Forecasting the Gross Domestic Product in Nigeria Using Time Series Analysis and a Sample Frame of 1960-2015.

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Abstract
Economic growth in Nigeria has been under serious dimensional attacks especially since the commencement of the present government. The GDP as the proxy for economic growth surrendered to recession since the second quarter of 2016. Economic recession is synonymous with what most commentators and analysts use, as a practical definition of recession, two consecutive quarters of decline in a country's real (inflation adjusted) gross domestic product (GDP)—the value of all goods and services a country produces. It is considered as a period of falling demand, production, and economic activities which cause panic and great concern in financial markets generally. The quest for knowing what is next was the objective of this paper. The GDP in US Dollars was subjected to static forecasting models using 1960 – 2015 as the sample frame with a decade forecast of 2016 – 2025. Findings revealed that the GDP, which was at a peak of $568.51Billions in 2014 toed a downward trend of $481.07Billions in 2015, picked from the downward trend increasing marginally to a forcast value of $483.53Billions in 2016 and $508.78Billions in 2017 to $533.33Billions in 2018 and GDP of $564.78Billions in 2019; but could not reach the 2014 peak (maxima), the peak to-trough (2014) output of $568.51Billions, until the 1st quarter of 2020. One of the recommendations was that the Federal Government should be economically diplomatic in handling the menace of militancy in the Niger Delta if it will be difficult to balance the economy without oil. This will go a long way in revamping the economy provided the level of destruction is still within economic repairable possibilities.

Keywords: *Economic Growth, Economic Recession, Static Forecasting Models.*

1. Introduction

Economic growth is always the priority of any credible government around the globe. One of the major macro-economic objectives of any country is to ensure a sustainable economic growth, manage inflation, and control interest rate because their behaviours tell much on the economic growth of a country. The gross domestic product (GDP) is a proxy for economic growth and it is so important that its dynamics significantly influences the overall development of national economies. The GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. (CBN, 2014)

The recent international economic crisis and the current economic recession in Nigeria have

highlighted the need for effective monitoring and forecasting of the GDP. Economic recession as defined by most commentators and analysts use, as two consecutive quarters of decline in a country's real (inflation adjusted) gross domestic product (GDP)—the value of all goods and services a country produces. According to NBER (2009), this definition is a useful rule of thumb, it has drawbacks because focus should not be on GDP alone, but it is often better to consider a wider set of measures of economic activity to determine whether a country is indeed suffering a recession.

It is therefore timely to underscore sound policy regulation of a system which leads to outstanding success of the particular system. A sample of the GDP was 1960 – 2015 in Table 1. In 2013, the GDP (in US Dollars) was $514.96Billions; $568.51Billions in 2014 and a sharp crash to $481.07Billions in 2015. The eagerness and disquietness to know what will become of the GDP after 2015 is one of the objectives of this paper.

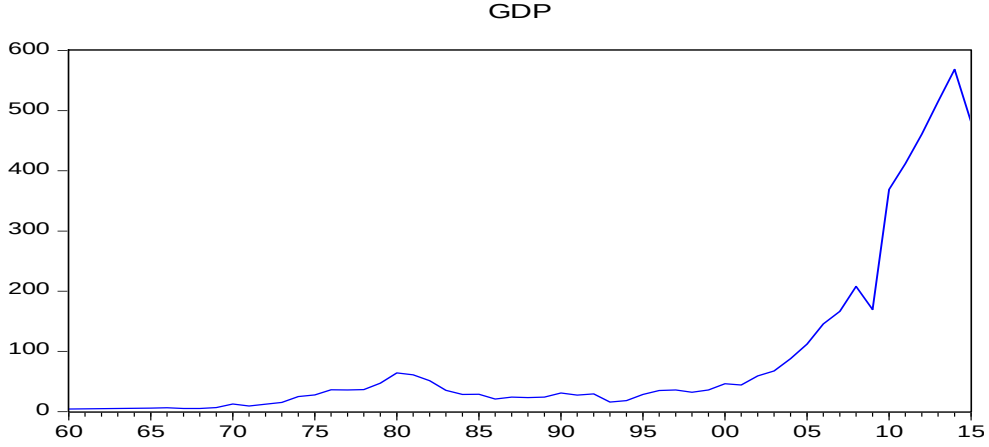
Table 1. The Nigerian GDP in Dollars 1960 – 2015.

