The Impact of Global Oil Prices on the Nigerian Economy: Evidence Markov Regime-Switching Models

Musa Ismail Shafa
Nigerian Defense Academy Kaduna, mismailokpetu@gmail.com. 08063232183

Ali Salisu
Department of Economics, Faculty of Social Sciences, Bayero University, Kano.
alisalisubeto@gmail.com; 08068978846

Adahama Ibrahim Haladu
Department of Economics, Faculty of Social Sciences, Capital City University, Kano
adahamahaladu@gmail.com; 08063509665

Abstract

It is widely known fact that global oil prices shocks and its substantial consequence on real macroeconomic output still remain a significant issue bedevilling a number of world economies. This study examines the impact of global oil price on macroeconomics variables in Nigeria using Markov Regime Switching (MRS) models. The unit root test of ADF and PP indicated all the variables employed are stationery at first difference. The study found that the estimates lend support to the presence of regime switching for the effects of oil price shocks on real gross domestic product. It was observed that the probability regime two of oil price shocks has high volatility than regime one in the whole sample period of the study with their P-value been statistically significant. The study recommend that policy makers should look inward to diversify the economy from mono-economy of oil sector and exploit alternative revenue areas such as aggressive tax regime by taxing the rich more, solid mineral exploration, reserve management, investment in agricultural mechanisation and adopt flexible policies to attract foreign investment.

Keywords: Macroeconomic fluctuation, Oil price shocks, VAR and Markov Regime Switching model.

1 Introduction

It is widely known fact that global oil prices shocks and its substantial consequence on real macroeconomic output still remain a significant issue bedevilling a number of world economies. The relationship that exist between oil prices and the economic level of activities has attracted key public debate in recent time with extensive empirical literature on the oil price- GDP relationship (Hamilton, 2011). However, the perception over the years weakened due to subsequent empirical studies that shows oil prices having little influence on output of the economy. The mechanism in which oil price fluctuation affect economic activities is subject to supply and demand channels. According to Wei, (2003) the supply side effects mechanism view oil as a production input. Hence, oil price fall may result to decrease the cost of production

and enhanced output and these will increase the aggregate supply. This will promptly induces economic activities with growth expectation due to inputs variables prices has reduced and vice-versa. The demand side effects however, will focus on the effect of oil price shocks on the consumption and government expenditures. Thus, a decline in oil price will lead to an increase in real disposal income and due to the fact consumption and government expenditure on the economy are positively related to income, a reduction in government expenditures will eventually reduce consumption in the economy. This reduces aggregate demand and hence, affect the growth of an economy. This is a situation Nigerian economy is currently facing as a result of fall in oil price from all time high of $105 per barrel to steady fall to $50 per barrel and this has affected government expenditures in recent time (Wei, 2003). Similarly, Odularu, (2009) examined the oil price shocks effects on oil exporting countries of the world. As the case of Nigeria which is one of the oil exporting economy and a rise in the oil price per barrel combine with its supply quota fixed by the organisation of Petroleum Exporting Countries (OPEC), will result to a boom in oil revenues and this in turns make available more funds for government expenditure. This will strengthen macroeconomic performances and growth in the oil exporting countries (Odularu, 2009). More importantly, Ojapinwa, (2011) prior to her independence, Nigerian economy was characterised with dominance of exports and commercial activities with no industrial sector which agriculture was the cornerstone of economic sustainability and contributed about 67 percent to GDP. Agricultural products served as foreign exchange that was utilised to import raw materials and capital goods. Since the discovering of crude oil in the late 1960s and its growth in the 1970s, became the major source of revenue for the country and contributed to Gross Domestic Product (GDP) of about 75%, this has a significant role in shaping the economic and political landscape of the country (Ojapinwa, 2011). The main objective of the study is to examines the impact of global oil price on macroeconomics variables in Nigeria. The rest of the paper is organized as follows: literature review which is the second part of the paper, methodology which discussed the model employed in the study and is the third part of the paper, part four of the paper is presentation and analysis of the empirical findings and the part five discussed the conclusion and recommendations of the study.

2 Literature review
2.1 Conceptual Review
Macro-economic Variables
According to Adekunle, Alalade, and Okulenu (2016), macroeconomic variables are key indications or markers of the present economic developments. Keynes recognized the following as important macroeconomic variables: money supply, interest rate, GDP, exchange rate (EXR), and inflation. These variables all have an impact on the overall state of the economy. The most comprehensive quantitative measure of a country's overall activity is its gross domestic product, or GDP. Keynes contended that only a recurrent, large rise in government expenditure would be necessary to support investment at full employment levels since the market cannot produce enough savings, or capital, on its own. Like all professionals, the government needs to research, evaluate, and comprehend the key factors influencing the macroeconomy's current behavior in order to manage it effectively. The government must therefore comprehend the factors driving economic growth, the causes of recession and inflation, the timing of these trends, and the combination of policies that will best address these issues. It represents the monetary worth of all products and services produced, over a given length of time, particularly a year, inside a country's borders (Aroriode & Ogunbadejo, 2014).

