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Oil Price and Macroeconomic Variables a Comparative Study of African Oil and Non-Oil Producing Countries

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Abstract

This study assesses the relationship between oil price and macro-economic variables in African countries (oil and non-oil producing) between (1990-2018). Data for the study were sourced from United States of America Federal Reserve Economic Data (FRED) data base, Energy Information Administration (EIA) database and Central Banks of various countries selected. The study employs Panel Vector Error Correction model as estimation technique (PECM). The panel unit Root Test results show that variables (both exogenous and endogenous) are stationary at their first difference with individual effects and individual linear trends. The results of panel co-integration tests for both oil and non-oil African countries show that oil price and macroeconomic variables do not have a stable long-run equilibrium relationship. Results from impulse response function show that innovative shocks from positive oil price produced positive but insignificant responses from macroeconomic fundamentals while shocks coming from negative oil price produced negative and significant reactions from macroeconomic variables in African oil producing countries. In non-oil African countries, both positive and negative oil price shocks have influence on macroeconomic variables but this does not transit beyond short-run. Based on these findings, the study therefore, concludes that change in oil price has effects on macroeconomic fundamentals but the effect (negative and positive) are more pronounced in African oil producing countries. The study recommend that economic diversification is required in African economies but much required in oil producing countries.

Keywords: Oil Price, Macroeconomic Variables, African countries and (PVEC).

1. Introduction

The constant fluctuations in world oil price in the last three decades has exposed several economies globally to various level of uncertainties. Series of policies have been formulated by the governments of various countries affected to improve the performance of their economies, sustain economic growth and development. However, much is yet to be achieved in this regards. This is because, oil prices like other commodities is volatile and it volatility move endogenously in response to changes in supply and demand conditions. Take for example, when demand for oil falls, which may be as a result of a weak economy this may bring about reduction in oil price. While increase in oil price may come due to increase in demand for oil as result of high energy consumption from industrialization. Increase in oil price can as well come from reduction in supply. Therefore, when demand and supply price

elasticities are low, disturbances on eiller side of the market can result in sharp price fluctuations. Rabah, Zoltan, Dougles, Akito, Armen, How and Iraxiong (2017).

Oil being an internationally traded commodity, changes in its price has effect on macroeconomic variables. Take for instance, oil exporting countries may have their exchange rate appreciate when oil price increases and have their exchange rate appreciates when oil price reduces whereas is vice versal for oil importing countries. Also, an increase in oil price at international oil market for oil exporting countries may follow by rise in inflation as noted by Dohner (1981) which explained that higher oil prices have significant impact on inflation. In turn, higher level of inflation has negative impact on the financial market through higher input prices, forcing consumers to cut down on their purchases which brings about a reduction in revenue and profit. Conversely, an increase in oil price also affects the wealth of the nations through the transfer of income from oil importing countries to oil exporting countries in the form of trade balance then leads to fluctuations in exchange rates. Prasad BAL and Rath, (2015).

Furthermore, oil still account for the highest percentage of energy consumption globally despite the fact that alternative forms of energy are being working on always. Therefore, any change in it price is still considered as an important external economic shock that influence macroeconomic variables across countries.

Additionally, the pioneer theories on the relationship between exchange rate and oil price which started by Golub (1983, Krugman (1983) and Gorden (1984) and Gorden (1984) summited that an increase in oil price at international oil market leads to increase in values of currencies in oil producing countries while is vice versal in oil importing countries. However, this has become a contentious issues. There are being divergence views on this. Take for instance. Reboredo and Rivera. Cnsro (2013) and Pershin et al (2016), summited in their studies that oil price has no influence on exchange rate behavior. Therefore, is pertinent to consider how the changing in oil price link exchange rate with inflation both in oil importing and oil exporting countries which has to do with pass – through effect. A low pass-through mean that imported transmitted inflation will have insignificant effect on the dynamic prices, while the opposite is the case for high pass-through. It is not ambigious that pass through effect is low in advanced economies while it is high in developing economies. Campa and Goldbery, (2002). Choudhri et al 2002, Mccarthy, 2000, Goldfajn and Werlang (2000).

Oil producing countries in Africa have experienced series of oil price boom but sad to report that this has not really translated to better macroeconomic performance. Both doutch deases and resource course are other of the day in most of these countries. However, this might have been attributed to poor management of revenue from oil to due to high level of corruption and leakages. Therefore, it is pertinent to examine the actual impact of oil price on African countries. Also, to know if oil producing countries in Africa are better than their counterparts who are non-oil based economies.

