 174.134$$

$$BIC_2 = 20\ln\left[\frac{70277996.699}{20}\right] + 4\ln(20) = 313.428$$

$$BIC_{pooled} = 39\ln\left[\frac{135770143.894}{39}\right] + 4\ln(39) = 602.108$$

4.2.5 Comparison of the three Identified Regression Models

We compared the three identified regression models for the various service expenditures on the Nigeria GDP to determine the model that has more effect on total GDP of Nigeria in Table 5.

Table 5: Regression Analysis Summary of the Parameter Estimates

MODELS	PARAMETER ESTIMATES β_0 (p-value) t-test	β_1 (p-value) t-test	β_2 (p-value) t-test	β_3 (p-value) t-test	β_4 (p-value) t-test	MSE	R^2	$R^2(ad$	AIC	BIC	F
Model (1)	**78.842 $\pm$ 24.772 (0.006**) 3.183**	5059.82 $\pm$ 21.122 (0.706) 0.385	**3.006 $\pm$ 0.123 (0.000**) 24.110**	8913.128 $\pm$ -134.77 (0.221) -1.277	**2442.383 $\pm$ 0.752 (0.001**) 4.118**	**6105.246**	**99.8%**	**99.8%**	**170.356**	**174.134**	**4494.669**
Model (2)	**-8038.840 $\pm$ 2078.533 (0.002**) -3.868**	34.929 $\pm$ 40.956 (0.407) 0.853	**2.822 $\pm$ 0.327 (0.000**) 8.642**	5.372 $\pm$ 9.387 (0.576) 0.572	4.824 $\pm$ 2.458 (0.069) 1.963	4685199.780	99.8%	99.7%	309.445	313.428	1837.510
Pooled Model	-550.213 $\pm$ 475.377 (0.255) -1.157	**-65.739 $\pm$ 28.458 (0.027**) -2.310**	**3.123 $\pm$ 0.291 (0.000**) 10.739**	**29.959 $\pm$ 6.179 (0.000**) 4.849**	**5.253 $\pm$ 2.264 (0.026**) 2.320**	3993239.526	99.8%	99.8%	595.454	602.108	4119.503

Footnote: **= Significant at p< 0.05

A summary regression analysis of parameter estimates, AIC, BIC, MSE, standard error, t-test, p-values, and F-values for the models is shown in Table 5 for (model 1, 2 and the pooled model). It's worth noting that all of the model parameters' estimations aren't significant at 5%, which appears to be skewed. The Military Government Period Model, which has the highest R-square and R-square adjusted values with 99.8%, the smallest AIC and BIC values of 170.356 and 174.134, and the highest F-value of 4494.669 calculated, is the "best" model among the three regression models in Table 5. As a result, model (1) of estimation is the best, as it has the most impact on Nigeria's total GDP.

As a result, the three variables, Agriculture spending (X_2), Public Administration expenditure (X_4) and other factors not included in the model, which is represented by the constant parameter β_0. However, only Agriculture expenditure (X_2) and the constant parameter β_0 are significant for Military Government period model. For the pooled regression model, all the estimated parameters performance well and were also significant and adequate except the constant parameter β_0.

5. Conclusion

Regression analysis was used to create a series plot for the separate service expenditures and their combined plot, which revealed an upward trend for the overall plot and implied a linear relationship between the expenditures and Nigeria's total GDP. To select the significant parameters and test for model equality, the Durbin method of estimating a multiple regression model was used. Following that, the data was split into two models: Military Government and Civil Government. All of the model parameter estimates were not significant at 5%, which appears to be skewed. Agriculture expenditure (X_2), Public Administration expenditure (X_4), and other factors not included in the model, which is represented by the constant parameter β_0, were the only three variables that were significant.

The Military Government Period Model, which has the highest R-square and R-square adjusted values with 99.8%, the smallest AIC and BIC values of 170.356 and 174.134, and the highest F-value of 4494.669 calculated, was revealed to be the "best" model among the three regression models in Table 5. As a result, model (1) of estimation is the best, as it has the most impact on Nigeria's total GDP.

