IMPACT OF OIL PRICE SHOCKS ON KEY ECONOMIC VARIABLES: P-SVAR ANALYSIS

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Abstract
The study investigates the impact of oil price shocks on real GDP, real exchange rate, inflation and unemployment in Nigeria, Venezuela, Algeria, Angola and the United Arab Emirates. The study analyses the panel data for the period of 1985-2017 using P-SVAR model. The findings of the study indicate that shocks in oil price are significantly associated with changes in real GDP and inflation. The study also reveals the shocks in the price of oil do not lead to significant changes in the real exchange rate and unemployment. The result of the impulse response of the P-SVAR indicates changes in the oil prices have a significant impact on the changes in real GDP and inflation across the panel. However, the responses of oil price innovation to unemployment and the real exchange rate are found to be insignificant. Therefore, the study recommends that OPEC should put more control measures to sustain stability in the international oil market. In addition, there is a need for oil exporting countries to provide a policy framework that will translate fortunes from oil price shocks towards improving other real sectors of the economies, the shocks is favourable. There is also a need for the oil exporting countries to put in place serious fiscal and monetary policies that will checkmate the inflationary impact when the price is unfavorable at the international oil market.

Keywords*: Oil price, Real GDP, Real Exchange rate, Inflation, Unemployment, P-SVAR*

1.0 Introduction

Crude oil is one of the important resources necessary for the production of goods and services and the provision of basic necessities of life. It is known to have played a tremendous role towards changes affecting exchange rate, unemployment and economic growth (real GDP) among diverse nations. This is because the product serves as a major source of income for the oil exporting countries and a vital source of energy for both less developed, emerging and advanced economies. This opinion has been supported by the works of (Alhasan and Kilishi, 2016, Chikwe, Uja, & Uzhoma, 2016, Offiong, Atsu, Ajaude & Ibor, 2016 and Energy Policy and Management, 2016).

Moreover, although OPEC plays some regulatory roles to stabilize the international oil market, geopolitical and natural interference also determine the demand and supply of the resources. Thus, when the demand outweighs the supply of the crude oil, its prices will likely increase and vice versa. Thus, international oil market has been associated with trend of oil price fluctuation on different historical accounts. For instance, right from the early 1980's, oil price has increased from a minimum of $9.82 per barrel to a maximum of $138.74 in 2013 and less than $29.78 in 2014 (Energy Policy and Management Centre, 2016). Therefore, shocks in the crude oil price seem to be associated with macroeconomic instability of both oil exporting and oil importing countries. For example, oil receipts accounted for 82.1%, of GDP, 83% and about 90% of the Nigeria's foreign exchange earnings in 1974, 2008 and 2010 respectively (Central Bank of Nigeria,

2011, Alhasan and Kilishi, 2016).

However, despite of all efforts made by researchers such as Alhasan and Kilishi, 2016, Chikwe, Uja, & Uzhoma, 2016, Offiong, Atsu and Energy Policy and Management, 2016 to buttress the effects of shocks in oil prices on only some economic variables; the phenomenon has not yet been thoroughly investigated. Thus, the need to further investigate the impact of oil price shocks on Microeconomic variables such as real GDP, real exchange rate, inflation and unemployment using a cross-sectional data and P-SVAR analysis via recursive identification scheme and the impulse response cannot be overemphasized.

This paper is structured into five sections. Following the introductory section, is section two which is the literature review, methodology is section three, section four is the findings and discussions, and section five concludes the paper

2.0 Literature Review

2.1 Empirical Literature

Various researchers studied the impact of oil price shocks on macroeconomic variables using various statistical techniques, they come up with mixed findings. Among such researchers include; Sahbi (2012) and Robert (2015), Nagmi (2016) and Farhani, (2012). According to Sahbi (2012) and Robert (2015) find that when more recent data are used, going up to the early 1990s, then the oil price no longer appears to cause declines in output. Moreover, Miloud & Abdalla (2016) using a six variables VAR over 1960 – 1993, find that industrial output Granger-causes oil consumption, but that neither oil consumption nor oil prices Granger-causes industrial output, even allowing for asymmetric effects. In addition to having a later time period, their study differs from Hamilton's (2003) analysis by including the interest rate as a variable. They observed that VAR implies that 'oil prices exert significant effects on monetary base and then the monetary base caused significant shifts in industrial production. Thus, accommodative monetary policy appears to have weakened any economic consequences of oil price shocks.