There are having studies conducted on the relationship between oil price and macroeconomic performance in African countries. Olomola (2006), 2013) Akinlo, (2013), Akpan, (2003) Omobolade (201) and others. However, very few studies have attempted to compare the relationship between oil price and macroeconomic variables in oil produing and non-oil producing countries in Africa.

The rest of the paper is structured thus, this introductory section is followed by section two that presents literature, Section three deals with methods and materials section four centres on results and discussions while section five concludes the paper.

2. Empirical literature

The issue of the relationship between oil price changes and macroeconomic variable has become a perennial and contentions one since it started by Hammaton, (1983). The issue is said to be contentions since agreement are yet to be reached not only among academic researchers but also among policy makers as regards the actual direction of causality between oil price changes and macroeconomic fundamentals.

Moreover, some of these previous studies are presented here empirically to provide guides and directions for the model to be used in this present study. Altahir (2019) investigated the dynamics in the relationship between oil price and exchange rate in Nigeria between January 1986 to June 2018. The study employed moment turn Threshold Autoregressive (MATAR) and structural vector Autoregressive models (SVAR) as estimation techniques. Finding from the study showed that there was absence of asymmetric cointegration in the relationship between oil price and exchange rate in Nigeria during the study period. In the same line of study, Tiwari et al. (2013) examined the relationship between oil price and exchange rate in Romania using wavelet analysis as estimation technique. Result from this study shows that oil price has significant impact on exchange rate in Roman both in the short and long runs. In the same vein, Udden el al. (2014) studied the relationship between exchange rate and oil price in Japan using wavelet analysis as estimation technique. Results from the estimation revitalized that the relationship between oil price and exchange rate in Japan is not stable and that the magnitude of the relationship keeps changing over time horizon which underscoring the significant effect of oil prices on exchange rate. In the same line of study, Fratzscher e l. al. (2014) investigated the relationship among exchange rate, oil price and asset prices. The study used Granger causality test as estimation technique. Finding from the study showed a bi-directional relationship between oil price and exchange rate but a unidirectional relationship between oil price and asset price. In advancing literature, Tiwar, and Albulescu (2016) examined the relationship between exchange rate and oil price in India. The study employed Asymmetric multi-horizon Granger causality test as estimation technique finding from the empirical result showed that oil price granger caused exchange rate in the long run but they did not granger cause each other in the short – run. Also Arour, Lathian and Nguyen (2011) investigated the relationship between oil price and stock market in six countries members of the GVIF cooperation council (GCC) from 2005 – 2010. The study employed VAR as estimation technique. Finding from the study showed that there was significant return and volatility spillovers between world oil prices and GCC stock market during the study period. Park and Kalti (2007) studied the relationship between oil price and economic growth in U S A and 13 European countries. The study made use of VAR and GARCH as estimation techniques. Finding from this study showed that an increased in volatility of oil prices significantly depressed real stock returns in the selected countries. Bartleet and Gounder (2007) investigated the relationship between oil price and economic growth in Venezuela. The study employed VAR as estimation technique. Finding from the study showed a significant relationship between oil price and economic growth in Venezuela during the study period. Babatunde (2015) examined the impact of oil price shocks on exchange rate in Nigeria using VECM estimation technique. Finding from the study showed that when oil price increases exchange rate appreciates and exchange rate depreciates when oil price falls. Pershun et al. (2016) examined the dynamic of oil price and exchange rate in some selected African countries using VAR as estimation technique. Finding from the study showed that the impact of oil price on exchange rate varies across the selected countries. Take for instance, when oil price increase, currencies of African oil producing countries appreciate and depreciate when oil price falls. Alessandro and Metto,(2005) studied the relationship among oil prices, inflation and interest rate for a-7 countries. The study employed vector autoregressive lag as estimation