YEARS	GDP in Dollars	YEARS	GDP in Dollars	YEARS	GDP in Dollars	YEARS	GDP in Dollars
1960	4.196	1974	24.847	1988	23.272	2002	59.120
1961	4.467	1975	27.779	1989	24.231	2003	67.650
1962	4.909	1976	36.309	1990	30.757	2004	87.840
1963	5.165	1977	36.035	1991	27.393	2005	112.250
1964	5.552	1978	36.528	1992	29.301	2006	145.430
1965	5.874	1979	47.260	1993	15.789	2007	166.450
1966	6.367	1980	64.202	1994	18.086	2008	208.060
1967	5.203	1981	61.076	1995	28.550	2009	169.480
1968	5.201	1982	51.397	1996	34.990	2010	369.060
1969	6.634	1983	35.451	1997	35.820	2011	411.740
1970	12.546	1984	28.501	1998	32.004	2012	460.950
1971	9.182	1985	28.874	1999	35.870	2013	514.960
1972	12.274	1986	20.721	2000	46.390	2014	568.510
1973	15.163	1987	24.093	2001	44.140	2015	481.070

Source: World Bank national accounts data, and OECD National Accounts data files. http://data.worldbank.org/indicator/NY.GDP.MKTP.CD,

The Graph below depicts the sharp drop in 2014. The US dollar equivalence was used mainly for comparison with other countries and to avoid the vagaries of the exchange value of the Naira.

Figure 1a. Graphical Representation of the GDP 1960 - 2015



The economic report for a country is the most important determinant of its currency's value. Knowing all those factors and indicators to watch will help a country keep pace in the competitive and fast-moving world of foreign exchange market.

Economies cannot be exempted from the characteristic positive and negative changes in live. From time immemorial, economic growth has been obeying the rule of ups and downs termed cycles. Economies are sometimes in periods of boom, and sometimes in periods of slow growth. These cyclical tendencies can probably result in recession at times, and do not respect even the developed countries. In the United States, for example, there were six recessions of varying length and severity between 1950 and 2011. The National Bureau of Economic Research (NBER, 2009) makes the call on the dates of U.S. business cycles. The Nigerian GDP in US Dollars 1960 – 2015 shows a high rise in 2014 and a sharp drop in 2015 as above.

Economic prosperity, growth and development cannot be quite successful without a 'synergy' among the different players within the globe. A world of interdependence signals world problem from individual country's problem. (ADEBAYO 2016b), and any common problem should be tackled by a coordinated effort with active support from the global community. Some examples are terrorism and issue of health hazards that can spread beyond any territorial boundaries with adverse effect on global economy. A case of Ebola was still fresh in the memory when USA was reluctant in giving assistance to Nigeria. When the disease was terminated in Nigeria it located its terminal base in the USA.

1.1 Objectives of the Study

The specific objectives of this study are:

1. To forecast the GDP to cover a decade from 2016 to 2025
2. To analyse the forecast to be able to observe the year the GDP will be restored to the global maxima of $568.51Billions and eventual trend.

2.Review of Related Literature

2.1.Forecasting

Economic and policy makers especially at macro-economic level should be aware that economic and business conditions vary over time, and must find ways to keep abreast of the effects that such changes will have on the overall political, social and economic variables.. One technique that can aid in planning for future needs is forecasting. Although numerous forecasting methods have been devised, they all have one common goal—to make predictions of future events so that projections can then be incorporated into the planning and strategy process.

Time-series forecasting methods involve the projection of future values of a variable based entirely on the past and present observations of that variable. Examples of economic or business time series are the monthly publication of the Consumer Price Index, the quarterly statements of gross domestic product (GDP), and the annually recorded total sales revenues of especially the government.(Levine et al, 2005). Economic variables such as GDP, inflation, exchange rate, interest rates, stock prices, unemployment rate are among other economic variables that can come under forecast.

