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A Time Domain Approach to Modeling Nigeria's Gross Domestic Product

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Abstract **Original Research Article**

This study examined the contribution of the various sectors to the Gross Domestic Product (GDP) of Nigeria and also developed a model for forecasting the Gross Domestic Product of Nigeria within a time frame of 33 years. Data emanating from Central Bank of Nigeria was used and analyzed using regression analysis and time series analysis. The regression results shows that the three sectors; Agricultural sector, Industrial sector and Service sector has a positive relationship and only the Industrial sector and the Service sector contribute significantly with a coefficient of 0.286, 0.631 while the contribution of the Agricultural sector is not significant with a coefficient of -0.039 implying that service sector contributes the most with 631 million naira followed by the industrial sector with 286 million naira while the agricultural sector does not contribute significantly since it decreases by 39 million naira. The contribution of the agricultural sector is not significant. A time domain model (fundamental approach) which makes use of Box Jenkins approach was applied to a developing country like Nigeria to forecast Gross domestic Product for the period 1987 to 2019 using ARIMA model. The result reveals that there is an upward trend and the First difference of the series was stationary, meaning that the series was I (1). Using expert modeler, the best model that explains the series was found to be ARIMA (1, 1, 0). The diagnosis on such model was confirmed, the error was white noise, presence of no serial correlation and a forecast for period of 10 years terms was made which indicates that GDP will continue to appreciate with these forecasted time period.

INTRODUCTION

The development of the Nigerian Economy is one that emanated from a monoculture economy beign based purely on the agricultural sector of the economy, therefore making the sector the main stay of the economy. The discovery of the crude oil in (1956) in commercial quantity has however nullified this assertion, since it has relegated the hitherto mainstay of the economy to the background [1-4]. This makes it rely solely on the fortunes accuring from the proceeds of oil sector for the growth and development of the Nigerian economy. It is however important to note that the various sectors of any economy has a contribution to the development of that economy, this is to say that no matter how small the contribution of any sector, to the national income of that economy, it add up to the aggregate income of the economy and thus contributing directly or indirectly to the gross domestic earning of such economy. The Gross Domestic Product (GDP) is a basic measure of a country's overall economic performance. It is the market value of all final goods and services made within the border of a country in a year and are often positively correlated with the standard of living. GDP is the most frequently used indicator of economic activity and is most often measured annually or quarterly to gauge the growth of a country's economy between one period and another. A country is said to have good economy if its GDP is relatively high [5-7]. GDP is important in determining if an economy is growing quickly or slowly than the same quarter the year before, it is used to compare the size of economics that is relative growth rate of economies throughout the world. Also for investors, the GDP is used as a means of adjusting their assets location and to decide where the best opportunities lie. The Gross Domestic Product (GDP) of Nigeria is made up of diverse sectors which includes; Agriculture, Industry, Services, etc. Agriculture is one of the dominant sectors of the Nigerian economy. Though since independence, its role in the economy has been on the downward trend especially its contribution to GDP. The sector comprises of crops, livestock, fishing and forestry. It involves the cultivation of land, raising and rearing of animal for the purpose of production of food for man, feed for animals and raw materials for industries. It is essential for the expansion of employment opportunities, reducing poverty and improvement of income contribution for speedy industrialization. The service sector has been increasing in major activities of the economy. The service sector comprises of transport, communication, utilities, hotel and restaurant, insurance etc. The service sector has major contribution in value added and gross fixed capital formation in Nigeria. It is an important source of revenue for the nation. Employment share in service sector is increasing, people are moving from other economic sectors to service sector. Industrialization is an integral part of development and structural change in any nation. The industrial sector comprises of the crude petroleum and natural gas, solid mineral and the manufacturing industries. History recorded that the industrial sector performance in Nigeria's economic growth is as old as the nation itself. It dates back to the amalgamation of the southern parts of the country in 1914 for the geographical land mass called Nigeria. A number of fiscal and monetary policies together with institutional reform measures have been undertaken since independence. Right from the first national development plan (1962-1968) to the fourth national development plan (1981-1985) rapid industrialization received priority in Nigeria's development objectives. These measures continued in May 1999 under the Olusegun Obasanjo administration. It is envisioned that Nigeria will be transformed into a major industrialized nation and an economic power [8, 9].

The Knowledge of the economic performance is of great importance to every nation. The pattern of GDP growth is held to indicate the success or failure of economic policy and to determine whether an economy is in recession. How different economic sectors contribute to the GDP growth, and how allocation should be distributed among the various sectors in Nigeria is of importance to the nation. Also whether the GDP growth is appreciating or depreciating in the nearest future is also of importance to the nation. This research work explores the contribution of three major economic sectors (building and construction, industry and service sector) on the gross domestic product in Nigeria. Also a forecast on how GDP could contribute to the economy in the nearest future is analyzed [10-15].

METHODOLOGY

Here we are going to present the data for this work and explain the methodology used in the analysis the data. The data used for this study is a secondary data collected from CBN statistical bulletin on gross domestic product of some economic sectors; agriculture, industry and services at 1990 constant basic prices (N' Billion). The data is limited to thirty-three years from 1987-2019.

