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IMPACTS OF OIL PRICE VOLATILITY AND MONETARY POLICY ON ECONOMIC PERFORMANCE OF NON-OIL PRODUCING COUNTRIES IN AFRICA

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Abstract

The study investigates the impacts of oil price volatility and monetary policy on the economic performance of Africa's non-oil producing countries. Economic performance is proxy for the GDP growth rate and monetary policy is proxy for the interest rate and money supply. The oil price volatility is developed through GARCH process. The study covers a period from 1982 to 2018 and Panel Auto regressive Distributed Lag PANEL-ARDL is applied. The results show that both oil price volatility and monetary policy have significant impact on the economic performance of these countries, however, while oil price volatility has negative and transitory effect, expansionary monetary policy is shown to have sustained significant impact on their economic performance. The uniqueness of the study majorly lies in its scope and methodology. Past studies have concentrated on oil exporting countries alone and they have been focusing much on the effects of oil price volatility on their growth without assessing the role of monetary policy. The study fills these gaps.

Key words:

Oil price volatility, monetary policy, economic performance, Africa non-oil producing countries.

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1. Introduction

World crude oil price has entered into an era of higher price volatility due to geopolitical uncertainties, supply constraints, high refinery utilization and high demand growth (Kesicki, 2009. Omolade, Ngalawa and Kutu, 2019). The implication of this on non-oil producing countries is multifaceted in terms of policy responses to deal with uncertainties occasioned by the incessant oil price changes which have constituted shocks perturbing different economies of the world. The non-oil producing countries in Africa which is the focus of this study are unique in the sense that they do not have any proven oil production capacity hence these economies are highly affected by oil price movement (Saliu et al, 2019).

However, an important macroeconomic policy that has been used by different countries in the world to tackle the negative impacts of oil price volatility is the monetary policy. Appropriate monetary policy response during oil price fluctuations is believed will help economies to improve on their economic performance even in the face of oil price fluctuations. But on the contrary non-oil producing countries are found struggling to cope with oil price fluctuations often and this usually affects their economic performance especially during these periods. For instance, Kenya, which is a major non-oil producing economy in Africa, raised her gross expenditure by about 30% in 1980 during the second oil price shock when the oil price rose by about 70% (IMF, 2000). Countries like Mozambique, Rwanda, Zambia and Botswana which are also non-oil producing economies in Africa, among others, witnessed the same trend during these periods.

From the literature, the links between oil price volatility, monetary policy and economic performance of an oil importing country is explained within the contexts of real balance, inflation and wealth effects of oil price. According to (Brown and Yücel, 2002) oil price changes effect can be transmitted to economic activities of an oil importing country through the following channels:

1. Wealth transfer effect; indicating the transfer of wealth from oil importing countries to oil exporting countries and hence deteriorating terms of tread for oil importing countries.

2. Real balance effect; where an increase in oil prices would lead to increase in money demand. When monetary authorities fail to increase money supply to meet growing money demand, there would be a rise in interest rate and a retardation in economic growth.

3. Inflation effect; where a rise in oil price generates inflation. When the observed inflation is caused by oil price-increased cost shocks, a tight monetary

policy can deteriorate the long term output by increased interest rate and decreased investment.

Considering these facts, it is obvious that the channels explained above might be less pronounced in countries like South Africa, Cameroon and Ghana, among others, who might not be net oil producers but still have some local oil production capacities.

Based on the foregoing the relative effects of oil price changes on the economy of Africa's non-oil producing economies can be controlled with the use of appropriate monetary policy that is following either tight or expansionary monetary policy. Hence understanding the relationship between oil price volatility, monetary policy and economic performance of these countries is very important.

Notwithstanding, few empirical studies such as Jeminez-Ridriguez and Sanchez (2012), Gupta (2007) among others have investigated oil price shock and economic growth of oil importing developed countries and some studies have also examined the same for developing countries like the Philippines (Raguindin and Reyes, 2005), Venezuela (El-Anashasy, 2005), Nigeria (Iwayemi and Fowowe, 2011), Iran (Farzanegan and Markwardt, 2009), Thailand (Rafiq et al., 2009), Tunisia (Jbir and Zouari-Ghorbel, 2010) and China (Cong et al., 2008; Tang et al., 2010; Du et al., 2010). However, most of these studies are outside Africa and the role of monetary policy was not investigated in all the studies.