2.2.The Least-Squares Trend-Fitting and Forecasting.

The component factor of a time series most often studied is trend. Trend is studied as an aid in

making intermediate and long-range forecasting projections. As depicted in Figure 1, to obtain a visual impression of the overall long term movements in a time series, a chart is constructed in which the observed data (dependent variable) are plotted on the vertical axis, and the time periods (independent variable) are plotted on the horizontal axis. The Forecasting add-on module provides two procedures for accomplishing the tasks of creating models and producing forecasts. The Time Series Modeler procedure estimates exponential smoothing, univariate Autoregressive Integrated Moving Average (ARIMA), and multivariate ARIMA (or transfer function) models for time series, and produces forecasts. The procedure includes an Expert Modeler that automatically identifies and estimates the best-fitting ARIMA or exponential smoothing model for one or more dependent variable series, thus eliminating the need to identify an appropriate model through trial and error. Alternatively, one can specify a custom ARIMA or exponential smoothing model. ARIMA has been very popular and it is referred to as the BOX-JENKINS methodology (Box and Jenkins, 1978). The emphasis of this method, according to Gujarati et al,(2013), is not on constructing single equation or simultaneous equation models but on analyzing the probabilities, or stochastic, properties of economic time series on their own. The Box-Jenkins philosophy is to "let the data speak for themselves".

AR(1) = a first-order autoregressive to correct for residual serial correlation. It is regressing the dependent variable(s) with linear combination of its past values or lagged values.

MA(1) = a first-order moving average model ,i.e., regressing the dependent error with linear combination of its past error or lagged error. It also corrects serial correlation.

2.3. The Static and Dynamic Forecasting Models.

- **The Static Model –** The static forecasting model based its forecast on the current circumstances affecting the variable of forecast, estimating future forecast without giving consideration to potential future changes. Therefore the model may not be adequate in forecasting volatile economic variables since forecasting may not estimate the full effect of policy changes accurately.
- **The Dynamic Model –** A dynamic forecasting model, on the other hand, would evaluate proposed policy changes in the variable of forecast and therefore the dynamic forecasting estimation is better in reflecting the full impact of policy changes. The usefulness of dynamic forecasting may be offset by the model's complexity because it is more dependent on a set of assumptions (probabilities and subjective judgments) about the expected changes in the economic environment. In most cases, the outcome of static forecast would be the starting data for the dynamic forecasting models.

2.4. The GDP and the Forecasting Models.

The static model was used in this study for forecasting the GDP, taking the prevailing circumstances to predict the GDP for a decade (2016 – 2025). A dynamic model may start forecasting the GDP based on a set of assumptions on the exogenous and endogenous variables that can inject their influences on the GDP. Dynamic model would take into consideration the agricultural diversification of the Federal government, the policy on the restriction of importation of luxury goods and goods that can be produced in Nigeria with favourable comparative advantage. The sensitization on the purchase of made in Nigeria goods and also the zero tolerance to corruption, reduction in cost of governance and the gospel of transparency and accountability. All these would make the Naira strong as well as improving the GDP out of recession.

The dynamic model would not also shy away from the effects of terrorism in the North East and

militancy in the Niger Delta, foreign direct investment (FDI) dis-incentives especially insecurity and economic sabotage activities reflecting dirty politics in the country.

2.5.Economic Recession.

The determinants of economic activities depend on a number of macroeconomicvariables. Economic recession is synonimous with such definition as "two consecutive quarters of negative real gross domestic product (GDP) growth. The National Burreau of Economic Research, (NBER, 2009) goes extra thought and define a recession as a "significant decline in economic activity spreading across the economy, lasting more than a few months." This is as a result of a wide range of indicators and peak to trough decline in particularly payrol employment, domestic production and income, and industrial production. The oil sector has been very dominant in the nation's economy. A share of the economy in the third quarter of 2015 was 10.27% of total real GDP but had dropped to 8.19% of the same quater in 2016. The contraction ,no doubt, could be accredited to the activities of the Niger Delta militants against the country's oil wealth.