technique. Findings from this study showed that impact of unexpected oil price shocks on interest rate suggesting a contractionary monetary policy response directly to curb inflation. The study equally found that the transmission channel of interest rate to the economy comes through reduction in output growth rate and inflation. In the same line of study, Brahmasrene et.al,(2014), studied the U. S crude oil imports from five countries. The study made use of monthly data which was estimated by VAR. The study cut across Canada, mexico, colombia, the united kingdom and Venezuela. The period considered by the study was between January 1996 and December, 2009.The study employed Granger causality to test for the causal relationship between oil price and exchange rate. Finding from this study showed that exchange rate Granger-caused crude oil prices in the short-run while the crude oil granger caused exchange rate in the long run. Also, Olukorede, (2014) investigated the effects of oil price shocks in U. S Norway and South Africa between 1980 and 2010. The study employed structural VAR as estimation technique. Findings from this study revealed that in developed nations among selected countries (US and Norway) stick to the non-linear oil-price shock. However, this was not so in developing countries (South Africa). Zied, etal, (2016) investigated the relationship between oil price and economic growth in selected OPEC countries between 2000 and 2010. The study made used of Co-sepctral and Co-integration analysis as estimation technique. The findings from this study revealed that oil price shocks during fluctuation period (Business cycle) and financial crises price affect the economies of the selected OPEC members. Ali, (2014) examined the direct and indirect effects of an oil price shock on the growth of Lithuanian economy between 1995q1 and 2012q4. The empirical result indicated that the indirect effects of a 50% increase in oil price growth rates on real GDP growth of Lithuanian were positive while expected the direct effects were negative. However, the positive indirect effects through the trade linkages mitigate the negative direct effect of oil price shocks in both short run and long run. Atems ET. Al (2015), studied the asymmetric effect of oil price on exchange rate in selected oil importing countries. The study employed VAR as estimation technique. Finding from this study showed that exchange rates responded to shocks emanating from oil price asymmetrically which was detrimental. In the same line of study, chou and Tseng, (2015) studies the relationship between oil price and exchange rate fluctuations on retail gasoline prices in Taiwan between 1990 and 2013. The study employed asymmetric autoregressive distributed lag model as estimation technique. The study showed that the response of gasoline price shocks was slow and complex exhibited reverse adjustment. To complement the previous studies, vasunori and Hamori,(2013) examined the effects of oil price shocks on the exchange rate and real economic activity in selected advance nation between 1974 and 2010. The study employed a two-step structural VAR as estimation technique The results from this study showed that oil price supply shocks caused an appreciation in the REER and no significant effect on inflation in the oil abundant nation such as USA, Canada, UK ,France, Italy and Norway but showed a decline in REER and inflation to oil price shocks. Bal and Rata, (2015) investigated the relationship between oil price and exchange rate in China and India. The study made use of monthly data between January, 1994 and March, 2013. The data was estimated by Granger causality. Finding from this study showed a significant bi-directional non-linear causality between oil price and exchange rate.

Tura ET. Al (2016) examined different channels of oil price to the real economy. Inflation was considered as one of the channels between 2004 and 2014. The study made used of VAR as estimation technique. Result showed that the level of inflation in the oil exporting countries was significant. However, the fiscal and cost channels were the major amplifier of the effect of oil price shocks on inflation during the study period.

Olomola (2008) and Adejumo, (2010) examined the effects of oil price on some macroeconomic variables between 1990 and 2016. The study employed Co-integration and error correction as estimation technique. Finding from this study showed that oil price shock

did not affect exchange rate in Nigeria during the study period. Kamel and Ahderrazak, (2015) studied the impact of oil prices on macroeconomic fundamentals. In eight Middle East and North Africa countries between 19941 and 20152. The study employed panel ARDL as estimation technique. Result revealed that there was short-run dynamics and cross section relationships between oil price and macroeconomic variables such as growth rate of consumer Price index, oil price, money market rate, market capitalization and oil price. Omolade and Niagara, (2014) investigated the growth of the manufacturing sector in Africa countries between 1970 and 2010. Static and dynamic panel data was used as estimation technique. Finding showed that there was negative relationship between oil price and growth of manufacturing sector during the study period.

Conclusively, from the studies reviewed, consensus is yet to be reached on the exact relationship between oil price and macroeconomic variable. Take for instance, some studies found that oil price changes have significant effects on macroeconomic variables while results from some studies revealed insignificant relationship between oil price and macro-economic variables.

3. Method and Materials

Model Specification

In order to apply various tests in this study, an econometric model has to be identified. The model built for the study is motivated by johan-parvar Mohammed, (2011), LeBlanc and Chin (2014) Therefore, equation 3.1 is been presented to empirically examine the relationship between oil price and macroeconomic variables in African countries.