Nagmi (2016) studies the effects of Fluctuations of Oil Price on Economic Growth of Libya using VAR Model and Co- integration technique from 2000-2015, the result however shows that the variables are co-integrated of order one I (1) having a long-run relationship between crude oil price and growth. It therefore concludes that higher oil price has a positive and statistical significance impact on the economies of Libya and also, Libyans economy need to be diversify than continue to be relying on crude oil alone due to its shocks. According to Farhani, (2012) a strong weakness occurred on the relationship between oil price increase and GDP in US due to existence of breakpoint and asymmetric effects of oil price variations. The study focuses on the causal relation via linear regression model, dynamic model and VAR model although, the major gap highlighted from the study use that, findings and conclusion seems to be contradictory and these necessitates the need for further studies. Further, in the work of Lindsay (2015) on the effects Gasoline price levels on GDP per capita, using multi regression method, the study found a positive relationship between gasoline price and GDP per capita. This a relationship varies across countries but the study did not show what happens between the current and future trends relative to variables.

Also, Rebecca and Marcelo, (2002) dwelled on oil price shocks and real GDP growth for some OECD countries, MVAR analysis was used considering both linear and non-linear approaches it concludes that real impact of oil prices on GDP growth is negative with an

exception of Japan economy as positive in the short-run. This study had little power because at the time it was done, no substantial oil price declines had yet taken place. IMF, (2000) using a calibrated model of the global economy (MULTIMOD), estimated that a $5 rise in the price of oil in 2001, over and above the price expected by futures markets in late 2000, would lead to a drop in global output of 0.3 percent in each of the first two years, with the US and the European Zonedown by 0.4 percent. More recently, IMF (2007) using their Global Economic Model (GEM), found that a supply-induced doubling of the oil price leads to a slow-down in world GDP of 1.4 percent at its trough, a little over one year after the shock, while world inflation rises by 1.5 percent at its peak, after two quarters. This wide range of papers appears to confirm Hamilton's core finding that oil price rises reduce GDP.

In another study conducted by Hamilton, (2011) analysed that the relationship between real oil price and real exchange rate in members of OPEC countries using monthly data from 2000 to 2007 including seven countries of OPEC members. The result from co-integration tests by pooling the series of seven countries found that oil price is one of the reasons for the exchange rate long-run movement. The result reveals positive relationship between oil price and real exchange rate as the OPEC membership countries is the net oil exporter countries. This finding was confirmed by Khuram Hua, Zahra, Javed & Amna (2015) on exchange rate volatility and oil price shocks using ECM and Co-integration techniques as the variables commoved together both in the short-run and long-run.

Marcel (2014) conducted a study on oil prices, exchange rate and asset prices, the findings reveals a bidirectional causality between the US dollar and oil prices in the early 2000's. In addition, the result found a negative correlation between oil prices and US dollar. The reason for this contrary finding may be attributed to the data utilization. Oyetunji, (2013) studied oil price and exchange rate volatility in Nigeria, result reveal that a proportional change in oil price leads to a more than proportional change in exchange rate volatility in Nigeria by 2.8%. This non equal proportionality between the variables may also be as the author used an annual data to determine the volatile and thus suggests that diversification is the solution to such economic irregularity.

Oluwatosin (2012), carried out an analysis on oil price-exchange rate Nexus in Nigeria with evidence from oil exporting countries, EGACH, Johansen co-integration and VECM technique, and annual data were utilized, the result revealed that there is significant relationship between oil price shocks and exchange rate; an increase in the price of oil culminates in an appreciation of the Nigerian currency against the US dollar. Also, Adebiyi, Charles & Aderemi , (2014) examined the relationship between oil price, exchange rate and stock market behaviour in Nigeria using Multivariate VAR from 1985-2008, the result shows a significant relationship among the variables while causation runs from oil price shocks to real exchange rate. In addition however, Pasrun (2015) examined the effect of oil price shocks on Vietnam's trade balance in the period of the first quarter of 1999 to the fourth quarter of 2011; the result reveals that, in the long run, a 1% increase in the crude oil prices and exchange rates has caused the country's trade balance to drop by 0.12% and 0.79%. In the short term, the variables of oil price and exchange rate were positively correlated with the trade balance.