2.2 Theoretical Framework

In purely theoretical studies, early analyses focused instead on demand-side effects of sharp increase in oil price. In these models, a rise in oil prices will rise the general price level, which according to Keynesian assumption of rigid wages that reduces the level of employment in an economy (Pierce, 1974). Rasche, (1977) used production function to analyses on the effects of oil shocks on output to inputs of capital, labour and energy. The shocks of oil price is exogenously determined that lead to either decrease in the supply of energy reduces the level of output directly by lowering production which have a multiplier effect on wage reduction movement toward labour supply schedule (Rasche, 1977). Similarly, Mork, (1989) demonstrated the efficacy on the interactive effects between wage rigidities and supply-side effects. These model further reiterate the linear relationship that exist between the log of oil price and that of GDP, which in turn of a decrease in oil price will induce an economic boom. The model noted that there is nothing special about the oil. Hence, the primary economic inefficiency is as a result of acquaintance of Keynesian mismatch between the aggregate wage and the aggregate price level, and the fluctuations in oil price is one among many development that is attributed to mismatch in the economy (Mork,1989).

2.3 Empirical literature

Anochie, Okereafor, and Bashir (2023) examined the effect of macroeconomic variables (exchange rate, interest rate and inflation rate) on productivity of Nigeria's manufacturing sector using secondary data collected from annual time series from 1980-2020. The ordinary least squares, cointegration and regression statistics were used to analyse the data. The study found that exchange rate and interest rate has significant effect on the productivity of Nigeria's manufacturing sector; and that inflation rate has no significant effect on the productivity of Nigeria's manufacturing sector.

Onyeka and Nduka (2022) examined the effect of exchange rate, interest rate, inflation rate, trade openness, foreign direct investment and money supply on the Nigeria in economy. Findings revealed that inflation rate, trade openness, foreign direct investment and money supply have positive and significant effect on real gross domestic product in the short run while exchange rate and interest rate had insignificant effect on real gross domestic product in the short run. The study therefore concludes that selected macroeconomic variables have been an effective short run policy instrument that largely affects Nigeria in economy.

Damieibi, Ihenetu, and Amadi (2021) evaluated the effect of macro-economic variables on economic growth in Nigeria. The findings showed that inflation rate, unemployment rate, exchange rate and interest rate had no significant effect on economic growth but the combination of these variables had negative effect on economic growth at 5 percent level of significance during the period of the study. Bound test was also conducted to check the co-integration so that the error of the short run could be corrected at the long run but the result still showed no relationship.

Olokoyo, Oyakhilome Abiola and Chika (2021) examined the macroeconomic determinants of bank performance in Nigeria. The results reveal that economic growth, trade and interest rate stand out as the important macroeconomic predictors of bank performance in Nigeria. We find that growth and trade promote bank performance as against high interest rate which impedes bank performance.

Yusuf, (2015) recently applied VAR and SVAR to examine the analysis of the impact of oil price shocks on the growth of the Nigeria economy. The variable used are GDP, exchange rate, agriculture output, oil price and unrest. The findings shows that the response of oil price shocks and unrest to real gross domestic product on economic growth reflect positive and negative impact in the long run (Yusuf, 2015).

Cavalcanti, (2013) conducted a research study and used SVAR to examine the impact of the oil price shocks on the Brazilian and the US economies for the last three decades. The study employed some variable like gross domestic product, inflation and output growth. The results of the study shows that the Brazilian and the US oil price shocks has significantly declined there growth on the GDP while the inflation volatility is high in the US and in Brazil. Hence, the oil price shocks indicates an improved impact on the output growth but it also account for a small volatility of inflation behaviour (Cavalcanti, 2013). Mehmet, (2014) considered the use of Markov regime switching model to examine the US crude oil and stock market prices. The result shows that there is high volatility regime prior to depression that was caused by OPEC and also low volatility regime caused by the major players in the international oil market (Mehmet, 2014).

Oriakhi, (2013) used VAR to analyse the Oil Price Volatility and its Consequences on the Growth of the Nigeria Economy. The variable used are oil price, economic growth, unrest, real GDP and government spending. The findings shows a negative effects of oil price fluctuation on economic activity and government spending (Oriakhi, 2013). Ibrahim, (2014) assessed the Oil price shocks and Nigeria Economic Growth. The data used were aggregate consumption, investment, government spending, non-oil export and import. The study employed the use of VAR and findings shows that oil price do not have a positive impact on the economy. (Ibrahim, 2014).

Gomez, (2011) used VAR to considered the impact of oil price shocks on Spanish economy. The study focused was on the oil price, consumer price index (inflation), and GDP relationship. The result indicates that the movement of oil prices could explain some recent inflation in the economy and also significantly influence the GDP of Spain (Gomez, 2011).

Similarly, Park et al, (2011) employed Structural Vector Autoregressive model to investigate impact of oil price on the Korea regional economies. The analysis was on industrial output, GDP, oil price and CPI. The findings in the short and long term lag structure indicates a negative response to industrial production and the Capital region seem to be less affected by the shocks of oil price (Park et al, 2011).

Olumola, (2006) examined Oil Price Shocks and Macroeconomic activities in Nigeria with the use of VAR method. The study made use of oil price, real exchange rate, inflation and output as a variables. The result indicates that the fluctuation in oil price do substantially affect the real exchange rate in Nigeria (Olumola, 2006). Akpan, (2009) also study on the Oil Price and Nigeria's Macro Economy. The research study made used of the variable such as real industrial production, real exchange rate, real public expenditure, real oil price and inflation with the use of VAR mothed. The finding shows that oil price shocks; for instance, positive and negative will significantly increase inflation and as well increased real national income (Akpan, 2009).

Aliyu, (2009) assessed the impact of Oil Price and Exchange rate Volatility on Economic Growth in Nigeria and employed the used of VECM. The study made use of variables such as

nominal GDP, CPI, Exchange rate, and Oil price. The findings revealed that oil price and appreciation in the level of exchange rate positively impacted on the real macroeconomic variables in Nigeria (Aliyu, 2009). Ojapinwa, (2011) examined the industrial impact oil price in Nigeria, with the use of VAR. The variables employed were oil price, capacity utilization, money supply, inflation, unemployment and exchange rate. The result found was that the oil price have a significant influence on industrial output. (Ojapinwa, 2011).