$RGDPgrt = B_o+B_1RExR_t+B_2\ WOP_t+B_3RIR_t + B_4\ FIR_t + B_5GFCF_t+B_6INf_t\ U_t$ -------- 3.1

Where: $RGDP_{gt}$= is real output growth rate at period t

INF_t represents inflation in period t

$REXR_t$ represents the real effective exchange rate in period t

WOP_t stands for world oil price in period t,

RIR_t represents real interest rate in period t

FIR stands for foreign interest rate at time t.

GFCF stands, for Gross Fixed capital formation in period t

Lastly, Et represents the error term in period t.

Econometrics analysis:

The estimation technique for this study is Panel Vector Error Correction model.

4. Results and Discussions

Panel Unit Root Test

Table 1: ***Panel Unit Root Test Result***

OIL PRODUCING COUNTRIES						
	TEST AT LEVEL			TEST AT FIRST DIFFERENCE		
Variables	LLC	BT	IPS	LLC	BT	IPS
RGDPgr	-2.89211*	-4.52668*	-2.94514*	-6.72221*	-6.13297*	-6.81112*
WOP	1.19711	-1.22721	1.19711	-4.96077*	-2.33130*	-2.61828*
FIR	-5.28627*	-0.16353	-5.82054*	-4.68607*	-7.56025*	-6.15796*
EXR	-3.28728*	0.42250	0.21944	-5.48680*	-2.96599*	-5.72852*
RIR	-1.84712*	-1.51933	-1.00367	-3.40751*	-5.22188*	-4.09627*
GFCF	-1.01602	-0.53579	-0.57332	-6.45342*	-4.14986*	-3.89365*
NON-OIL PRODUCING COUNTRIES						
	TEST AT LEVEL			TEST AT FIRST DIFFERENCE		
Variables	LLC	BT	IPS	LLC	BT	IPS
RGDPgr	-4.10178*	-2.55357*	-3.67849*	-6.84233*	-9.50477*	-8.34526*
WOP	-0.04804	-1.22721	1.19711	-4.96077*	-2.33130*	-2.61828*
FIR	-5.28627*	-0.16353	-5.82054*	-4.68607*	-7.56025*	-6.15796*
EXR	-3.37030*	0.45187	-1.91393*	-4.41900*	-4.23096*	-4.42170*
RIR	-2.67453*	-3.24525*	-2.10679*	-8.86417*	-5.70007*	-7.99558*
GFCF	-1.07134	-0.77973	0.77126	-6.11954*	-5.14839*	-4.16726*

(*) connote rejection of unit root hypothesis at (5%) level of significance level

Source: *Author's Computation, (2020)*

Table4.1 presents results of Levin-Lin-Chu (LLC), Breitung test (BT) and Im-Pesaran-Shin (IPS) panel unit root test conducted in the study, both at level and at first difference for the selected oil producing and non-oil producing African countries. As reported in table 4.1, in the case of oil producing countries, only real GDP growth can be said to be stationary at level as confirmed by all the panel test statistics, while other variables including world oil price (WOP), foreign interest rate (FIR), real exchange rate (EXR) real interest rate (RIR) and gross fixed capital formation (GFCF) became stationary after first differencing. The result showed all variables used in the study except RGDPgr are integrated of order one i.e. I (1), which connote that these variables retain innovative shock passed on them only for a short period of time. For non-oil producing countries, real GDP growth rate and real interest rate were confirmed to be stationary at level by all tests conducted, while other variables were confirmed to be stationary after first differencing. In essence, test result showed that most of the variables used in the study are integrated of order one I(1), for both oil producing and non-oil producing countries, hence the need to conducted cointegration test in the bit to ascertain the existence of otherwise of long run relationship among the variables.

Table 2: ***Panel Cointegraton Test****:*

Oil-Producing Countries		
	Test Value	Prob
Kao test (adf-stat)	0.715256	0.2372
Pedroni test (v-stat)	0.164853	0.4345
Pedroni test (rho-stat)	0.284343	0.6119
Non-Oil Producing Countries		
	Test Values	Prob
Kao test (adf-stat)	-0.409437	0.3411
Pedroni test (v-stat)	-2.025916	0.9786
Pedroni test (rho-stat)	0.602853	0.7267

Source: *Author's Computation (2020)*

With reflection of stationarity at level based on at least one of the unit root test results, and combine validation of stationarity of all the unit root test after differencing the variables once, this study conducted both Kao and Pedroni co-integration test to validate the presence of co-integration amidst the variables used, all in the quest to ascertain the VAR estimation to be conducted. As reported in table 4.2, notably, both Kao cointegration test and pedroni co-integration test revealed that there is no enough evidence to reject the null hypothesis of no cointegration, thus the study affirmed that there is no cointegration amidst the variables used in the study both for oil producing and non-oil producing countries sampled in the study. Thus, this study employed panel vector autoregressive (PVAR) estimation

Impulse Response Analysis

The panel VAR estimation will be discussed in the light of impulse response of real GDP growth to other endogenous variables in the VAR system. Notably, response of RGDPgr to other variables is presented in the last column of figure 4.1 for oil producing countries and figure 4.2 for non-oil producing countries respectively.