Table-1: GDP and its various Sectors

YEAR	Industrial sector	service sector	Agricultural sector	GDP
1987	89.45	34.50	84.43	251.05
1988	83.61	33.84	86.49	246.73
1989	72.26	31.63	85.28	230.38
1990	78.15	30.65	80.98	227.25
1991	28.04	39.36	26.77	253.01
1992	83.09	29.28	28.04	257.78
1993	81.83	30.14	39.36	256.00
1994	85.41	31.45	58.08	275.41
1995	94.24	34.51	69.92	295.09
1996	125.66	32.64	84.59	328.61
1997	108.40	40.73	129.61	328.64
1998	109.99	43.12	132.70	337.29
1999	109.64	44.61	135.19	342.54
2000	107.04	46.19	106.68	345.23
2001	108.45	47.10	113.50	352.65
2002	115.28	33.83	149.51	367.22
2003	116.87	50.14	155.93	377.83
2004	118.15	59.17	162.25	388.47
2005	110.85	53.28	170.81	393.11
2006	122.06	55.18	135.12	412.33
2007	128.74	59.17	182.66	431.78
2008	123.91	72.46	190.37	451.79
2009	150.25	72.75	203.01	495.01
2010	156.49	79.18	216.21	527.58

2011	159.16	85.48	231.46	561.93
2012	155.17	93.33	248.60	595.82
2013	151.70	102.62	266.48	634.25
2014	146.52	117.00	283.18	672.24
2015	149.49	130.44	299.82	718.98
2016	158.19	145.07	317.28	776.33
2017	161.12	161.52	335.18	834.00
2018	162.99	177.05	348.49	888.89
2019	165.82	193.15	365.28	950.11

Regression Analysis

In statistics, regression analysis is a statistical tool that is commonly used for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps one understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the independent variables is varied, while the other independent variables are held fixed. Most commonly, regression analysis estimates the conditional expectation of the dependent variable given the independent variables – that is, the average value of the dependent variable when the independent variables are fixed. Under regression, we have simple regression, multiple regression, polynomial regression etc. But for the purpose of this research, we shall make use of multiple regressions to determine the contributions of some economic sectors to GDP.

Multiple regression is an extension of simple linear regression. It is used when we want to predict the value of a dependent variable based on the value of two or more independent variables. This is obtainable where there is need to include more independent variables in a simple regression in order to improve one's analysis result. The independent variables in this research work are the selected sectors of the economy.

The multiple regression model can be expressed as follows;

$$Y = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} \dots + \beta_K X_{ik} + \varepsilon_i \quad i = 1, 2, \dots, n \quad \dots\dots (1)$$

Where

Y is the dependent variable

$X_1, X_2, \dots, X_k$ are the independent variables

$\beta_0, \beta_1, \dots, \beta_k$ are the parameters referred to as regression coefficients.

ε_i represents the error which is normally distributed with mean 0 and variance $\delta^2 I$

In matrix notation the model in $Equation$ 1 can be written as; $Y = X\beta + \varepsilon$

Where,

$$Y = \begin{bmatrix} y_1 \\ y_2 \\ \cdot \\ \vdots \\ y_p \end{bmatrix} \quad X = \begin{bmatrix} 1 & x_{11} & x_{12} & \dots & x_{1k} \\ 1 & x_{21} & x_{22} & \dots & x_{2k} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ . & . & . & . & . \\ 1 & x_{n1} & x_{n2} & \dots & x_{nk} \end{bmatrix} \quad \beta = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \cdot \\ \vdots \\ \beta_p \end{bmatrix} \quad \varepsilon = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \cdot \\ \vdots \\ \varepsilon_p \end{bmatrix} \dots\dots (2)$$

The least square estimate of the multiple regressions coefficients is given as:

$$\hat{\beta} = (X'X)^{-1}X'Y \quad \dots\dots (3)$$

Equation 3 is possible if $X'X$ is non –singular, that is $\det(X'X)$ $is\ not$ equal to zero.

Time Series Analysis

A time series is a sequence of observations that are arranged according to the time of their outcome. Spiegel and Larry (1980) defines it as a set of observation that is obtained at regular periods of time. It is a set of observations generated sequentially in time. There are obviously numerous reasons to record and analyze the data of a time series. Among these is the wish to gain a better understanding of the data generating mechanism, the production of future values or the optimal control of a system.

In statistical literature, time series refers to that body of principals and techniques which deals with analysis of observed data $X_t,\ t = 1, 2, \dots, n$

Some fundamental concepts in the theory of time series models include the following:

Stochastic Processes

A statistical phenomenon that evolves in time according to probabilistic laws is called a stochastic process. A sequence of random variables $\{Y_t : t = 0, \pm 1, \pm 2, \dots\}$ is called a stochastic process and serves as a model for an observed time series.

Stationary and Non- Stationary Stochastic Model

An important class of stochastic models for describing time series, which has received a great deal of attention is the so called stationary models, which assumes that the process remains in equilibrium about a constant mean level. Specifically, a process Y_t is said to be strictly stationary if the joint distribution of $Y_{t1}, Y_{t2}, \ldots, Y_{tn}$ is the same as the joint distribution of $Y_{t1-k}, Y_{t2-k}, \ldots, Y_{tn-k}$ for all choices of time points $t_1, t_2, \ldots, t_n$ and all choices of time lag k.

A non-stationary time series implies that the process has no constant mean, non-stationary time series can be stationarized by a suitable degree of differencing.