In a related study, Adeniyi, (2011) employed VAR to investigated the Oil Price Shocks and Economic Growth in Nigeria: Are Thresholds Important? The study used variables like gross domestic product, government revenue, government consumption, monetary indictors and inflation. The findings revealed that the oil price do not account for a significant proportion of macroeconomic movement aggregates (Adeniyi, 2011). Iwayemi, (2011) study of the role of the impact of Oil Price Shocks on the Selected Macroeconomic variables in Nigeria with the use of VAR. The selected variables used are output, government expenditure, inflation, oil price and exchange. The findings indicates that oil price shocks do not have major impact on most macroeconomic variables in Nigeria (Iwayemi, 2011).

Hamilton, (2005) the Keynesian Income-expenditure model, which aimed to determine the equilibrium of real GDP, investment, employment and consumer prices. This concept tried to focuses on the relationship that exist between the national income and its expenditure. The theory argued that national economy equilibrium level of output or it real GDP may not necessarily correspond to it natural level of real GDP. In this income-expenditure model, that the main equilibrium level of real GDP which is expected to be inconformity with the current aggregate expenditure level in the economy and in turned boost household income multiplier. It is assumed that if the current level of aggregate expenditure is not enough to purchase the required real level of GDP that needed to be supplied, the desired output will be cut back till the real GDP level is equal to aggregate expenditure in order to attained economic growth (Hamilton, 2005). Rodriguez, (2004) there exist different influential body of literature, both the theoretical and empirical study on the macroeconomic effects of oil price shocks on OECD nations particularly Norway, UK, Germany France, Italy and US with the use of multivariate VAR and linear specification. The study focused on real GDP, oil price, short and long interest rate, wage, consumer price. The result was positive while in US when using non-linear specification model of multivariate VAR with more experience on the negative effect on her growth (Rodriguez, 2004).

2.4 Gap identified
More so, some studies have criticise all these analyses, due to fact that the researchers treat this oil price shocks as exogenous. Some research studies argue that oil prices respond to some factors that also affect stocks prices in the economy. Thus, it is incumbent on the researchers to decompose the whole oil price shocks into the structural factors that will reflect the main exogenous attributes of such a shocks in the economy. Finally, across literature there seem no general consensus on the impact of oil price shocks on macroeconomic performance. Furthermore, previous studies have concentrated either on the advance economies, emerging economies, developing economy and other small open oil exporting countries.

3 Methodology
3.1 model specification
$$GDP = F(GOP, OILR, CPI, INVEST) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3.1)$$

Where GDP is the real gross domestic product proxy to economic growth which is the dependent variable in the model, GOP is the global oil price. The Nigeria- Bonny light spot oil price was used for this analysis as it accounts for the large percentage of the country's export over the years. $OILR$ is the oil revenue This is used as an avenue to determine the trend of the oil revenue as a result of the fall in oil price in recent time and how it affects the economy of Nigeria, since the economy depend much on the oil. CPI is the consumer price index. The consumer price index measured as the deflator for the inflation on goods and services. $INVEST$ is the gross capital investment. It has been used to investigate how the oil price shocks will impact on the investment behaviour during this critical moment.

3.2 Mark Regime Switching Model (MRS)

The MRS model was employed into these analyses to ascertain how the behaviour of the oil price shocks have great influence on the regimes state. The model is also aimed to ensued our alternative hypothesis are in conformity with the state of the regimes. It is important to note that with MRS, it will be classical to know and identify the expected duration of the two regime of which this shocks will exist could be view as the types of specification that is more flexible in handling process that is induced by the state. Hence, the common features with th e sufficient long time series data which often shows a dramatic shift in oil price on the macroeconomic variables (Hamilton, 2005). The event of a significant changes in government policies (Sims, 2004) or technological shocks. The structural breaks which cannot be predicted due to fluctuations in the economy activity over time as a result of business cycle. The shift or breaks that exist in the series are generated by some imperfect forecast (Hamilton, 2005). The Markov-regime-switch modelled a probabilistic in which such an institutional change that underlying variables is approximated with a random variable alternatives of a deterministic dummy. This research study intends to investigate the interaction that exist between the shocks of oil price and the macroeconomic variables for the Nigeria Economy for a period over five decades. Hence, it will be pertaining to know that it is unrealistic to assume the underlying variables that have not witnessed any sudden change or regime shift within the period under review (Hamilton, 2005).

A Markov regime-switching VAR model can be defined as:

$$Y_t = U_{S(t)} + \beta_{S(t)} Y_{t-1} + E_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots ()$$

Where $S(t) = 1, 2, \dots\dots K$ denote the state or the regime at a time t. $U_{S(t)}$ is considered to be a common intercept that changes the depending on the state or regime process, as Y_t denote GDP of dependent variable in the model which is explain as Y_t is (n x 1) vector of endogenous stationary variables. $U_{S(t)}$ is (n x 1) vector of explanatory variables such as investment, oil revenue and consumer price. E_t is (n x 1) vector of the unobserved stochastic where $E_t \sim N$ (0, $\sum_{S(t)}$), t= 1, 2----n. $\beta_{S(t)}$ is (n x n) matrix of autoregressive parameters that is a dependent on the state of process, $S(t)$ is considered to be a random variables.