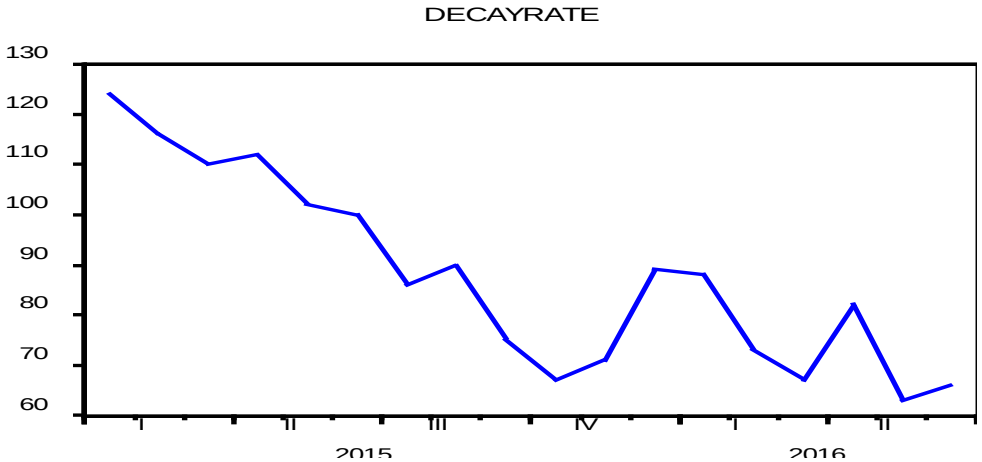
The Dollar-Naira exchange rates and other economic indicators- inflation rate of 18% in November 2016, unemployment rate of 13.3%, underemployment rate of 19.3% - have not been in our favour either with an average exchange rate range of N350 to N400 per US Dollar. According to Udo (2016) the recession deepens as the GDP contracts 2.24 percent in the third quarter of 2016. The total collected revenue of the Federal Governent has dwindled ridiculously as in Table 2 and the decay rate. The terminal effects of the negative forces on the economy are the foreign reserve shortage, tendencies towards debt ridden and poverty. The revenue allocated by the three-tier governments has been nothing to write home about. Table 2 below and the adjoining graph (Figure 1), vindicate the aforementioned.

Table 2. Monthly Revenue Allocation by the Federation Accounts Allocation Committee

S/N	Month/Year	Amount NBilliom	Decay Rate
1	June 2013	718.10	124
2	Nov 2013	675.3	116
3	Feb 2014	641.1	110
4	Apr 2014	649.57	112
5	Oct 2014	593.3	102
6	Dec 2014	580.4	100
7	Jan 2015	500.1	86
8	Feb 2015	522.05	90
9	Mar 2015	435.06	75
10	Apr 2015	338.34	67
11	May 2015	409.3	71
12	Jun 2015	518.54	89
13	Jul 2015	511.8	88
14	Aug 2015	422.6	73
15	Sep 2015	389.94	67
16	Oct 2015	473.83	82
17	Nov 2015	369.88	63
18	Dec 2015	387.77	66
19	Jan 2016	370.0	64
20	Feb 2016	345.09	59
21	Mar 2016	299.7	52
22	Apr 2016	288.5	50
23	May 2016	305.13	53
24	Jun 2016	559.03	96
25	Jul 2016	443.66	76
26	Aug 2016	510.27	88
27	Sep 2016	420	72

Source: Federation Accounts Allocation Committee monthly revenue allocation to Federal, States and Local Governments up to September 2016.

Figure 1b. The Decay (Decreasing) rate of the Monthly Allocation



The base month for the decay rate was December 2014. Other months before the base year are for comparison only.

2.6.Research Questions

The following research questions were formulated to help in the achievement of the objectives of the study.

1. What are the forecast values of the GDP from 2016 – 2025?
2. What year would the GDP continue to pick up out of the trough?
3. When would the GDP attain the peak of $568.51Billions of 2014?