Furthermore, Studies on the impact of oil price to the macro economy in net oil importer countries has been investigated by Jbir & Zouari-Ghorbel 2009; in Mohammed, (2012). They studied the relationship between oil prices and some macroeconomic variables by the analysis of the subsidy role in Tunisia. Using Vector Autoregressive (VAR) to analyze the data during period 1993 Q1 to 2007 Q3, they found that there is no direct impact

between the oil price and macroeconomic variables of Tunisia. While in another study on net oil importer countries conducted by Chang and Wong (2003). They investigate the long run relationship between oil price shocks to the macroeconomic variables of Singapore whileVector Error Correction Model (VECM) is applied. They used quarterly data between 1978 Q1 and 2000 Q3. The results from impulse response and variance decomposition reveal that oil price shock provide a negative effect to the Singapore macroeconomic Variables.

Siok & Tong (2016), analyses the effect of the recent oil price shocks on US and some global economies by employing descriptive statistics and they come out with two major findings; firstly, oil price shocks have a stagflationary effect on some macroeconomic variables in oil importing countries as it slow down their rate of growth (reducing the level of output and hence causes recession) while, on the other hand oil price hike acts like a tax on consumption and the benefit of the tax goes to oil producers rather than the country (US government) itself. Also, in 2005, Federal Reserve Bank of San Franco (FRBSF) examines the relationship between oil price shocks and inflation using descriptive statistics and therefore concluded that 50% increase in oil price lowers the output by 0.4% and raises CPI by 0.2%. This means that, the inflationary impulse to oil price shocks seem not to have been large. However, the author had failed to specify the country under which such a claim is applicable.

Also, Martin (2004) carried out a study on macroeconomic impacts of oil price shocks on inflation and real exchange rate; evidence from selected MENA countries through the use of structural VAR model, the result therefore reveals the followings; the variables are statistically significant and economically large in oil exporting countries while, IRF result posit that in the long run oil price fluctuations have a small impact on inflation as it absorbed by the rigidity of subsidized products prices while, the impact on real exchange rate is larger in some oil importing countries (Tunisia and Moroco). This statistical significance relationship was also confirmed only in the long run on domestic inflation by Siok and Tong, (2016) and therefore recommended that policy makers should seek for an alternative solution on the effect of oil price shocks via monetary tools or actions.

Likewise, Hinde, (1997) used a Structural VAR model to study the estimating of oil price shocks and imported inflation, the result reveals that oil price shocks are important sources behind the deviation for prolong period of inflation. Mala, (2015) studied the macroeconomic effect of oil price shocks on ASEANS-5 Economies but result concluded that the effects of oil price shocks is positive to inflation (or accentuated) while, disruptive to output or GDP and more supportive by monetary policy to growth was recommended.

In another study, Knut, (2013), analyses the oil price shocks and monetary policy in data rich environment using Factor augmented VAR (FAVAR) approach, it found that the demand shocks are more important than the supply shocks driving several macroeconomic variables as well as the origin of shocks while, a positive oil demand shocks lead to increases in real price of oil and other prices with negative effects on real economic activities (labour market and stock market). This means that oil demand shocks are important sources of macroeconomic fluctuations while oil supply shocks are far less importance, this finding is in conformity with Mala, (2015) and Paul, (2007). In addition, Benjamin (2014) examines the impact of oil price to Qatar macro economy in the period between 1970 and 2007. Using VECM, the finding shows that the oil price leads to higher inflation. Qatar gets the benefit of the financial surplus from the oil revenue. But, since Qatar experienced fixed exchange rate regime and tight monetary policy, it leads to higher inflation rate in Qatar.

In another work, Miloud & Abdalla, (2016) applied Nonlinear autoregressive distributed lag (NARDL) using secondary data from 1970 to 2014 to analyse the relationship between oil price and inflation in Algeria. The results reveals that in the case of linear specification there is no such a relationship between oil price and inflation but nonlinear relationship was confirm between the variables. This means that, wrong specification of the model may definitely leads to spurious result and wrong conclusion regarding whether the variables co-moved together in the long-run.