$$\sum S(t) = \begin{pmatrix} \sigma^2 1, s(t) & \sigma 12, s(t) \\ \sigma^2 21, s(t) & \sigma 2, s(t) \end{pmatrix}$$

It seem the change from one state to another is a stochastic bit phenomenon that also reflect the shocks of oil price in their regimes. This could be governed by the transition of the probability matrix P or the order (k x k) and is defined as follows:

$$P = \begin{pmatrix} p11 & --- & pk1 \\ P1k & --- & pkk \end{pmatrix}$$

Where pij is the matrix of P which represent the ith of the column and the jth is the row of transition probability from the state j at a t-1 to a given state at time t. Hence, p12 signify state 1 which will be followed by state 2 in the system. The transitional probability helped us to realised vector states and make generalisation of our result the affects the economy under study. The specification that has been simply in such a way that $s(t)$ is the realization of a two-state in Markov chain with Pr (s (t) = i/s (t-1) = j, s (t-2) = k… $Y_{t-1}, Y_{t-2},$ &)

= Pr (s (t) = i/s(s (t-1) = j) = pij

Therefore, s (t) could be observed directly and this can infer on its operation through the examination of certain behaviour of Y_t, in which the parameter is in did important to absolutely describe the given probability law that governed Y_t are considered to be variance of the Gaussian advancement $\sigma s(t)^2$, the autoregressive coefficients that $\beta_{S(t)}$, is the intercepts which is $U_{S(t)}$, and (k x k) is considered as a transition probability matrix of P for this analyses.

4. Empirical Results and Discussion
4.1 Descriptive statistics
The preliminary quest of this data analysis was conducted with aim to determine the normality of the data, on the measure of the central tendency. Hence, the mean, median, is the assumed measure of the central tendency which indicate the sample average value and the standard deviation is the positive squared root of a given variance. The Jarque bera, skewness and kurtosis show the normality of the distribution. When the distribution is normal the skewness and kurtosis is approximately zero. Similarly , if the probability is less than 0.05 we will then reject the null hypothesis (H_0) and conclude there is no normality in the distribution as shown in table 2 and this has conformed to the hypothesis stated. Therefore, we accept the alternative hypothesis (H_1) .

Table 4.1 Descriptive statistics

	GDP	CPI	GOP	OILR	INVEST
Mean	5.936	0.842	2.779	7.434	10.465
Median	5.807	0.193	2.881	7.86	9.461
Minimum	4.531	-2.711	1.047	5.123	5.553
Maximum	8.072	5.006	4.681	8.735	16.425
Std. Dev	0.937	2.773	1.102	1.053	3.345
Variance	0.878	7.692	1.215	1.109	11.187
Skewness	0.519	0.149	-0.213	-1.055	0.289
Kurtosis	2.743	1.448	2.116	2.705	1.935
Probability	0	0.001	0.006	0.001	0.002

Obs	56	56	56	56	56

Source: Own calculation

Consequently, the histogram normality test below also affirmed the non- normality in the variables due to lack of perfectly symmetric distribution from it skewness and the distribution tail extending to the right. Also the kurtosis from the graph, does not shows that the distribution is bell-shaped and not too peaked or flat. Thus, only show a negative flat distribution. Hence, both the skewness and kurtosis are supposed to be (0) under normal distribution, so when the distribution is further away from 0, the more we experience non-normality from the distribution as we can deduce from the figure 3 below. The above affirmation further show clear that the oil price shocks is greatly influencing macroeconomic aggregates in Nigeria.

Figure 1: Normality Result
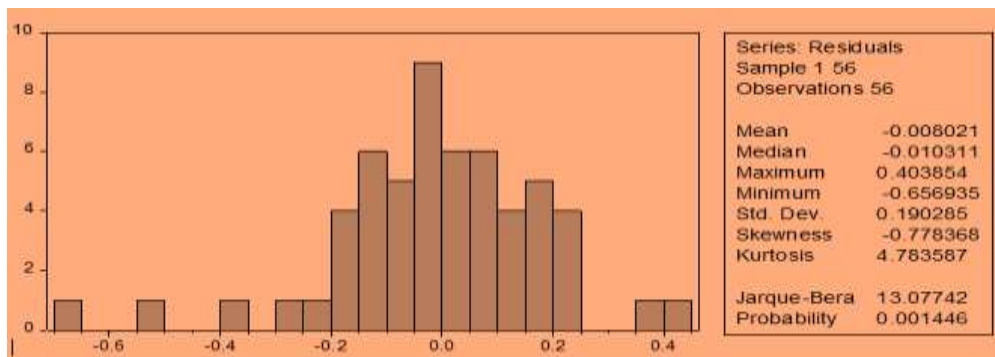
Source: Own calculation

4.2 Stationary Test Result

The below table 2 shows the summary of results for the unit root test that was conducted without trend of ADF and PP test which shows that all variables have a unit root. Therefore, we rejected null hypothesis at the level but at the first difference transformation indicate by the improved Phillip-Perron test shows that all the series are stationary except investment and consumer price index. Hence, the stationarity of the gross domestic product, global oil price and oil revenue are in line with the null hypothesis stated. The study also used the test with trend, but the result do not indicates any significant change as seen on the table. Therefore, we have to reject the null hypothesis and accept the alternative hypothesis, in line with the objective of this study.