Figure 1: Impulse Response Analysis (Oil Producing Countries)

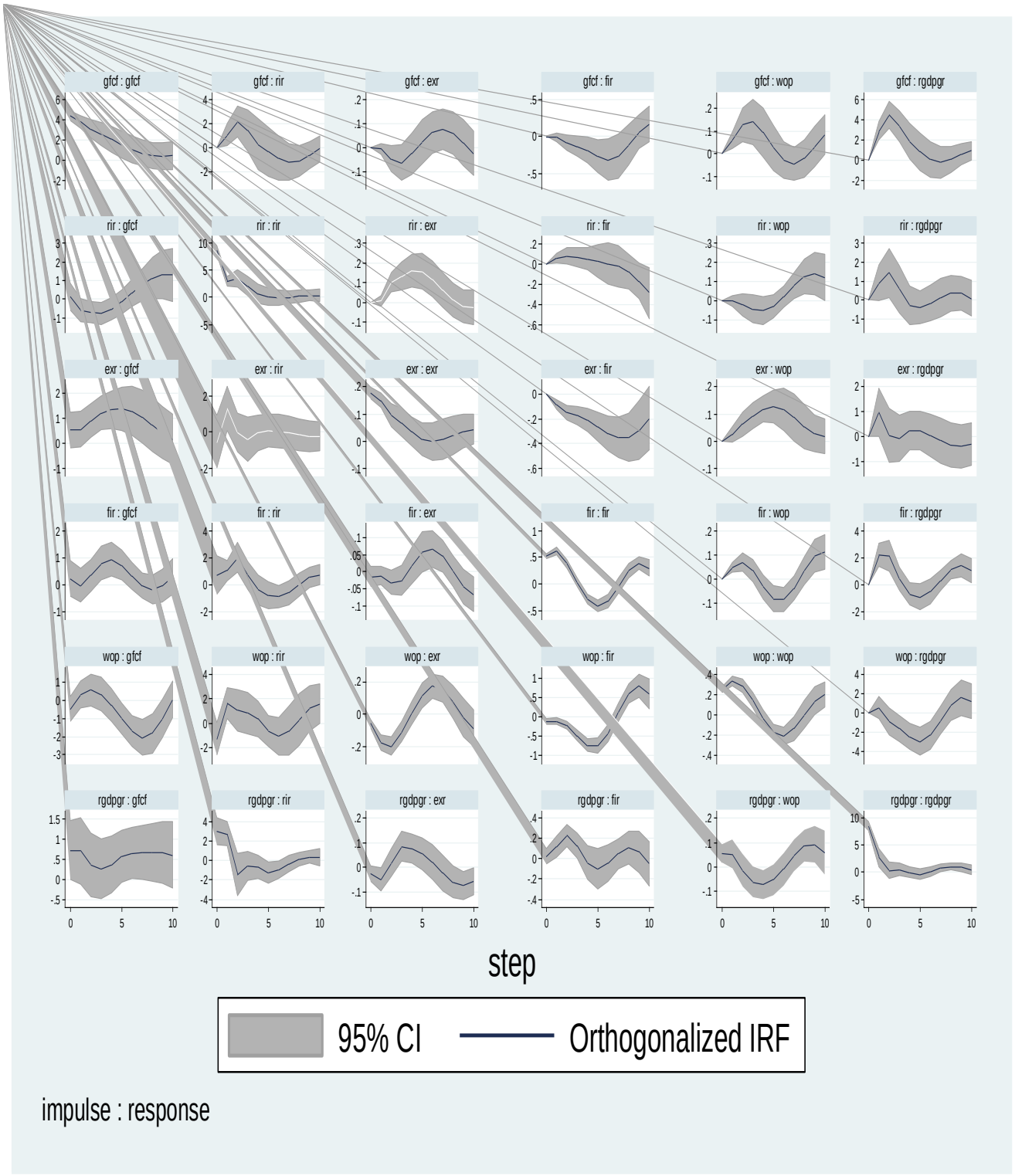
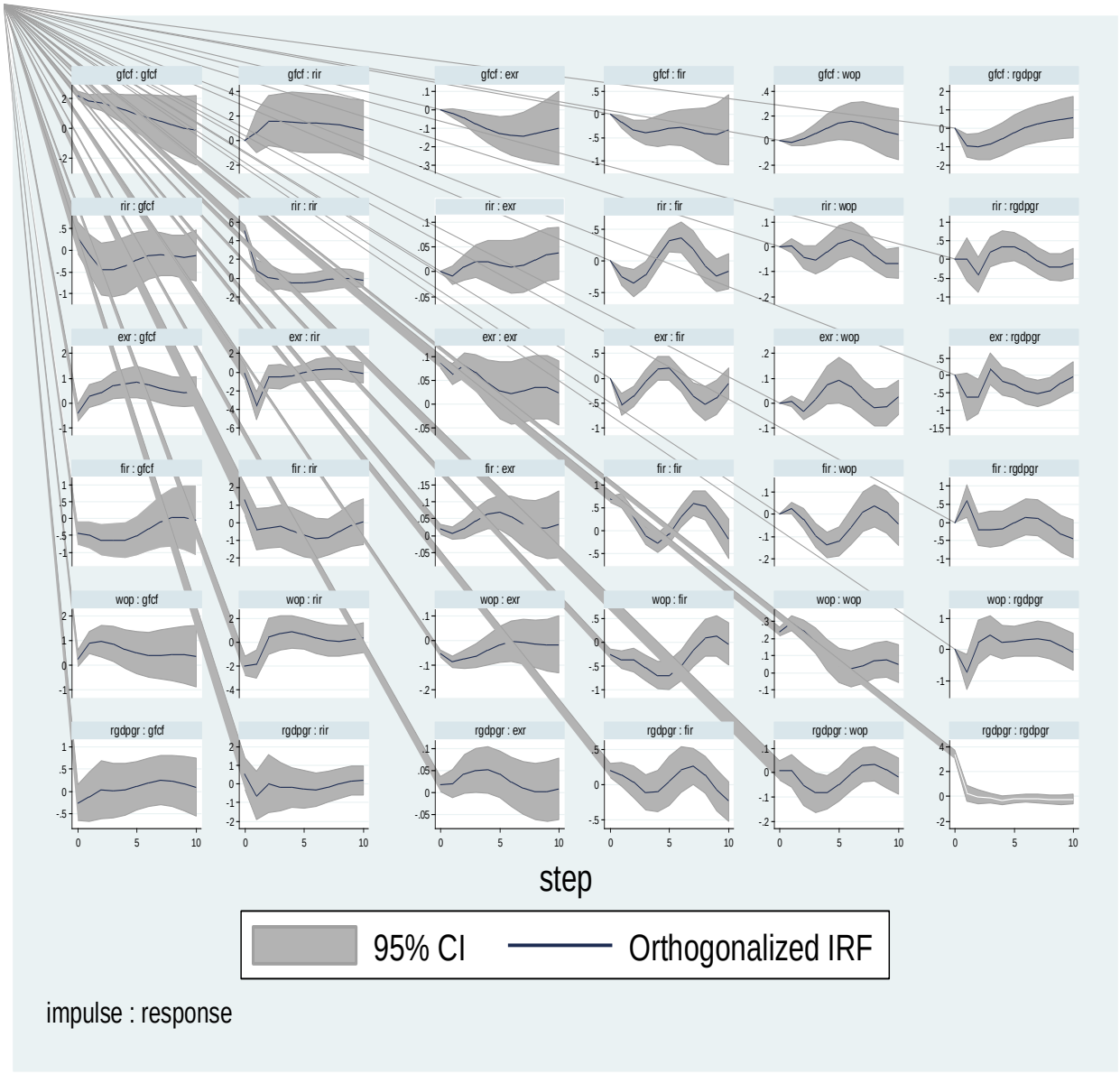


Figure 2: Impulse Response Analysis (Non-Oil Producing Countries)



For oil producing countries, overview of the response of real GDP growth rate to one standard deviation shock in world oil prices showed that in the first five period real GDP growth rate decline into the negative zone, but adjusted by a mild rising response in the negative zone between period 5 and 8, before it later projected into the positive zone during periods 9 and 10. This result reflects that real GDP growth of oil producing countries in Africa decline following innovative shock in world oil price. Notably this decline in RGDPgr remain in the negative zone for a long period of time before it adjusted into the positive zone, which implies the possible long term effect of world oil price shock on economic growth of oil producing African countries.