However, Fawad, (2013) studies the effect of oil prices on unemployment and interest rate using monthly data for the period 1991-2010. The study employs descriptive analysis in the form of interview and applied Toda Yamamoto causality test approach. The results of current study suggested the significant causal relationship between changes in oil prices and unemployment. That is, oil price granger causes unemployment in Pakistan. This implies that oil prices can be used in long run to improve the forecast of unemployment and real interest rate.

Similarly, Dogrul, and Ugur, (2010) examines the relationship between oil prices, interest rate and unemployment using a time series data between the period 2005 and 2009 applying Toda–Yamamoto procedure, just like Fawad, (2013). The study finds that fluctuations in the real price of oil and interest rate have significant impact on the forecasts of Turkey's unemployment rate in the long-run. Therefore, the causality runs from fluctuations in oil prices to unemployment. The study recommends that there is need for government to study changes in the oil price in order to keep unemployment under control in Turkey. Moreover, since Turkey, is one of the countries that relies on oil exports heavily and having homogenous characters like other oil exporting developing economies, the finding can be applicable to such countries as well.

2.2 Theoretical Framework

This study adopts the theory of supply side channel developed by Pasrun, (2015), the theory explains that rising oil prices can reduce output through supply side channel, because increase in oil prices means scarcity and increase in energy prices which are basic input in production. This will affect the growth of output and productivity. The reduction in productivity growth decreases real wage growth and increase the unemployment rate at which inflation accelerates if consumers expect the rise in oil prices to be temporary, or if they expect the near term effects on output to be greater than the long term effects, they will attempt to smooth out their consumption by saving less or borrowing more which boost the equilibrium real interest rate.

However, with slowing output growth and an increase in the real interest rate, the demand for real cash balance falls, and for a given rate of growth in the monetary aggregate, the rate of inflation increases (Christiana, 2016). Therefore, rising oil prices reduce GDP growth and, boost real interest rates and the rate of inflation. But if wages are sticky downward, the reduction in GDP growth will lead to increase unemployment and a further reduction in GDP growth

3.0 Methodology

Parametric statistical methods was employed to analyse a panel data from 1985-2017. This comprises testing the panel stochastic properties to ascertain applicability of the panel structural vector autoregressive (P-SVAR) model.

Therefore, P-SVAR model was employed to estimate the shocks transmission of one endogenous variable to other variables in the system. The golden assumption is that all

variables are endogenous and all are cross-sectional interdependent. One reason that makes panel SVAR outstanding in multivariate regression case is its ability to produce a robust result regarding the cross-sectional variations of the variables based on their lagged values. Therefore, to examine the impact of oil price shocks on other economic variables of all the countries (Real GDP, Real Exchange rate, Inflation and Unemployment) under study, the estimation of the impulse responses and variance decomposition using P-SVAR is necessary.

Following the works of Pablo, Adolfo, Fernando and Carlos (2008) and Hamilton (1994) P-SVAR model can be expressed as follows:-

$$(\beta o - \beta 1L - \beta 2L - \cdots - \beta pL^{P})yt = \beta(L)yt = K + \mu tE\,(\mu t\ \mu t') = 1 \ldots\ldots (1)$$

Where; yt is (n x 1) vector of the endogenous variables in the system, βL is a matrix polynomial of the lag operator with (n x n) matrices. *P* refers to the number of time lags in the model and βo represents interrelations among all endogenous variables. K is (n x 1) vector of randomised structural terms that express uncorrelated standardized (variance-covariance) shocks.

However, to take the issue of heterogeneity into account, Pedroni (2013) reports that Blanchard and Quah (1989) estimated a recursive bi-variate simulated S-VAR model as follows:-

$$\Delta zit = Ai\ (L)\epsilon it, where\ Ai\ (L) = \sum_{s=0}^{Qi} Ai, s\ L\ s \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where, $Ai, s = BQs + Cie^{\frac{-(s-\delta)2}{2!}}, \delta = 8, \gamma = 48 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\

$$y1t = A11(e)yt-1 + A12(e)yt-1 + \cdots A15(e)y5t-1 + F1(e)Wt + \mu 1t \quad \text{…….(6)}$$

$$y2t = A21(e)yt-1 + A22(e)yt-1 + \cdots A25(e)y3t-1 + F2(e) + \mu 2 \quad \text{…….(7)}$$

$$y5t = A51(e)yt-1 + A52(e)yt-1 + A53(e)y3t-1 + F5(e)Wt + \mu 5t \quad \text{…(8)}$$

and;

$$Wt = M(e)Wt-1 + wt \quad \text{……..…..(9)}$$

Where; $Aihj, h = 1,2,3\ are\ 5 \times 5$ matrices for each j and

$Ai4j, i = 1,2,3\ are\ 5 \times 2$ matrices for each j.