Table 4.2 Unit root tests without and with trend

Variable	ADF				Phillips- Perron (PP)			
	without Trend		With Trend		Without Trend		With Trend	
	Level	First Diff	Level	First diff	Level	First Diff	Level	First Diff
GDP	-1.799	-3.197	-1.859	-3.587	-1.758	-5.047	-2.212	-6.123
GOP	-1.582	-4.715	-1.732	-4.989	-1.566	-7.64	-1.975	-8.143
CPI	-0.516	-2.735	-0.895	-2.875	0.379	0.434	-1.256	-1.969
OILR	-2	-6.158	-2.568	-6.739	-2.296	-8.07	-2.765	-2.982
INVEST	-1554	-1.668	-1.932	-2.325	-1.021	-2.144	-2.497	-2.324
	Critical Values							
Rej H0 at 1%	-3.747		-3.576		-3.573			
5%	-3.145		-2.928		-2.926			
10%	-2.855		-2.599		-2.598			

Source: Own calculation

4.3 Estimation of Markov Regime Switching Regression (MRS)

The estimated results for the two state MRS model with variables under study using MS Regress package that was developed by (Perlin, 2010). Hence, the order of lag (1) has been selected based on AIC criteria from the VAR. The essence of employing this model, is to enable the researcher to determined and infer based on our dependent variable GDP in relation to the shocks of oil price and the other variables like investment, consumer price and oil revenue as the interplayed in the economy given the state of the regimes. Hence, the economy under study is purely a mono-economy that depend on oil sector. Thus, each regimes will helped us to indicate the expected probability duration the shocks will perverse due to it volatility and make inference for the future. The below table 9 shows high and low volatility of oil price shocks regime as identified by their P-values of (0.0001) that is less than 5% which is very significant for this study at this moment. Similarly, in regime 1 and 2 indicates that the oil price shocks have significant influence on real gross domestic product, consumer price, oil revenue and investment. Oil price shocks is assumed to be exogenously determined and has effected these macro-economic variables in Nigeria as seen by both regimes. This accentuate the fact that the economy over time heavily relied on their crude oil production, that is exogenously price determine by the world market.

The transition probability matrix shows that regime 1 highly persistence fluctuation with probability of (0.83, 0.081) in state 1 which means that its expected duration is 5.8 years while in regime 2 with probability of (0.17, 0.92) in state 2 which also implies that its expected duration is 12.3 years. It was observed that the probability of regime 2 is more prevalent than regime 1 in the entire sample period of this study. This means, state 2 has been experiencing high and low volatility for 12 years commencing from 2008. The coefficients of these variables are statistically significant with 0.46%.

Table 4.3 Estimate on Markov Regime Switching Model

GDP depends on:	Coeff & P-value		Coeff & P-value
Regime 1		Regime2	
GOP	0.369	GOP	0.469
	0.001		0.001
CPI	0.536	CPI	0.536
	0.001		0.001
OILR	0.095	OILR	0.095
	0.007		0.007
INVEST	0.562	INVEST	0.562
	0.001		0.001

Transition State probability Matrix

$$P= \begin{bmatrix} 0.826 & 0.174 \\ 0.081 & 0.919 \end{bmatrix}$$

Regime Properties

	Probability	Observations	Duration (years)
Regime 1	0.092	56	5.832
Regime 2	0.002	56	12.313

Source: Own calculation

The probability of each regimes will also helped us to affirm the earlier analysis. Figure 6 below indicate high smoothed probability estimate with persistence high and low volatility on oil price shocks from 1973, 2008 and 2015 on the vertical axis respectively. The figure further indicate that within the period 1960 to 1970, the oil price was relatively high which enable the economy stimulate to boost capacity building. The state of the regime started witnessing low oil price volatility from 1973 to 1987 before it recovered as the trend persist in state 1.

Figure 4.1 For Smoothed Probability Estimate of High and Low State 1

P(S(t)= 1)
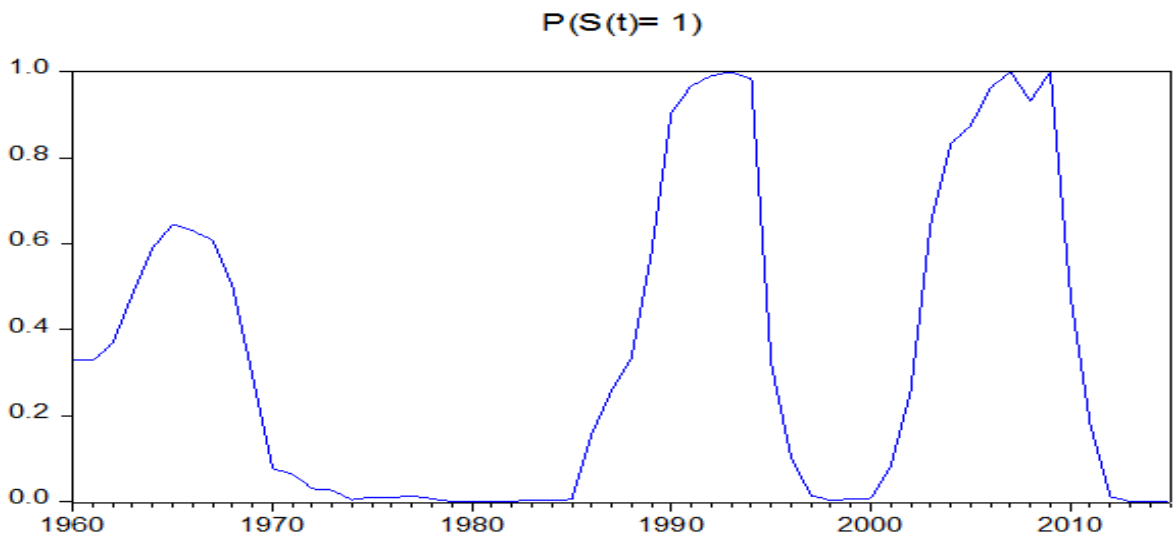
Source: Own calculation

In contrast, figure 7 below shows initial low estimated smoothed probability estimate with persistence low and high fluctuation on oil price shocks from 1973, 2008 and 2015 on it axis. The estimate further shows that within the period 1960 to 1970, the oil price was relatively low and later became high as the volatility persist. The economy have to just with the trend movement over a long period in the state 2.