Autoregressive Models

A stochastic process $Y_t, t \in Z$ is said to be an autoregressive process of order p, denoted by AR (p) if it satisfies the difference equation.

$$Y_t = \sum_{j=1}^{p} \emptyset_j Y_{t-j} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(4)}$$

$$Y_t = \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \cdots + \phi_p Y_{t-p} + e_t \ldots\ldots \text{(5)}$$

Where $\phi_{1,} \ldots, \phi_p$ are constant and e_t~N$(0, \delta^2)$ is a white noise process.

Moving Average Models

A stochastic process $Y_t, t \in Z$ is said to be a moving average process of order q, denoted by MA(q) if it satisfies the difference equation.

$$Y_t = \sum_{j=1}^{q} \theta_j Y_{t-j} + e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(6)}$$

$$Y_t = \theta_1 Y_{t-1} + \theta_2 Y_{t-2} + \cdots + \theta_q Y_{t-q} + e_t \ldots\ldots\ldots \text{(7)}$$

Where $\theta_{1,} \ldots, \theta_q$ are constant and e_t~N$(0, \delta^2)$ is a white noise process.

Autoregressive Moving Average

A stochastic process $Y_t, t \in Z$ is said to be an autoregressive moving average process of order p and q, denoted by ARMA (p, q) if it satisfies the difference equation.

$$Y_t = \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \cdots + \phi_p Y_{t-p} + e_t - \theta_1 Y_{t-1} - \theta_2 Y_{t-2} - \cdots - \theta_q Y_{t-q} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(8)}$$

Where $\phi_{1,} \ldots, \phi_p \, and \, \theta_{1,} \ldots, \theta_q$ are constant and e_t~N$(0, \delta^2)$ is a white noise process.

Autoregressive Integrated Moving Average

A stochastic process $Y_t, t \in Z$ is said to be an autoregressive integrated moving average process of order p, d and q, denoted by ARIMA (p, d, q) if it satisfies the difference equation:

$$\phi(B)(1 - B)^d X_t = \theta(B) e_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(9)}$$

Where $\phi(B) \, and \, \theta(B)$ are polynomials of orders $p \, and \, q$ respectively, d is the order of non-seasonal differencing and e_t is a white noise process.

Autocorrelation

Given n observations $X_1, X_2, \ldots, X_n$ *on a discrete* time series we can form $(n - 1)$ pairs of observations namely $(X_1 \, X_2), (X_2 \, X_3), \ldots, (X_{n-1} \, X_n)$. The autocorrelation coefficient is given by:

$$\rho_k = \frac{\sum_{t=1}^{n}(X_t - \bar{X})(X_{t+k} - \bar{X})}{\sum_{t=1}^{n}(X_t - \bar{X})^2} \quad \text{Where } \bar{X} = \frac{1}{n}\sum_{t=1}^{n} X_t \ldots\ldots\ldots\ldots\ldots \text{(10)}$$

This is called the autocorrelation at lag k

Partial Autocorrelation

The partial autocorrelation function (PACF) is the partial correlation coefficients between the series and lags of itself over time.

Lag

The lag operator is denoted by L. It shifts a time series so that the shifted time series lags one time unit behind. This is shown as

$$(LY)_t = Y_{t-1} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(11)}$$

Modelling Approach

To fulfill one of the objectives of this research, we will be using simple time domain techniques (ARIMA model) to forecast the GDP of Nigeria for the period from 1987 to 2019. The simple ARIMA model description is covered on Box – Jenkins methodology. The ARIMA encompass three components, AR, MA, and integrated series. AR stands for the autoregressive model i.e. regressing the dependent variables with linear combination of its past values or lagged values, MA stands for moving average model that is regressing the dependent error with linear combination of its past error or lagged error and I stands for the differencing order, that is number of difference applied on the stochastic process before attaining to stationary.

There are three steps we will take to achieve our aims, and these are listed as (1) model identification (2) model estimation (3) model diagnostic and forecasting accuracy.

Model Identification

The first thing to do is to test for Stationarity of the series (GDP of Nigeria) by observing the graph of the data to see whether it moves systematically with time or the ACF and the PACF of the stochastic process (GDP) either to see it decays rapidly to zero. If found out that the series is not stationary at level, then the first or second difference is likely to be stationary.

Model Estimation

Once Stationarity is attained, next thing is we fit different values of p and q, and then estimate the parameters of ARIMA model. Since we know that sample autocorrelation and partial autocorrelations are compared with the theoretical plots, but it's very hardly to get the patterns similar to the theoretical plots one, so we can use iterative methods and select the best model based on the following measurement criteria relatively AIC (Alkaike information criteria) and BIC (Bayesian information criteria), and relatively small SEE (standard error of estimate).

Model Diagnosis

The conformity of white noise residual of the model fit will be judge by plotting the ACF and the PACF of the residual to see whether it does not have any pattern or we perform Ljung Box Test on the residuals.

$$LB = n(n+2)\sum_{k=1}^{m}\frac{\rho_k^2}{n-k} \sim \chi_m^2 \quad \text{……………..} (12)$$

Where n is the sample size, m = lag length and ρ is the residual autocorrelation coefficient We can check about the normality by considering the normal probability plot or the p -value from the one-sample Kolmogorov Srnirov Test.

The decision: if the LB is less than the critical value of χ_{tab}^2, then we do not reject the null hypothesis. These means that a small value of Ljung Box statistics will be in support of no serial correlation or i.e. the error are normally distributed. This is concerned about the model accuracy. When steps 1-3 is achieved we go ahead and fit the model.