3. Methodology

3.1. Data Collection

A time series data on the US Dollar values in of the country's GDP in Billions from 1960 to 2015 was used for the study from World Bank national accounts data, and OECD National Accounts data files . The data was presented in Table 1 above.

3.2.Model Introduction

The Model of Forecasting from an Equation can be dynamic or Static. The static model is chosen because the static forecasting model performs a series of one-step ahead forecasts of the dependent variable: For each observation in the forecast sample:

$y_{s+k} = c(l) + c(2)x_{s+k}+c(3)z_{s+k}+c(4)y_{s+k-1}$ Eq 2 (6)

Such equation is always using the actual value of the lagged endogenous variable. This is translated into GDP forecast in US Dollars

$GDP_{2FA} = \alpha o + \alpha_1 GDP_{2FA}(-1) + \alpha_2 PYR + AR(1) + e_i$ Eq 3(7)

where:

GDP_{2FA} = the actual (default) value of the GDP in Table 1 was subjected to **moving average adjustments** resulting in $GDP_{1FA.}$ This was again adjusted with moving average the second time so that a **forecast is again forecast** resulting in GDP_{2FA} with moving average (MA(2) for 56 years. This is the dependent variable with the adjusted values in Table 3.

GDP_{2FA} (-1) = a lagged variable of the dependent variable. This is a one step ahead static forecasts requirement since, each period, the value of $GDP_{2FA}(-1)$ is used in forming the forecast of GDP_{2FA}.

PYR = the period expressed in years with a total of 56 years. This is the independent variable.
α_0 = the constant term or the model intercept.
α_1 = the coefficient of the lagged variable.
α_2 = the coefficient of the independent variable.
e_i = the stochastic or error term

3.3.Model Specification

The GDP_{2FA} above is transformed into equation 4 after being subjected to the static forecasting model

$GDP_{2FA}(P+K) = \Phi_0 + \Phi_1 GDP_{2FA}(P+K-1) + \Phi_2 PYRp+k + AR(1) + \varepsilon_i$ (Eq 4)

where:

$GDP_{2FA}(P+K)$ = the second order moving average adjustments [**MA(2)]** forecast to which the previous year's (lagged) GDP i.e. GDP_{2FA} (-1), was added to the current year (PYR) and **AR(1) (See equation 4).** Hence GDP_{2FA} was subjected to **AR(1) and MA(2)** and was stationary at the second order Augmented Dickey-Fuller test statistics (see Taable 7). The model conforms to ARIMA (1 2 2).

Φ_0 = constant term
Φ_1 - Φ_2 = coefficients to be estimated.
p = the base period (year) of start of forecast, i.e. year 56 i.e. year 2015.
k = any year from the forecasting period (2016 - 2025)
AR(1) = a first-order autoregressive to correct for residual serial correlation. It is regressing the dependent variable(s) with linear combination of its past values or lagged values.
. εi = the error term.

$GDP_{2FA}F = (\int i)\ GDP_{2FA}$ Eq 5

where
$\int i$ = multiplicative scoring factor for a 10 year's period in column (e) of Table 4
$GDP_{2FA}F$ = total GDP forecast for 2016 to 2025. This is in column (f) in Table 4
The actual trend base is P56. In Table 3 the GDP_{2FA} corresponding to P56 is $460.51 Billion Dollars. A forecast for P57 - 66 is required; i.e. 2016 – 2025. [See column (f) Table 4]

4. Results and Discussion

4.1. An overview - Some clarifications are needed especially on the various Tables. Table 1 is the raw data (or default value) of the Nigerian GDP in Billion US Dollars from 1960 - 2015 followed by the graph of the Table in Figure 1 also. In Table 3, the forecast values (1960 – 2015) were subjected to MA(2) and Augmented Dickey Fuller test statistics which was stationary at second difference as presented in Table 7. Table 4 columns (d), was the Model of Forecasting from an Equation using the Static Model and the values of GDP_{2FA} from 2016 to 2025 were calculated. A multiplicative scoring factor in column (e) for second order moving average adjustment was used to multiply column (d) to get the FORECAST in column (f). Forecast values in column (f) was added to the raw value in Table 1 and extended the years from 1960 to 2025, to ensure raw data-forecast comparison.