*Figure 2: For Smoothed Probability estimate of low and High State 2*

P(S(t)= 2)
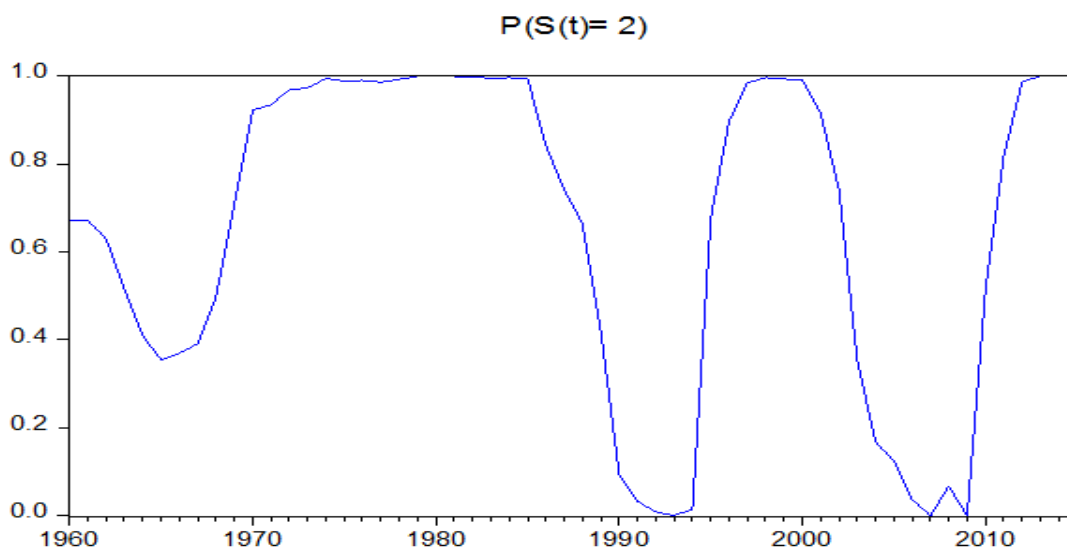
Source: Own calculation

The below figure 8 shows the expected durations from each regime state. The Markov Switching model has demonstrated a clear land mark of the two states based on the estimates.

The probability durations enable us to identify from shocks on how each regimes behave in the states. Thus, from 1960 to 1970 down the regime 1 shows that the volatility took 5 years above another regime came in with low and later raised as the trend moved in the state.

Figure 4.2 For Expected Duration of Oil Price to GDP in Regime 1
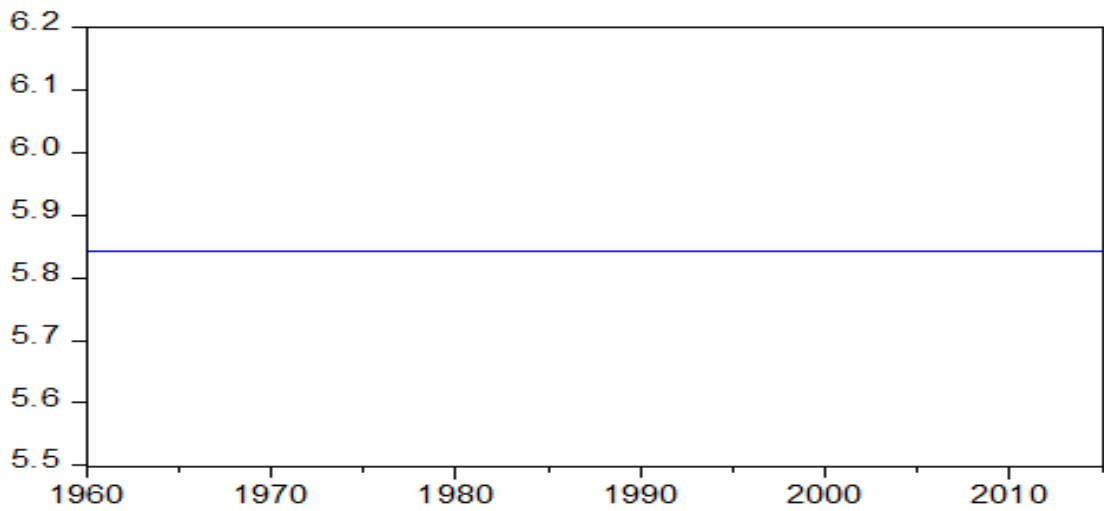
Source: Own calculation

Similarly, figure 9 of regime 2 was observed to experience in more fluctuated probability with long duration expectation of 12 years and above from the shocks and this will helped policy makers to strategically plan due to unforeseen further shocks that may arise.