Forecasting with the Model

Forecasting for one period or several periods into the future with the parameters for a tentative model, we use SPSS package.

The theoretical behavior of ACF and PACF were summarized in Table-2 below:

Table-2: Theoretical Pattern of Acf and Pacf

MODEL	ACF	PACF
AR(P)	It tails off as an exponential decay to zero.	It cuts off after lag(p)
MA(q)	It cuts off after lag(q)	It decays exponentially to zero
ARMA(p,q)	It decays exponentially to zero	Cut off

Data Analysis

Table-3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.989	.978	.975	0.02870

The value of R= 0.989 tells us that there is a high positive relationship between the predictor variables (Agriculture, industry and service sector) and GDP. The value of R^2 of 0.978 (known as the coefficient of determination) tells us that 98% of the variation in GDP could be explained by Agriculture, industry and service sector while the remaining 2% could not be accounted for. The Adjusted R^2 of 0.975 is close to the R^2 value of 0.978 meaning that the model is fit for making generalization.

Table-4: Estimation of Model Parameter

Model	Unstandardized Coefficients	
	B	**Std. Error**
(Constant)	0.995	0.087
Agricultural sector	-0.039	0.049
Industrial sector	0.286	0.069
Service sector	0.631	0.041

The regression model given is given as:

$$GDP = \beta_0 + \beta_1(Agriculture) + \beta_2(industry) + \beta_3(services) + \varepsilon_k$$

$$GDP = 0.995 - 0.039\,(Agriculture) + 0.286(industry) + 0.631(services) + \varepsilon_k \quad \text{…………..} (13)$$

From Table-4 it could be observed that for every one billion naira increase in the agricultural sector there is a corresponding decrease of 39 million naira in GDP if all other sectors are under control. Industrial sector also contributes to the GDP; for every one billion naira increase in the industrial sector GDP increases by 286 million naira if all other sectors are under control. For every one billion naira increase in the service sector, GDP increases by 631 million naira if all other sectors are under control. If there is no increase in any of the three sectors GDP increases by 995 million naira. From the analysis it shows that service sector contributes the most, followed by the industrial sector and the agricultural sector contributes the least.

Table-5: Adequacy of the model

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.047	3	.349	423.546	.000[b]
	Residual	.024	29	.001		
	Total	1.071	32			

The result from the p-value of the ANOVA table shows that GDP has been explained by the variables in the model, this shows that the model is adequate.

Table-6: Parameter Significance.

Parameter	T-value	P-value	Remark
β_1 = -0.039	-0.804	0.428	Non- Significant
β_2 = 0.286	4.173	0.000	Significant
β_3 = 0.631	15.516	0.000	Significant

The p-value in Table-6 shows that industrial sector and service sector contributes significantly to GDP while the contribution of the agricultural sector is not significant.

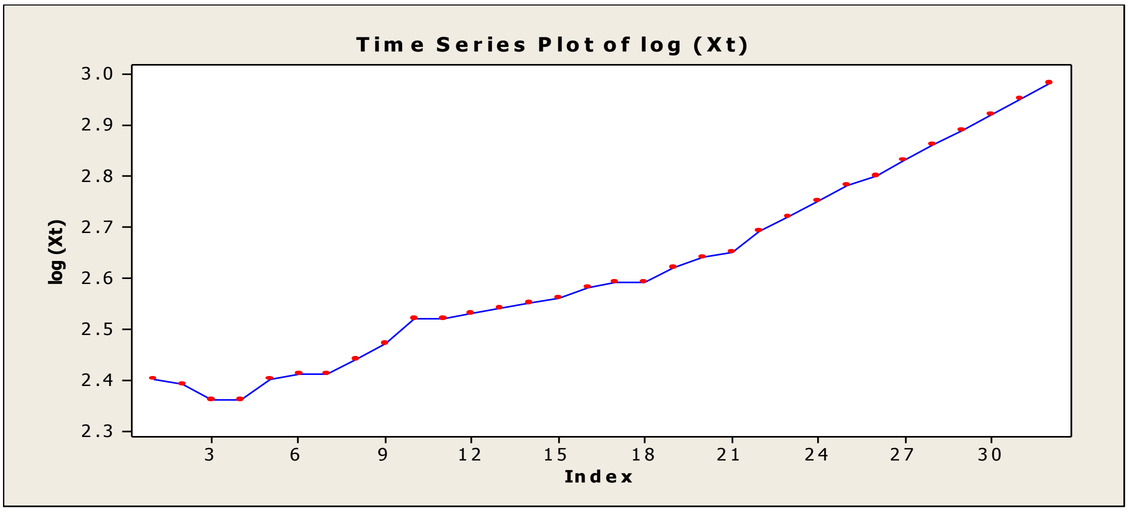

Fig-1: Trend on GDP

From the graph in Fig-1 it shows that GDP has an upward trend.