It is on this note that the present study aims at examining the effects of both oil price volatility and monetary policy on the economic performance of Africa's non-oil producing countries. This will enable the researcher to ascertain the current roles of both oil price volatility and monetary policy on the economic growth of these countries with a view to recommending appropriate action for the monetary authorities that will minimize the negative effects of oil price volatility on these economies.

The rest of the study is divided into literature review, methodology, results, discussions and conclusions.

Literature Review

(Omolade, Ngalawa, & Kutu, 2019) investigates the influence of crude oil price shocks on the macroeconomic performance of Africa's oil-producing countries. Eight major net oil producers, namely, Algeria, Nigeria, Egypt, Angola, Gabon, Equatorial Guinea and Congo Republic are included in the study. Sudan is excluded due to data constraints. The study covers the period between 1980 and 2016, which represents the periods with the most boom and bust movements in crude oil prices. The Hamilton Index (1996) which uses the net oil price increase is applied. The study compares the

price of oil in each quarter with the maximum value observed during the preceding four quarters. This is used to derive sharp increases and declines in oil prices to capture oil price shocks. A Panel Structural Vector Auto-Regression model is adopted for analysis. The results show that the reaction of output to sharp increases and declines in oil prices differ. It is also observed that structural inflation accompanies sharp declines in oil prices more than monetary inflation, since both outputs and investment decline significantly.

(Saliu, Adedeji, & Ogunleye, 2019) This study examined the interrelationships among the monetary policy transmission mechanism, oil price shocks and output growth in the selected African oil producing countries. Data for the study were sourced from World Development Indicators published by the World Bank and the International Monetary Fund (World Economic Outlook). The study employed Structural Vector Autoregressive (SVAR) as estimation techniques. Findings from the SVAR Impulse Response Functions revealed that the overdependence on exploitation of oil by African oil producing countries without a corresponding diversification and switching to alternative sources of energy leads to ineffectiveness of oil economies in Africa to confront and combat some negative impacts of global oil price shocks. Findings from the study equally showed that the economies of oil producing countries in Africa are prone to shocks from the US real interest rate which represents the foreign interest rate. Finally, the study also showed that the expansionary monetary policy (in which interest rate is reduced to stimulate investment) is more effective in compensating and offsetting the negative effect of the decline in global oil price in the selected African oil producing countries.

(Van Eyden, Difeto, Gupta, & Wohar, 2019) uses a number of different panel data estimators, including fixed effects, bias-corrected least squares dummy variables (LSDVC), generalised methods of moments (GMM), feasible generalised least squares (FGLS), and random coefficients (RC) to analyse the impact of real oil price volatility on the growth in real GDP for 17 member countries of the Organisation for Economic Co-operation and Development (OECD), over a 144-year time period from 1870 to 2013. The main finding of the study is that oil price volatility has a negative and statistically significant impact on economic growth of the OECD countries in the sample. In addition, when allowing for slope heterogeneity, oil-producing countries are significantly negatively impacted by oil price uncertainty, most notably Norway and Canada.

(Herrera & Pesavento, 2009) investigates the changes in the response of the US economy to an oil price shock and the role of the systematic monetary policy response in accounting for changes in the response of output, prices, inventories,

sales, and the overall decline in volatility. The results suggest a smaller and more short-lived response of most macro variables during the Volcker-Greenspan period. It also appears that whereas the systematic monetary policy response dampened fluctuations in economic activity during the 1970s, it has had virtually no effect after the "Great Moderation".

(Yoshino & Taghizadeh–Hesary, 2014) examines how monetary policy affected crude oil prices after the subprime mortgage crisis. The paper finds that after the subprime mortgage crisis the weaker exchange rate of the US dollar caused by the country's quantitative easing pushed oil prices in US dollars upward over the period of 2009–2012, by causing investors to invest in the oil market and other commodity markets while the world economy was in recession in this period. This trend had the effect of imposing a longer recovery time on the global economy, as oil has been shown to be one of the most important production inputs.