**Figure 4.4 For Expected Duration of Oil Price to GDP in Regime 2**
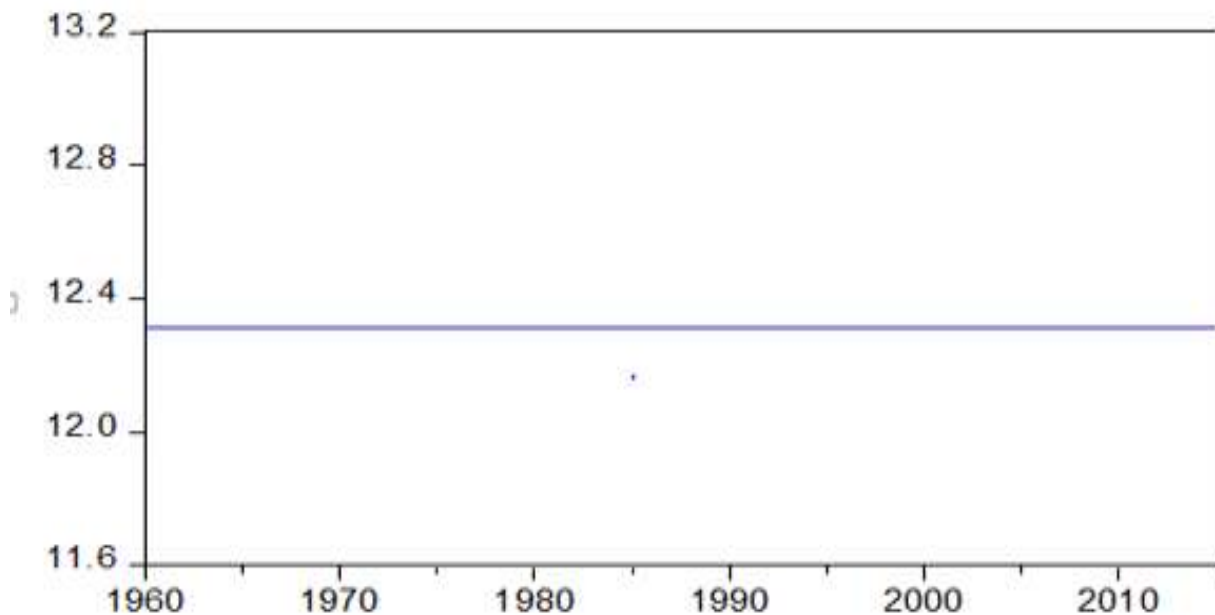
Source: Own calculation

4.4 GDP and GOP forecast

The below figure 10 shows gross domestic product and global oil price forecast was designed in line with the null hypothesis statement of the objectives. It was observed that the forecasted for GDP indicate some relative stability with an improvement in her performance 1960 to 1970 before the shocks of 1973 and continue stable before the 2008 oil price shocks. Hence, projection was made from 2011 to 2015 for it stability but fortunately the realisation from the shocks of oil price positively impacted on GDP which drastically dropped down in 2015 as shown by the blue line movement.

Figure 4.5 Forecast of GDP from 2011 t0 2015
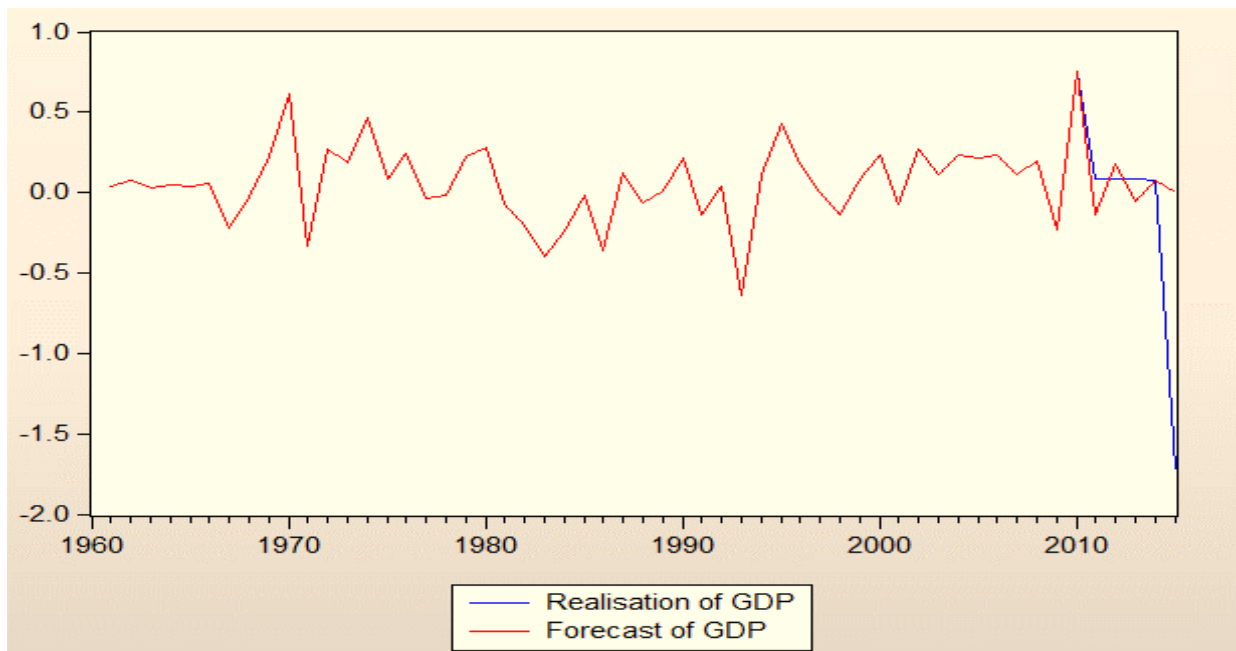
Source: Own calculation

Similarly, figure 4.5 of the global oil price also indicate stability from 1960 to 1970 before it shocks of 1973 and continue fluctuating been volatile throughout. Hence. The 2008 further see a high volatility in the oil price, which positively influence the GDP behaviour. However, it was forecasted from 2011 to remain relatively stable to 2015 but witnessed a dramatic fall in the shocks of the oil price that is seen by the blue trend and this reflected in our GDP to followed suit due to dependent on oil. Hence, other variable like investment, consumer price and oil revenue also been relatively influence by the oil price movement.