Thus, $E(\mu t\mu' t) \equiv \sum \mu = \begin{bmatrix} \propto 11 & \propto 12 & \propto 13 \cdots & \propto 15 \\ \vdots & & \ddots & \vdots \\ \propto 51 & & \cdots & \propto 55 \end{bmatrix}$

Above equation express a dynamic interdependencies of all variables in the system $Aik, j = 0, k \neq i$ for some$j$, and static interdependencies $\propto i, k \neq 0, k \neq i.$, while $Aik \neq Ai + 1k, K \neq i, i + 1\ are$ cross − sectional heterogeneity.

4.1 Results

4.1.1 Levin-lin & Chu and Im-Peasran-Shin Tests of Stationary

Table 1: Result of Panel Univariate Stochastic Properties

Variables	Levin-lin & Chu (1992)		Im-Peasran-Shin (1997)	
	t-statistic(s)	p-value	t-statistic(s)	p-value
Op	-0.52	0.30	-0.14	0.44
Rgdp	0.91	0.81	0.43	0.66
Infl	-1.64	0.05	-2.00	0.02
Exr	1.67	0.95	2.31	0.98
Unepl	-0.23	0.40	1.71	0.95

Sources: Author's computation using Stata 13.0 (2021).

Result from table 1 shows the Levin-lin & Chu (1992) and Im, Pesaran and Shin (1997) that, all the variables in their log form are not stationary going by their P-value. This shows that the null hypothesis of none stationarity be rejected at 5% level of significance except inflation. This mean that cross sectional units of the panel univariate stochastic properties does not change the stochastic process of cross sectional interdependence.

Table: 2 Model Evaluation Criteria

Equation	Parms	RMSE	R-sq	F-value	P-value
Op	13	12.89	0.82	78.23	0.00
Rgdp	13	0.84	0.39	5.19	0.00
Exr	13	6.01	0.98	420.30	0.00
Inf	13	0.69	0.09	1.81	0.07

Unepl	13	1.13	0.97	159.09	0.00

Sources: Author's computation using Stata Version 13, (2021).

Table 2 shows the validity of the oil price equation, the forecasting power through the use of root mean square error (RMSE), the coefficient of determination (R^2) and overall significance of the explanatory variables using F-statistic. For the forecasting power of the equation, the RMSE is 12.9, that is, the forecast error is 12.9% meaning that the model forecasting accuracy is 87%. The R-square shows that approximately 82% of the points lie on the regression line, which implies that the oil price equation is statistically significant. In order to see whether the explanatory variables used in the equation are statistically adequate, the F-statistic shows a value of 78.23 which is greater than the tabulated F-value at 5% significance level. Therefore, the model is statistically adequate and significant at 1% level of significance.

Table 3: Result of S-PVAR Oil Price Responses to other Endogenous Variables

Step/Lag	Coeff.	Std. err.	t- value	P-value
OP				
1_op	0.82	0 .08	9.82	0.00
1_gdp	4.62	9.93	0.47	0.06
1_exr	0.16	0.13	1.23	0.22
1_inf	1.32	1.53	0.86	0.39
1_unepl	0.68	0.80	0.85	0.02
2_op	0.15	0.03	0.18	0.85
2_gdp	-12.22	15.68	-0.78	0.04
2_exr	-0.83	0.14	-0.67	0.55
2_inf	3.95	1.54	2.56	0.01
2_unepl	-0.64	0.79	-0.81	0.42

Source: Author's computation using Stata, 13, (2021).