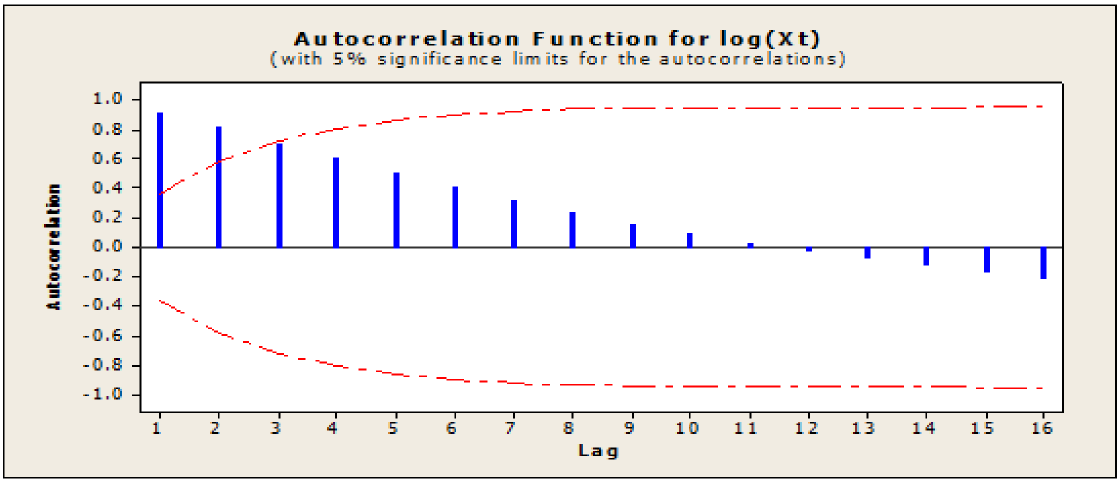

Fig-2: Acf of the Log Transformed GDP Data

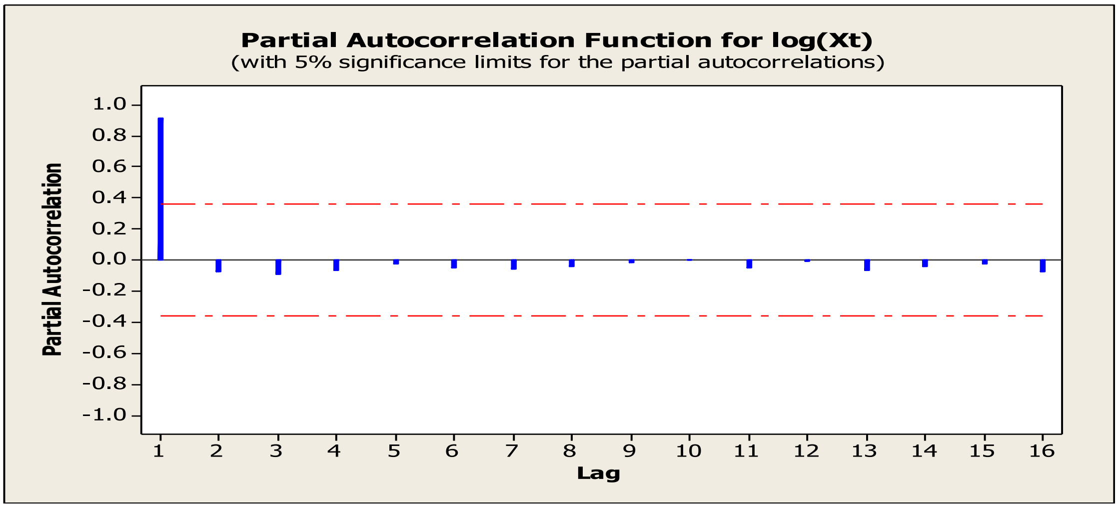

Fig-3: PACF of the Log Transformed GDP Data

From Fig-1, the graph log (X_t) is not stationary. The original ACF and PACF plot are found not to be stationary, hence a differencing of the first order is carried out to make the data stationary.