Figure 4.6 Forecast of GOP from 2011 to 2015
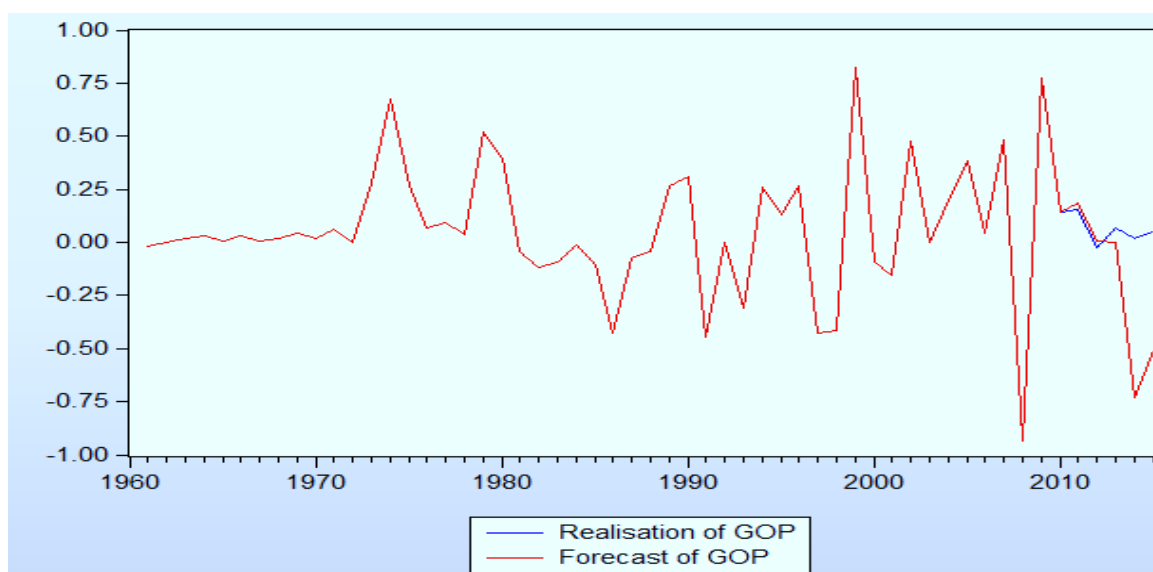
Source: Own calculation

The summary of finding is that, the stationary test result shows that all the variables are stationary at first difference except investment and selection criteria was made using AIC with lag (1) as the maximum. Oil price shocks was incorporated into unrestricted VAR as a dummy variable with a value (1) within the shocks period while the remaining period without shocks have the value (0) and this help to estimates the VAR. The results indicate that real GDP is significant at 1% due to the P-value of (0.001), which invariably imply that oil price has impacted on the gross domestic product of Nigeria.

Therefore, the above have clarified null hypothesis stated in lined with objective of the study. Similarly, the result for gross investment appears to be significant of which oil price has impacted positively due to its influence on real GDP based on coefficient of (0.45). This subsequently created a spill over effect on the gross investment aggregation of Nigerian economy.

The IRF shows that real GDP took the highest percentage change in its own variable in the first period but in the second period oil price absorbed the 13%. This implies that Real Gross Domestic Product was influenced by oil price shocks. Also, investment got impacted from the fourth with 12% and oil revenue of 10%. This indicates that any shocks of oil price on Nigeria economy, positively influence on its macroeconomic variables particularly gross domestic product, investment and oil revenue. More so, the oil price shocks granger cause the real gross domestic product while other variables like investment and consumer price does not individually granger cause real GDP but collectively granger course gross domestic product. Also oil price shocks granger cause oil revenue by 36%. This implies that, despite with low in oil price, Nigeria economy still generate revenue as a result of persistent crude oil production. Similarly, it was observe that in regime 1 and 2 indicates that the oil price shocks has significant influence on real gross domestic product, consumer price, oil revenue and investment due to their p-values. The transition probability matrix shows that regime 1, is highly persistence fluctuation in state 1 with expected duration of 5.7 years while in regime 2 with more prevalent volatility in state 2 with expected duration is 12 years. This means, state 2 has been experiencing more volatility starting from early 2008.The model has demonstrated a clearly

land mark of two states. Thus, this above estimated affirmations will lead us to make conclusion of our analysis below in chapter six.

5. Conclusions and Recommendations

The study examines the impact of global oil price on macroeconomics variables in Nigeria. The Markov regime switching estimates also indicates that both regimes of oil price shocks have significant influence on real GDP, consumer price, oil revenue and investment due to their P-values. Despite oil price shocks is assumed to be exogenously determined and have effected macroeconomic variables in Nigeria. It was observed that the probability of regime 2 is more volatile than regime 1 throughout the period under review. However, based on the previous studies in Nigeria such as Benedict and Christopher, (2006), Akintoye, (2006) and Olusegun, (2008) did not find any significant influence of oil price shocks on this variables: government expenditure, money supply, consumer price and output. The study recommend that policy makers should look inward to diversify the economy from mono-economy of oil sector and exploit alternative revenue areas such as aggressive tax regime by taxing the rich more, solid mineral exploration, reserve management, investment in agricultural mechanisation and adopt flexible policies to attract foreign investment.

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