4.2. The graph of the extension was in Figure 2 and Figure 3 was from 2013 to 2025 of the Forecast so as to make comparison easy. The value of GDP for years 2013, 2014, and 2015 were $514.6B, $568.51B and $481.07B. The GDP continue to go through a trough in 2016, 2017, picking up in 2018 and was able to resuscitate to 2014 peak value of ($568.51B) in 2019 or

thereabouts with $564.78BIillion. The actual 2014 value would be achieved in the first quarter of 2020. The L.M. test for serial correlation in Table 6 shows that GDP_{2FA} has no serial correlation. The GD_{P2FA} was also stationary at the 2nd difference as in Table 7. Where applicable some pointer summaries were provided under each of the Tables or Figures.

5. Conclusion and Recommendations

5.1. Conclusion

This study has been able to forecast the Nigerian GDP in US Dollars. The forecast GDP for 2016 – 2025 shows that it would take about four years (2019) to achieve a GDP peak of $568.51Billions of 2014. This does not preclude the possibility of the effect of sound economic policies in rescuing the GDP from a trough to a peak. This is especially if government URGENTLY responds to recessions by adopting expansionary macroeconomic policies, such as increasing money supply, increasing government spending and decreasing taxation.

5.2. Recommendations.

Sound economic policies by each level of governments and patriotism by citizenry and the players in all economic sectors are antidote for economic growth. Governments should urgently respond to recessions by adopting expansionary macroeconomic policies, such as increasing money supply, increasing government spending and decreasing taxation.

The Federal Government should be economically diplomatic in handling the menace of militancy in the Niger Delta if it will be difficult to balance the economy without oil. This will go long way in revamping the economy provided the level of destruction is still within economic repairable possibilities.

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APPENDIX

Table 3. The Period in Years and GDP 2nd Order Adjustments (GDP_{2FA}) as MA (2)

YEAR	$ GDP 2ND Order Adjus	YEAR	$ GDP 2ND Order Adjus	YEAR	$ GDP 2ND Order Adjus	YEAR	$ GDP 2ND Order Adjus
1960	4.4420	1974	26.9479	1988	21.8700	2002	53.6787
1961	5.0452	1975	28.9412	1989	24.3191	2003	64.7582
1962	5.3241	1976	34.1216	1990	27.9262	2004	76.1665
1963	5.3811	1977	36.1660	1991	26.2220	2005	112.8786
1964	5.2175	1978	33.1660	1992	25.4070	2006	137.7048
1965	5.8954	1979	45.2398	1993	15.8774	2007	182.0301
1966	5.7810	1980	55.6699	1994	17.1253	2008	220.2585
1967	4.9806	1981	61.4181	1995	31.2224	2009	191.4189
1968	4.5098	1982	48.6668	1996	37.0414	2010	400.2657
1969	6.6712	1983	38.7693	1997	40.4568	2011	428.9665
1970	11.8796	1984	30.1720	1998	34.7101	2012	433.1809
1971	10.0415	1985	32.6117	1999	37.3707	2013	516.8324
1972	12.9936	1986	22.4731	2000	43.5953	2014	516.1856
1973	17.1258	1987	25.1010	2001	44.3005	2015	460.5057

The second order forecast adjustment of the data in Table 4 is in Table 3 above. The GDP in Dollar forecast for the next ten years is calculated below and represented in Table 4. The Forecast from GDP_{2FA} in Column (d) is the $GDP_{2FA}F$ in Column (f)