In addition, result showed that, RGDPgr rise progressively between period 1 and 2 but fell sharply from period 2 up to period 10 where it maintain and neutral position. In response to innovative shock in real interest rate (RIR), real exchange rate (EXR) and foreign interest rate (FIR), RGDPgr rose in the initial periods but later fell in the intermediate period though the decline in RGDPgr to other variable varies in magnitude

In the case of non-oil producing Africa country, RGDPgr response only with a sharp decline between the period 1 and 2, after it sustained an upward rise between period 2 and period 8 before it later decline mildly within the positive region. This result reflect that innovative shock in world oil price has instant negative impact on the level of economic growth of non-oil producing Africa countries but such effect does not transit beyond the short run.
In addition RGDPgr response to innovative shock in other variables including gross fixed capital formation (GFCF) real interest rate (RIR) and exchange rate is negative in the initial periods but later rose into the positive zone, while in the case of foreign interest rate RGDPgr response rose in the at the initial period but decline but later decline into the negative region.

Forecast Error Decomposition Analysis

Forecast error variance summary presented in table 3 focused on real gross domestic product growth rate and world oil price, being the major variables of interest in this study. The table capture the contribution of other variables in the PVAR system to forecast error variance In both RGDPgr and WOP with emphasis on the share of world oil price (WOP) in the discourse of real gross domestic product of both oil producing and non-oil producing Africa countries.

Table 3: Summary of Variance decomposition.

OIL PRODUCING COUNTRIES						
Variance Decomposition of RGDPgr						
Period	RGDPgr	WOP	FIR	EXR	RIR	GFCF
1	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	47.0193	15.6870	8.5280	0.8068	2.1489	25.8101
Variance Decomposition of WOP						
Period	RGDPgr	WOP	FIR	EXR	RIR	GFCF
1	4.5016	95.4984	0.0000	0.0000	0.0000	0.0000
10	5.7689	61.7188	5.6770	10.8196	7.6042	8.4115
NON-OIL PRODUCING COUNTRIES						
Variance Decomposition of RGDPgr						
Period	RGDPgr	WOP	FIR	EXR	RIR	GFCF
1	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	61.3491	6.3740	3.1723	8.3890	2.9287	17.7870
Variance Decomposition of WOP						
Period	RGDPgr	WOP	FIR	EXR	RIR	GFCF
1	0.1087	99.8913	0.0000	0.0000	0.0000	0.0000
10	4.6322	56.8644	10.7139	4.4146	2.4941	20.8809

Source: Author's Computation (2020)

For oil producing countries, as presented in the first section of table 3, RGDPgr accounted for 100% of forecast error variance in itself in period 1, while in period 10 it only accounted for 47%. All other variables could not account for any notable contribution to forecast error variance of RGDPgr in period 1 but at period on 10, world oil price accounted for 15.68%, foreign interest rate accounted for 8.52%, exchange rate accounted for 0.80%, real interest rate accounted for 2.14% while gross fixed capital formation accounted for 25.81%. This result showed that in the initial period world oil price does not has any traceable explanation to variation in economic growth of oil producing Africa countries on the short run, but on the long run it accounted for a notable percentage of forecast error variance. In addition both foreign

interest rate and gross fixed capital formation account for notable percentage of variation in economic growth on the long run.

For oil producing countries, world oil price accounted for 95.49% of forecast error variance in itself in period 1 and 61.71% in period 10, while real gross domestic product only accounted for 4.5% and 5.7% in period 1 and 10 respectively. Other variables only account for notable percentage of forecast error variance in World oil price in period 10, with specific percentage of 5.67% 10.81%, 7.60% and 8.4% for foreign interest rate, real exchange rate, real interest rate and gross fixed capital formation respectively. This result reflect that world oil price is strongly endogenous, as other variables in the system including real gross domestic product could not account for substantial percentage of its forecast error variance especially on the short run in the case of non-oil producing countries, result as presented in the second section of table 3 revealed that only RGPDgr account for 100% of forecast error variance in itself in period, but in period 10 it accounted for 61.34%, while world oil price accounted for 6.37%, foreign interest rate accounted for 3.17%, real exchange rate accounted for 8.38%, real interest rate accounted for 2.92% while gross fixed capital formation accounted for 17.78%. This result showed that as compared to oil producing countries, world oil price (WOP) accounted for only 6.3% of forecast error variance in the level of economic growth of non-oil producing Africa countries on the long, with no trace of influence on the short run.