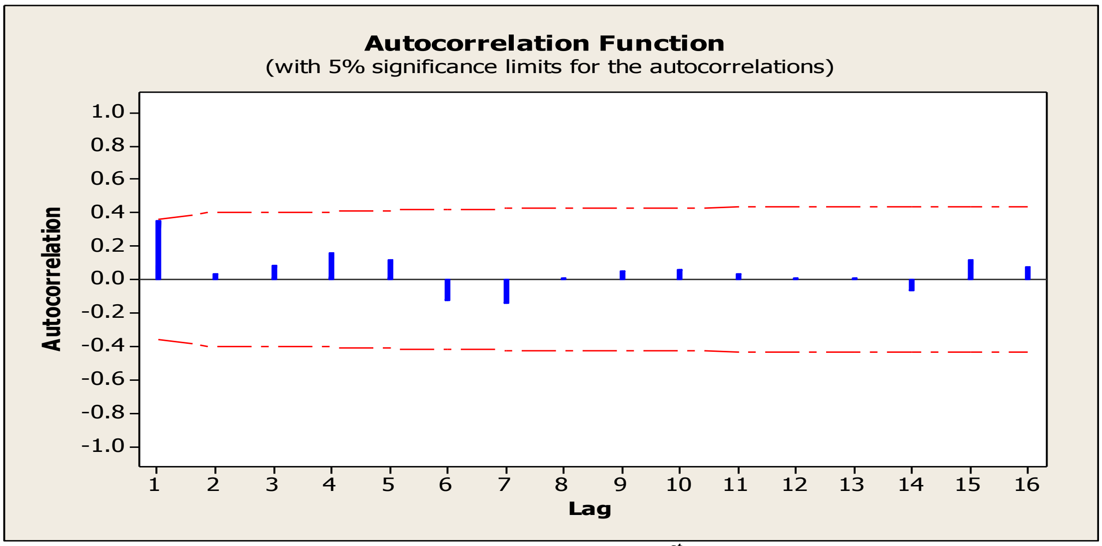

Fig-4: Auto correlation function of the 1st differenced series

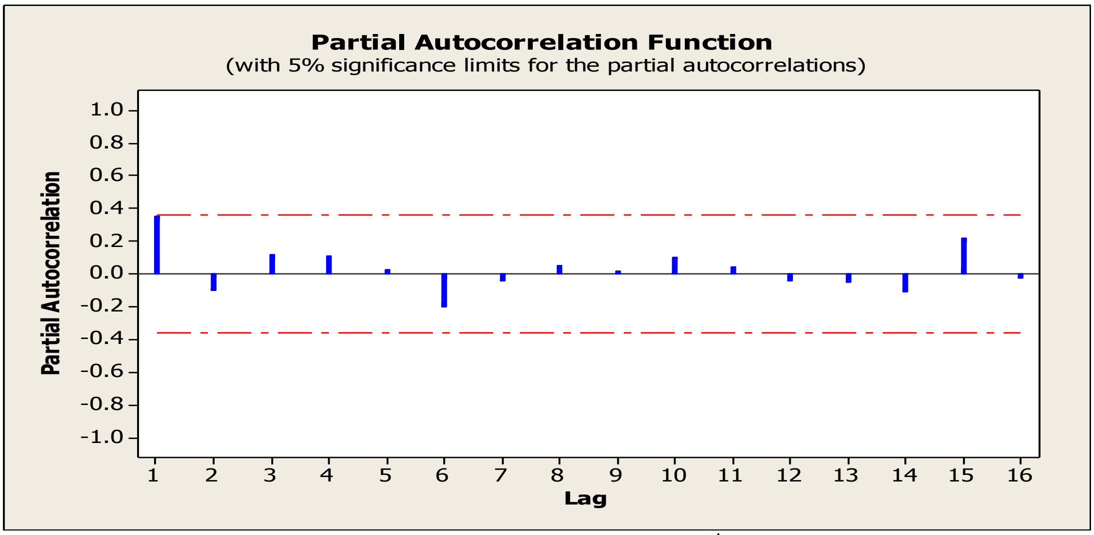

Fig-5: Partial Auto correlation function of the 1st differenced series

The first order differencing cuts off after lag 1 as observed in the PACF which indicated an AR of order 1 process.

Table-6: Model Description

			Model Type
Model ID	var2	Model_1	ARIMA(1,1,0)

The model identified can be stated as:
$X_t = \varphi_0 + \varphi_1 (X_{t-1} - X_{t-2}) + X_{t-1} + \varepsilon_t$ ……. (14)

Table-7: ARIMA Model Parameters

					Estimate	SE	T	Sig.
var2-Model_1	var2	Log Transformation	Constant		.041	.010	4.028	.000
			AR	Lag 1	.382	.169	2.258	.031
			Difference		1			

The value φ_0 of in the model is 0.041, and φ_1 is 0.382. We can now state the model as:

$$X_t = 0.041 + 0.382 (X_{t-1} - X_{t-2}) + X_{t-1} + \varepsilon_t \text{ …………..} (15)$$

H_0 : Model parameter is not significant
H_1 : Model parameter is significant
Level of significance: $\alpha = 0.05$
Decision rule: Reject H_0 if $|t_{cal}| > t_{tab}$: otherwise do not reject.

Test statistics: $t_{cal} = \frac{\hat{\varphi}}{se} \sim t_{n-1\,(\alpha)}$

Where; $\hat{\varphi}$ = estimate and se = standard error

Calculations

$$t_{cal} = \frac{0.382}{0.169} = 2.26$$

$t_{tab} = 1.658$

CONCLUSION: Since $2.26 > 1.658$ we reject H_0 and conclude that the model parameter $\hat{\varphi}$ is statistically significant.

Table-8: Model Statistics

Model	Number of Predictors	Model Fit statistics		Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	Normalized BIC	Statistics	DF	Sig.	
var2-Model_1	0	.131	5.234	8.215	17	.962	0

We observed that from Table-8 that the p-value is 0.962 and we conclude that the model is adequate.