Table 4. The Forecast

S/N (a) *	Period b) 56	YEARS (C) 2015	GDP_{2FA} ($GDP_{2FA} = \alpha_0 + \alpha_1 GDP_{2FA}(-1) + \alpha_2 PYR + AR(-1) + e_i$ (d)	Multiplicative Scoring Factor(f_i) (e)	(f_i)(GDP_{2FA}) = $GDP_{2FA}F$ (The Forecast) (f)
1	57	2016	487.18	0.9925	483.53
2	58	2017	514.55	o.9888	508.78
3	59	2018	542.61	0.9829	533.33
4	60	2019	571.38	0.9902	564.78
5	61	2020	600.85	0.9941	597.30
6	62	2021	631.03	1.0009	631.59
7	63	2022	661.91	1.0101	668.59
8	64	2023	693.37	1.0133	702.59
9	65	2024	725.68	1.0138	735.69
10	66	2025	758.71	1.0093	765.76

The calculation below takes the previous GDP_{2FA} as the base value so that the base value of P = 57 is $460.51B and for P = 58 is $487.18B and so on (ADEBAYO, 2016a)

Sample Calculation for Column (d) in Table 4

1. For P = 57 i.e. 2016,

$GDP_{2FA}(p+k)$ = -1196.93 +1.0034GDP_{2FA}(p+k-1) + 0.6061PYR(p+k) + 0.1382

$GDP_{2FA(56+1)}$ = -1196.93 +1.0034GDP_{2FA}(56+1-1) + 0.6061(2016) + 0.1382

$GDP_{2FA}(57)$ = -1196.93 +1.0034GDP_{2FA}(56) + 0.6061(2016) + 0.1382

$GDP_{2FA}(57)$ = -1196.93 + 1.0034(460.51) + 1221.897 + 0.1382.

$GDP_{2FA}(57)$ = -1196.93 + 462.076 + 1221.897 + 0.1382.

= 487.18

For P = 58 i.e. YR2017,

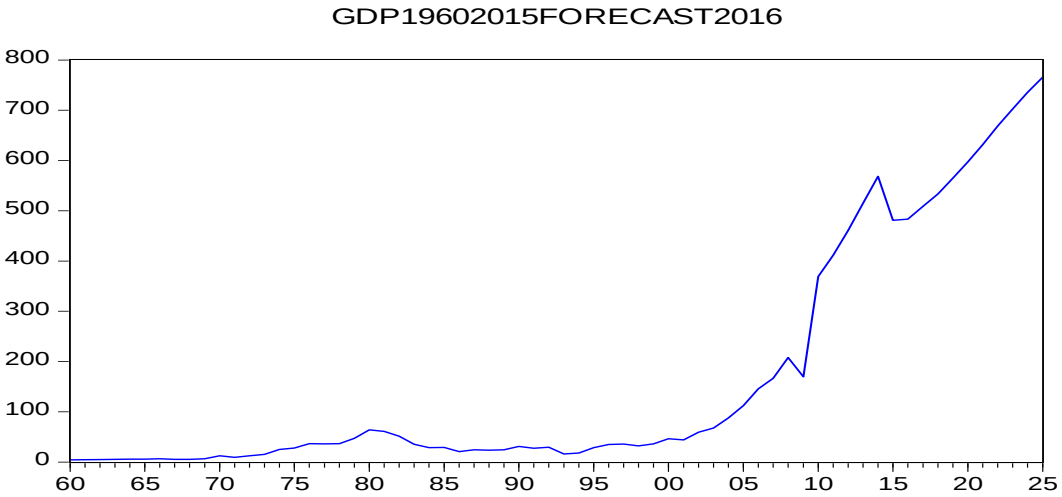
$GDP_{2FA}(58)$ = -1196.93 +1.0034GDP_{2FA}(57) + 0.6061(2017) + 0.1382