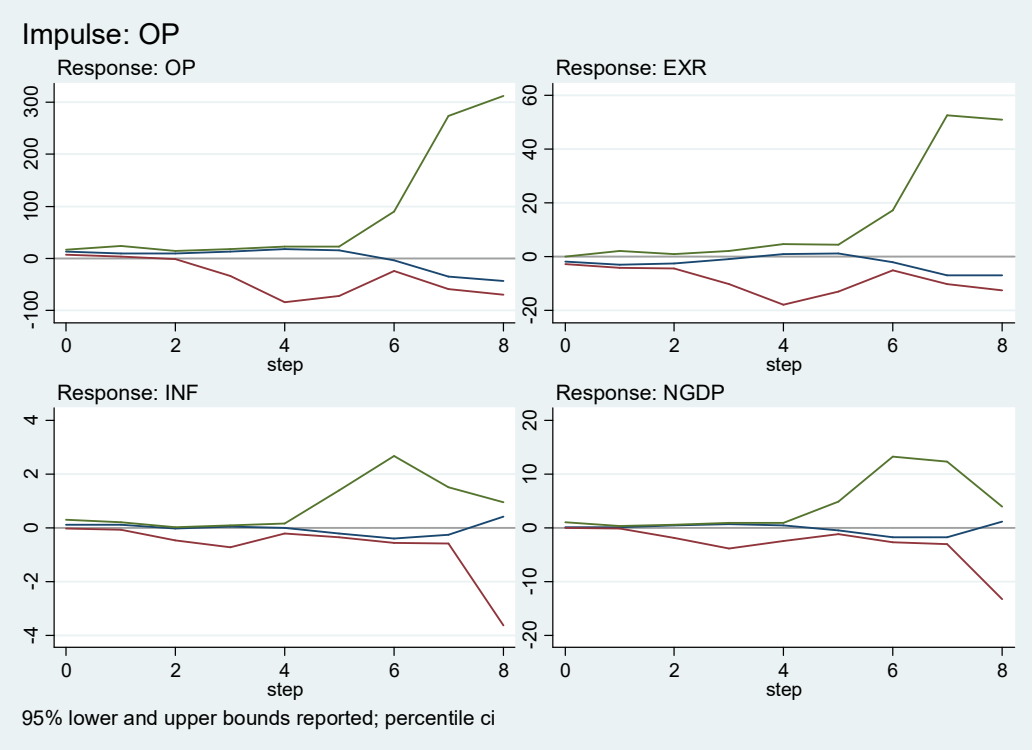
Table 3 presents the result of the structural parameters of oil price responses to other endogenous key economic variables in the model. The result at lag 1 shows that, the relationship between oil price (OP), real gross domestic product (RGDP), real exchange rate (EXR), inflation (INF) and unemployment rate (UNEPL) across the countries are positive in the first lag. The result indicates that given the coefficient value 4.62, a one dollar change in the price of oil, will lead to 4.62 percentage change in real gdp across the countries in the model and vice versa. The result also indicates that exchange rate has the magnitude of the coefficient of 0.16. This implies that, a one dollar change in oil price at international oil market will leads to approximately 0.16 or 16% percent increase or decrease in the real exchange rate across the countries while the coefficient of inflation shows that a dollar change in the price of oil will cause the inflation of the countries under study to skyrocket by 1.32 percent. This further explain how important oil prices affected the production, transportation and distribution costs which further translate to general increase in the prices of the commodities. The impact of the oil price change on unemployment is buttress to be at 0.68. This means that any dollar increase in the oil price at international oil market, unemployment rate in the oil exporting country will experience 68 percent changes in its unemployment rate.This can be possible if those countries utilize fortunes from the price increases to improve productive sectors of the economy like agriculture, manufacturing and mining.

In addition, results from the second lag period reveal that, the absolute value of the structural coefficient parameter 12.22 indicates that a one dollar increase in the oil price will lead to approximately 12 percent increase in real gdp and vice versa. While, the absolute value of the coefficient of exchange rate is 0.03 in the second lagged period, shows that a dollar increase oil price will lead to approximately 3% decrease in real exchange rate. Thus, the coefficient of unemployment in its absolute term of 0.64 also indicates that a one dollar increase in oil price will lead to a decrease in unemployment rate by about 6.4% and vice versa.

Moreover, the real gdp parameter of the model is statistically significant at 10% and 5% for the first and second lagged value. The inflation parameter is significant at second lagged value. All other parameters like real exchange rate and unemployment are not statistically significant at both first and second lagged value. However, since the model as estimated in table 2 is statistically adequate, the findings are adequately reliable and unbiased.