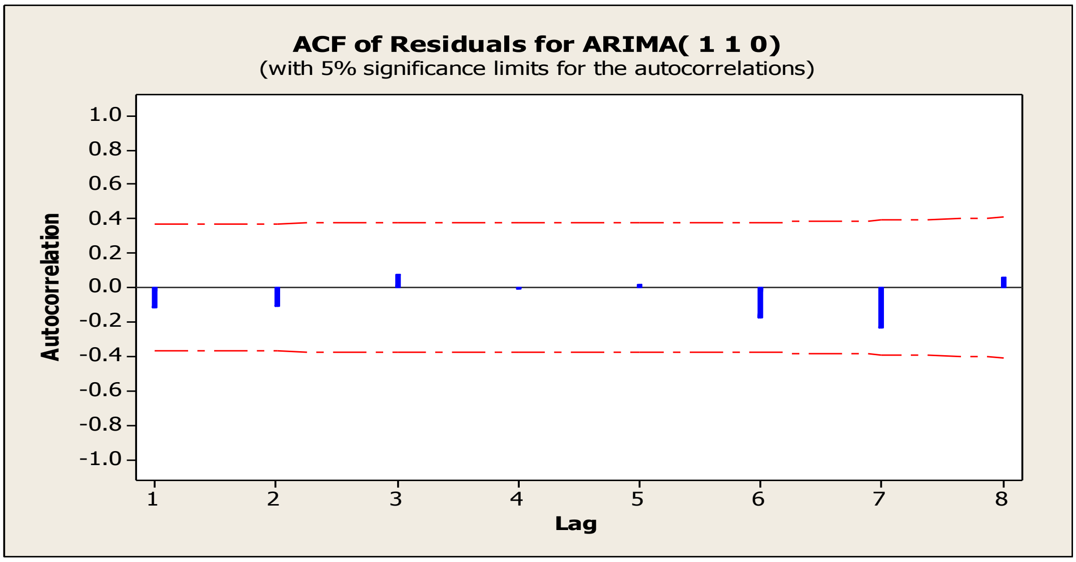

Fig-6: Residual auto correlation function

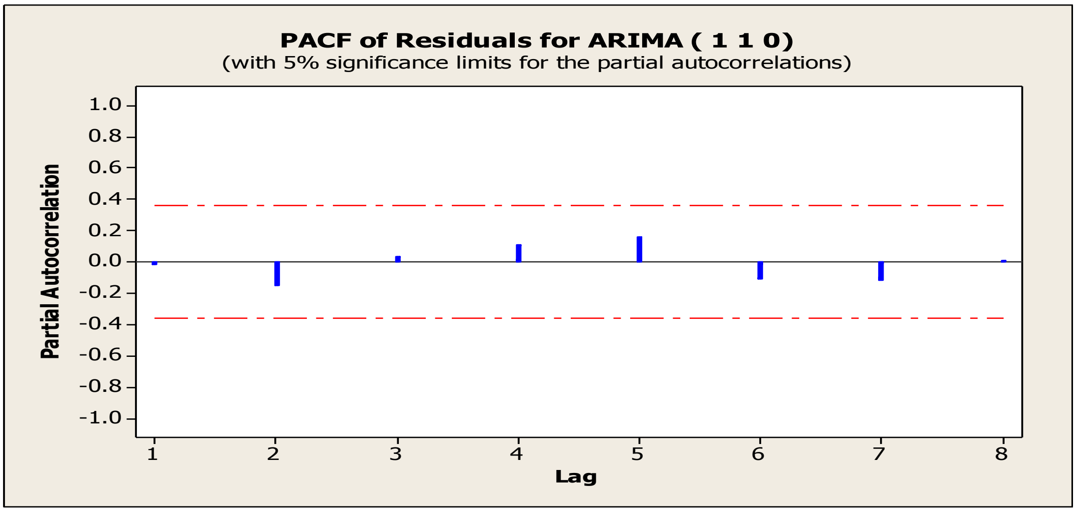

Fig-7: Residual partial auto correlation function

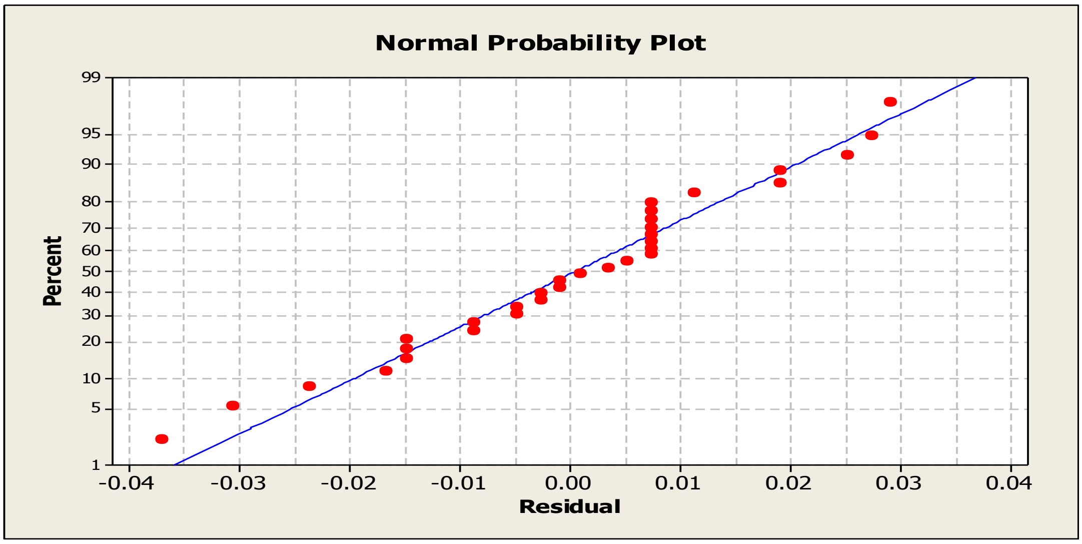

Fig-8: Residual normal probability plot partial

From the graph residual autocorrelation function plotted against the lags, all the observation falls within the pegged limit. It is a confirmation that the model fitted is a good fit. The plot of the residual shows that error is normally distributed. Meanwhile, the model ARIMA (1 1 0) in Table-6 has been subjected to rigorous testing and has been found to be adequate for forecasting. Hence, in this section we would apply our tentative model developed in forecasting the GDP 1990 constant basic prices for year 2020-2029.