= -1196.93 +1.0034(487.18) + 0.6061(2017) + 0.1382

= -1196.93 +488.84 + 1222.50 + 0.1382

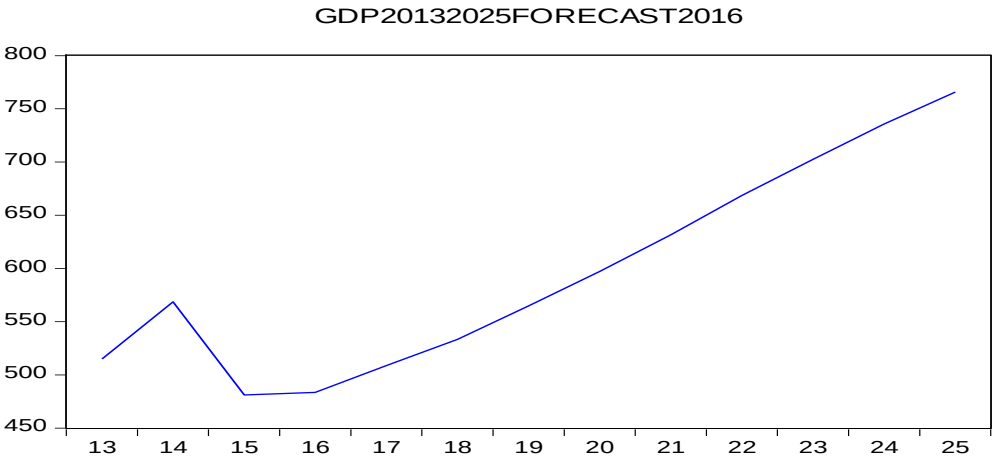
= 514.55 (and so on up to P=66 i.e. YR2025

Figure 2 .The 1960 – 2015 Values Plus FORECAST From 2016 - 2025



The value of the GDP in table 1 from 1960 to 2015 and added with it, is the Forecast values in Table 4 Column (f) from 2016 to 2025.

Figure 3. Forecasts From 2016 - 2025



The values of the GDP in Table 1 for 2013, 2014, and 2015 were added to the Forecast in Column (f) Table 4 for comparison. The GDP did not recover to the 2014 highest value of $568.51Billions until 2019 with $564.78Billions (still with about $4Billions shortage), or at the first quarter of 2020. The implication is that it is likely the economy would recover by 2019 or thereabouts.

Equation Output for Column (d)**

Estimation Command:
==========
GDP_{2FA} C GDP_{2FA}(-1) PYR AR(1)

Estimation Equation:
==========
GDP_{2FA} = C(1) + C(2)*GDP_{2FA}(-1) + C(3)*PYR + [AR(1)=C(4)]

Substituted Coefficients:
==========
GDP_{2FA} = -1196.92678049 + 1.00340859106*GDP_{2FA} (-1) + 0.60612958551*PYR + [AR(1)=-0.138186202008]

Table 5. Summary Statistics. E-View Output for the equation:

$GDP_{2FA} = \alpha o + \alpha_1 GDP_{2FA}(-1) + \alpha_2 PYR + AR(1) + e_i$

Dependent Variable: GDP_{2FA}
Method: Least Squares
Date: 11/11/16 Time: 10:19
Sample (adjusted): 2011M07 2015M12
Included observations: 54 after adjustments
Convergence achieved after 5 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1196.927	690.9935	-1.732182	0.0894
GDP_{2FA}(-1)	1.003409	0.045045	22.27580	0.0000
YR	0.606130	0.348746	1.738026	0.0884
AR(1)	-0.138186	0.163175	-0.846857	0.4011

R-squared	0.949197	Mean dependent var	89.58409
Adjusted R-squared	0.946149	S.D. dependent var	140.2935
S.E. of regression	32.55631	Akaike info criterion	9.875007
Sum squared resid	52995.68	Schwarz criterion	10.02234
Log likelihood	-262.6252	Hannan-Quinn criter.	9.931827
F-statistic	311.3979	Durbin-Watson stat	1.885864

Prob(F-statistic)	0.000000
Inverted AR Roots	-.14

Table 6. Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.129865	Prob. F(2,48)	0.3315
Obs*R-squared	2.427897	Prob. Chi-Square(2)	0.2970

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 11/11/16 Time: 10:26
Sample: 2011M07 2015M12

Included observations: 54
Presample missing value lagged residuals set to zero.

Table 7. Null Hypothesis: D(YGDPSASA,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.20504	0.0000
Test critical values:	1% level	-3.562669	
	5% level	-2.918778	
	10% level	-2.597285	

*MacKinnon (1996) one-sided p-values.
**E-VIEW 7 OUTPUT