4.1.2 Impulse Response Function

Figure 1



Source: Author's Computation, 2021.

Figure 1 above shows the response of the OP to itself from 0 lagged period to lagged period 5 is positive as indicated by the blue line which move slightly upward form the equilibrum. Thus, within this peiod OP gained a substantial improvement as a result of its own performance. While, the behaviour of the OP standard innovation to real exchange rate (EXR) across the countries is negative but moves slightly upward towards the natural path. Therefore the standard innovation of the OP to EXR is associtaed with some stuructural fluctuations recording negative from lag 1 to lagged period 3 and attained to equilibrum at lag 3 to 5 but negative from lag 5 to the last lagged period 8.

The result from the structural impulse response of the countries under study also shows that shocks for OP to inflation INF is positive as the blue line is above the natural path at the 1st lag and 2nd lag period but fluctuates slightly around the equilibrum towards the 3rd period. From the 4th period the OP shocks to INF declines negatively up to 7th period and raise up positively at lagged period 8 in figure 1.

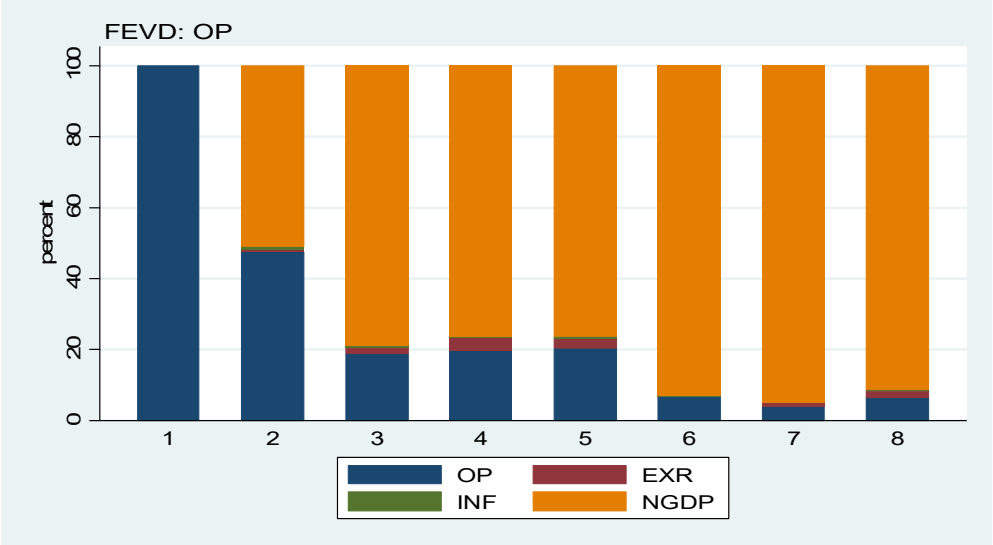
The response of the OP to real GDP (RGDP) across the countries is slightly above the natural path from the 1st lag to the 5th lag. Indicating that OP standard innnovation to the RGDP is positive but not very effective during this peiod. In the 5th 6th and 7th period, the blue line shifts downward showing a negative response of the RGDP of the OP innovation. However, after the 7th period the innovation line moves upward towards the equilibrum and raises above the equilibrum at the 8th period.

The response of the OP innovation to unemployment (UNEPL) indicates a slope from above the natural path in the 1st period and declines nagetively all through the 2nd period

but raises up again positively in the 3rd, 4th up to the 8th period. This shows a positive influence of the OP on UNEPL in the 1st period negative in the 2nd period and positive again in the 3rd to 8th period as indicated by the blue line.

4.1.3 Variance Decomposition

Figure 2



Source: Author's Computation 2021

Therefore, as depicted in figure 2 above, the variance decompotion of the OP, the error in the forcasting attributing to the OP itself 100% in the 1st period, drops to 50% in the 2nd period, and approximately 20% in the 3rd. 4th and 5th periods while, from the 5th up to the 8th period, the error forcast declines around 6% and 5% respectively. The OP shocks to EXR is zero in the 1st period and approximately 1% in the 2nd, and 6th period, and in the 3rd and 4th period about 3% while the 7th and 8th period has only the 2% respectively. The OP has a zero variance to RGDP in the 1st period and about 50% variance. However, by the 4th period up to the 8th period the variance error can only attribute 20% and 5% in the forcast of the RGDP.