$X_t = 0.041 + 0.382\,(X_{t-1} - X_{t-2}) + X_{t-1} + \varepsilon_t$. (16)

The forecast was carried out on a 95 percent confidence limit and it is displayed on the table below:

Table-9: Forecast Table

PERIOD	FORECAST	LOWER LIMIT	UPPER LIMIT
2020	1000.25	928.36	1076.29
2021	1047.30	921.43	1185.82
2022	1094.33	920.68	1291.82
2023	1142.60	925.25	1396.72
2024	1192.64	934	1502.42
2025	1244.73	946.01	1610.25
2026	1299.05	960.65	1721.20
2027	1355.71	977.50	1836.00
2028	1414.84	996.27	1955.25
2029	1476.54	1016.76	2079.44

CONCLUSION

The regression results shows that the three sectors; Agricultural sector, Industrial sector and Service sector has a positive relationship and only the Industrial sector and the Service sector contributes significantly with a coefficient of 0.286, 0.631 while the contribution of the Agricultural sector is not significant with a coefficient of -0.039. The F- test shows that the overall model is significant with a p-value of 0.000. The test for parameter significant also revealed that the agricultural sector is not statistically significant. The modeling cycle for the Box –Jenkins approach was in three stages, the first stage was model identification stage, where the series was non- stationary base on the result provided by the ACF and time plot. It was found out that the series was stationary at the 1st difference. The second stage was the model estimation, where the parameters conforms to the stationary conditions (less than one) and finally the third stage was model diagnosis where the errors derived from the model was normally distributed and random (no time dependence). From the result obtained it can be seen that only the industrial and service sector sectors of the economy contributes significantly to the Gross Domestic Product of Nigeria while the contribution of the agricultural sector is not significant. This implies that service sector contributes the most with 286 million naira followed by the industrial sector with 631 million naira while the agricultural sector does not contribute significantly since it decreases by 39 million naira. However the model identified from the time series analysis was ARIMA (1 1 0). From the graph of residual autocorrelation function plotted against the lags, all observation falls within the pegged limit. It is a confirmation that the model fitted is a good fit. From my forecast table (4.2.5), we can see all the prediction made for subsequent years and it also reveals that GDP will continue to appreciate with these forecasted time period.

REFERENCE

1. Amadi Uchenna, I., & Igboye, A. S (2013). The Fitting of ARIMA Model in Forecasting Nigeria Gross Domestic Product (GDP). J. of Physical Science and Innovation. 5(2), 79-90.
2. Anyanwu, S. O., Offor, U. S. Adesope, O. M., & Ibekwe U. C. (2013). Structure and growth of the GDP (1960-2008): implication for Small and Medium Enterprises in Nigeria. Global Advanced Research Journal of Management and Business Studies. 2(6), 342-348.
3. Bawa, S., & Mohammed, J. A. (2007). Natural Resource Abundance and Economic Growth in Nigeria. Central Bank of Nigeria Economic Review. 45(3):25-32.
4. Hussain, A., & Khan, A. (2008). Relationship between Agriculture and GDP Growth Rates in Pakistan: An Econometric Analysis (1961-2007). Academic Research International. 1(2), 74-89.
5. Farooq, U. Sabir, M. Tahir, H., & Rasheed K. (2011). Key Factors Affecting GDP in Pakistan Over the period 1975-2011. Journal of Economics and Sustainable Development. 4(1), 20-29
6. Lawal, W. A. (2011). An analysis of government spending on agricultural sector and its contribution to GDP in Nigeria. International Journal of Business and Social Science. 2(20), 244-250.
7. Oji-Okoro, I. (2011). Analysis of the contribution of Agricultural Sector on the Nigerian Economic Development. World Review of Business Research. 1(1), 191-200.
8. Okereke, O. E., & Bernard, C. B (2014). Forecasting Gross Domestic Product in Nigeria Using Box-Jenkins Methodology. Journal of Statistical and Econometric Methods. 3(4), 33-46.
9. Uddin, M. (2015). Causal Relationship between Agriculture, Industry and Service Sector for GDP Growth in Bangladesh: An Econometric Investigation.
10. Ukeje, E. U. (2003). Employment Creation Through Small and Medium Scale Enterprises: Country Experience. Bullion publication of Central Bank of Nigeria. 27(4):29-37.
11. Umaru, A., & Zubairu, A. (2012). An Empirical Analysis of the Contribution of Agriculture and Petroleum Sector to the Growth and Development of the Nigerian Economy from 1960-2010. International J Soc Sci and Education, 2(4).
12. Wang, X. Z. Wu, S. L., & Gao, F. (2010). The relationship between economic growth and agricultural growth: The case of China. Paper presented at International Conference on E-Business and E-Government (ICEE), Guanghou, China.
13. Yakubu, M., Shehu, L., & Mukhtar, G. (2013). Modeling and Forecasting of Nigeria Crude Oil Prices Using Box–Jenkins Technique. Journal of Physical Science and Innovation. 5(2), 50-59.
14. Maxwell, O., Happiness, O. I., Alice, U. C., & Chinedu, I. U. (2018). An Empirical Assessment of the impact of Nigerian All Share Index, Market Capitalization, and Number of Equities on Gross Domestic Product. Open Journal of Statistics, 8, 584-602.
15. Obubu, M., Konwe C. S., Nwabenu D. C., Omokri Peter A., Chijoke, M. (2016). Evaluation of the Contribution of Nigerian Stock Market on Economic Growth; Regression Approach. European Journal of Statistics and Probability United Kingdom 4(5):11-27.