In relative terms world oil price (WOP) contribution to forecast error variance in economic growth of oil producing Africa countries is higher than that of non-oil producing Africa countries by about 126% as it accounted for 15.68% in the case of oil producing countries. Hence world oil price is fundamental in the discourse of economic growth of oil producing countries than non-oil producing countries.

For non-oil producing countries world oil price accounted for 99.89% of forecast error variance in itself in period 1 and 56.86% in period 10, while real gross domestic product growth rate accounted for 0.10% in period 1 and 4.6% in period 10 respectively. other variables in the system does not account for any notable variance in world oil price in period 1, while in period 10 foreign interest rate accounted for 10.71%, real exchange rate account for 4.41% real interest rate accounted for 2.49% and gross fixed capital formation accounted for 20.88%. result should that world oil price is strongly endogenous, in period 1 and period 10, and that variables such as gross fixed capital formation and foreign interest rate exhibit relative high influence on world oil price on the long run.

Comparative analysis of the relationship between oil price and macroeconomic variables in oil and non-oil producing African countries.

The analysis started with panel unit root test. From the results obtained from the test, it showed that variables of interest were integrated of different orders 1(0) and 1(1) at their level but became stationary of the same order at their first different 1(1). This implies that all variables of interest in both oil and non-oil producing countries are integrated of the same order i.e. 1(1).thereafter, long-run equilibrium movement among the variables of interest was conducted. Results from the tests showed that there was no enough evidence to reject the null hypothesis of no long-run relationship between oil price and macroeconomic variables both in oil and non-oil producing countries in Africa. With this results, panel vector auto aggressive modal was used to establish the short-run relationship. VAR through impulse response function and variance decomposition. From impulse region function the response of Gdpgr to innovative shocks from positive oil price was positive but insignificant while it response to innovative shock from oil price decrease was negative and significant. Also, the response of other macroeconomic variables used in the model, for instance, exchange rate and inflation. The response of exchange rate to shocks coming from oil price increase is positive but insignificant

likewise inflation rate. However, the response of exchange rate and inflation innovative shocks from negative in oil price is negative and significant. This shows that oil price increase has no strong influence on macroeconomic variables in African oil producing countries while oil price decline has strong negative and significant impact on macroeconomic variables. In case of African non-oil producing countries, the responses of macroeconomic variables to innovative shocks from oil price change either positive or negative is only noticed in the short period and did not translate beyond short-run. Results from variance decomposition showed that all the various used in the model have influenced on macroeconomic variables both in oil and non-oil African countries.

5. Discussion of findings

Our findings show that there is no long-run co-movement between oil price and macroeconomic variables both in African oil producing and non-oil producing countries. This finding corroborates some earlier studies on oil price and macroeconomic variables see for instance, Olomola (2006), Iyoha and Oiruki, (2013), Akpan (2008), Akinlo (2006) in oil producing African countries, likewise, John, (2016), Gooddy, (2010), Gabriel (2008) and Poroparoal (2014) in African non-oil producing countries.

However, it was found that the effects of oil price change on macro-economic variables was more pronounced both in the short-run and long-run in African oil producing countries but the effect was only noticeable in the short-run and does not transit to long-run in African non-oil producing countries. This findings is at variance of some of the results obtained from some previous studies in the related topic see for instance. Nicholas, (2006), Sobowale (2008) and Chukudi (2004).

6. Conclusion and Policy Implication

This paper assessed the relationship between oil price and macroeconomic variables both in African oil producing and non-oil producing countries between 1990-2018. The study made use of panel vector error correction model as estimation technique. We found no long-run relationship between oil price and macroeconomic variables in both African oil producing countries and non-oil producing countries. The results from impulse response function showed that negative oil price produced negative and significant response from macroeconomic variables in African oil producing countries while innovative shocks from positive oil price produced positive but insignificant response from macroeconomic fundamentals. As regards non-oil producing countries in Africa, the response of macroeconomic variables to both negative and positive oil price did not go beyond short-run. Therefore, the study concludes that there is asymmetric relationship between oil prices and macroeconomic variables in African oil producing countries during the study period.

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