The OP forcasting variance to INF is approximately zero in the 1st , the 6th , the 7th and 8th periods. The only lagged period OP exert any forcasting influence on the INF is at the 2nd, 3rd, 4th and 5th period with only 1% error variance. This means that the OP can be a better predictor of itself in the short-run. Moreover, considering the percentages of its error variance OP cannot explain much in forcasting the EXR, INF, and RGDP not only in the short-run but even in the long-run.

4.2 Discussion of the Findings

The finding from the univariate stochastic properties based on Levin –lin & Chu (1992) as compares with Im-Peasaran-Shin (1997) results reveals no statistical difference in terms of stationarity result produced. This is because evidence from P-values have indicated that only inflatiion across the countries was statistically significant but other variables are not statistically significant. In addition, results from multivariate stochastic process taking into account the cross sectional interdependence produced two different results as the finding from Kao's (1998) of homogeneity shows that only oil price has a long-run relationship with inflation variable.

The result from the models evaluation criteria which shows that the equations of oil price are valid and the explanatory variables as used in the equations are statistically adequate and significant at 5% level of significance. Moreover, since the impulse response as in figure 1 indicates the oil price (OP) standard innovation to real exchange rate (EXR) move towards the natural path in the 1st period towards the 2nd period. However, after 2nd and 3rd period, it moves towards the equilibrum and maitains up to the 4th the period. The shocks then raises above the equilibrum around 5th lagged period but becomes negative from 6th period up to the 8th period. Therefore the standard innovation of the OP to EXR is associtaed with some stuructural fluctuations recording negative from lag 1 to lagged period 3 and attained to equilibrum at lag 3 to 5 but negative from lag 5 to the last lagged period 8. This implies that changes in the oil price may not have any significant influnce in the changes in the exchange rate of oil exporting countries under study.

The result from the structural impulse response of the countries under study also show that shocks for OP to inflation (INF) is positive as the blue line is above the natural path at the 1st lag and 2nd lag period but fluctuates slightly around the equilibrum towards the 3rd period. From the 4th period the OP shocks to INF declines negatively up to 7th period and raise up positively at lagged period 8.

The response of the OP to real GDP (RGDP) across the countries is slightly above the natural path from the 1st lag to the 5th lag. Indicating that OP standard innnovation to the NGDP is positive but not very effective during this peiod. In the 5th 6th and 7th period, the blue line shifts downward showing a negative response of the NGDP of the OP innovation. However, after the 7th period the innovation line moves upward towards the equilibrum and raises above the equilibrum at the 8th period.

The response of the OP innovation to unemployment (UNEPL) indicates a slope from above the natural path in the 1st period and declines nagetively all through the 2nd period but raises up again positively in the 3rd, 4th up to th 8th period. This shows a positive influence of the OP on UNEPL, in the 1st period negative in the 2nd period and positive again in the 3rd to 8th period as indicated by the blue line.

The results from the impulse response indicates that the response of real gdp is significant with a slight departure from the natural path indicating that, real gdp standard innovation to oil price is positive but not very effective from 1st to the 5th lagged period. This means that a rise in the international oil price has a tendency of increasing the real gdp of the oil exporting countries. This finding in line with the findings of IMF, (2000) and Nagmi, (2016)

Therefore, oil price shocks has a significant impact on the changes of the real gdp, and inflation but does not have any significant influence on changes in the real exchange rate and unemployment. This implies that, oil price shocks can be regarded as a reliable predictor for changes in the real gdp and inflation of oil exporting countries. Thus, oil price shocks cannot be the best predictor for changes in the exchange rate and unemployment of oil exporting countries.

Therefore, the study recommends that OPEC should put more control measures to ensure relative stability of oil prices at international oil market. In addition, there is need for oil exporting countries to provide policy framework where oil price fortunes will be translated towards improving other sectors of the economies, like manufacturing, agriculture and mining when the shocks is favourable. This will help to shock absorb serious economic crises when the oil price is not favourable. There is also need for the oil exporting countries to intervene in local firms by providing some fiscal and monetary policies like subsidy, interest rate and reserve deposits so as to checkmate the inflationary impact on the economy when the oil price shocks is not favourable at international market.

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