6. Recommendations

This study therefore recommended based on the findings that:

1. The government should make an effort to expand its health-care spending in order to reach out to citizens in rural areas. People living in rural areas will be in good health as a result of the increase in her health expenditure, allowing them to continue their everyday activities of fishing and farming. On the other hand, they should help provide free health services such as prenatal care, maternity care, and children aged 0 to 5, among others. It will improve the health of rural residents while also helping the government meet its welfare goals.
2. Government should devote a smaller amount of its budget to recurrent spending and focus more on capital spending, such as agriculture, education, and health, as it is the primary driver of economic growth.

3. The Federal Government of Nigeria should raise its spending on highway projects (Public Administration) since this will provide the necessary infrastructure to boost private and public sector productivity, facilitate the distribution of raw and finished goods, and boost economic growth.
4. Capital and recurrent service expenditures should be allocated primarily toward productive economic activity. This will promote economic activity and, potentially, counteract the negative impact on economic growth.

References

Adesola, O. (2009). Tax revenue, government expenditure and economic of Nigeria. *African Economic Research Review. An International Multi-Disciplinary Journal, Ethiopia. 4* (3a), 90 -108.

Ajayi, S., and Oke, A. (2012). *Public expenditure and financial accountability in Nigeria*. Paper presented at the Joint Government of Nigeria – World Bank Workshop on Improving Public Expenditure and Financial Accountability in Nigeria, Kaduna, April.

Akaike, H. (1973). Information theory and the extension of the maximum likelihood principle, in B.N. Petrov and F. Csaki, (eds.) *Proceedings of the Second International Symposium on Information Theory, Budapest, pp. 267-281.*

Babatunde M. A., & Adefabi, R. A. (2005). *Long-run relationship between education and economic growth in Nigeria: Evidence from Johannes's co-integration approach*. Paper presented at the regional conference on education in West Africa: Constraints and opportunities. Dakar Senegal Nov. 1st – 2nd 2006.

Bassanini, A., Scarpetta, S., & Hemmings, P. (2001). Economic growth: The role of policies and institutions, panel data evidence from OECD countries, OECD economic department. *Working Paper,* 283

Chandra, R. (2004). Government size and economic growth: An investigation of causality in India. *Indian Economic Review,* 39(2)

Folster, S., & Henrekson, M. (2001). Growth effects of government expenditures and taxation in rich countries, *European Economic Review, 45,* 1501-1520

Gupta, G.S. (1989). Growth variations across developing countries: How much and why? *Indian Economic Journal,* 36(3), 49-64.

Hansson, P. & Henrekson, M. (1994). A new framework for testing the effect of government spending on growth and productivity, *Public Choice,* 8(3-4), 381-401

Khalaf, G. (2013). A Comparison between Biased and Unbiased Estimators in Ordinary Least Squares Regression. *Journal of Modern Applied Statistical Methods*: 12(2), 17-28.

Mitchel, J.D. (2005).”The impact of government spending on economic growth”, Available at: www.heritage.org.

Obi, Z. C., & Obi, C. O. (2014). Impact of government expenditure on education: The Nigerian experience. *International Journal of Business and Financial Management Research*, 2, 42-48.

Okafor, F.C. (2002). *Sample survey theory with applications*. Afro-Orbis Publishers, Nsukka, Nigeria.

Olopade B.C and Olapade. D.O (2010). “The impact Growth and Development in Developing Countries: Nigeria as a case study. *Journal of Accounting 2(1), 12-25*

Omotor, D. G. (2004). An analysis of federal government expenditure in the education sector of Nigeria: Implications for national development. *Journal of social science*, *9*(2), 105-110

Shabana, N., Mohd, S. & Nazia, M. (2017). An examination of the relationship between government spending and economic growth in Namibia. *Journal of Accounting 1(2), 52-70*

Shalabh, D. (1997). Ratio method of estimation in the presence of measurement errors. *Journal of Indian Society of Agricultural Statistics* 50(2):150– 155.