Gaps in the literature

It is obvious from the studies reviewed that there is none based on non-oil producing countries in Africa. The few that focused on non-oil producing economies are outside Africa, Again, only few of the studies included monetary policy in their investigation. The literature appears to be awash with the effect of oil price on economic growth. Based on these identified gaps, the study investigates the relationship between oil price volatility, monetary policy and economic performance of Africa's non-oil producing countries.

2. Methodology

Research Design

This aspect of the research work focuses on the method of research embraced to be able to achieve all the objectives stated in chapter one. This section explains the theoretical framework which describes the theoretical underpinnings of the models adopted to achieve the objectives. Also the section contains the model specification which postulates the functional relationship between the dependent variable and the independent variables. Variable description and definitions as well as their sources are also described. Finally the estimating technique adopted for estimating the specified models are also discussed.

Study population/scope of the study

The criteria for selection of the countries that are categorized as non-oil producers in Africa are those without any proven oil reserve or production at all.

Consequently, all the countries in northern Africa are excluded from the study as each of them is either a net oil producer or oil producer. East Africa is dominated by non-oil producing countries and the following countries are selected Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mayotte, Mozambique, Reunion, Rwanda, Seychelles, Somalia, Uganda, Zambia, Tanzania and Zimbabwe. For West Africa, the following countries are selected; Senegal, Benin, Burkina Faso, Togo, Sierra Leone, Mali, Gambia, Liberia, Guinea, Guinea Bissau, Mauritania, Niger and Cape Verde. From Middle Africa, the CEMAC countries are excluded because they are predominantly net oil producers therefore, Central African Republic and Sao Tome and Principe are only included from this region. Southern African countries are mainly non-oil producing countries. Therefore, we include Botswana, Namibia, Swaziland and Lesotho in the study.

Again, the study period spans 1983 to 2018 because of data availability for all the countries coupled with the fact that the period is long enough to investigate the dynamic relationship among the variables included in the study.

Sources of data

The data on oil price is sourced from the OPEC database, 2019 while the reaming data on monetary policy variables and other macroeconomic variables for the countries are all extracted from the World Bank Tables, 2019 edition.

Theoretical framework

Considering the Keynesian national income identity where:

$$Y=C+I+G+(X-M) \quad (1)$$

Where Y is the output or national income, I is aggregate investment, C is aggregate consumption expenditure, G is the total government expenditure and (X-M) is the net income from abroad. M is import and X is export.

The model for this study is generated from the (X-M) in equation 1 where the external gap is explained. An important external gap model is the foreign exchange gap model of Findlay (1984), According to him, national income or economic growth is a function of export growth and propensity to import. Such that:

$$Y = f(Xe^{gt}, mY) \quad (2)$$

Where Y is national output, X is export, gt is the growth rate of export while m is the marginal propensity to import.

A change in Y overt time that is $\frac{dY}{dt}$ which is economic growth (y) can be expressed as follows according to Findlay (1984)

$$\frac{dY}{dt} = \alpha[Xe^{gt} - mY] \quad (3)$$

This can be re-written using y as the growth rate as follows:

$$y = \alpha[Xe^{gt} - mY] \quad (4)$$

Equation 4 shows that economic growth is a function of the growth of the net income from abroad.

However, non-oil producing countries in Africa spend a huge amount of money on the importation of oil and this affects their net income from abroad greatly. Oil import alone constitutes a very high percentage of their foreign exchange transactions, meaning that a substantial aspect of their foreign exchange earnings is spent on oil importation. Consequently, import in the non-oil producing economies in Africa is majorly divided into oil imports (oilM) and non-oil imports (NoilM) (Chuku, Akpan, Sam, & Effiong, 2011), such that

$$M = (\text{oilM}, \text{NoilM}) \quad (5)$$

Equation 5 can be substituted in equation 3 to become:

$$y = \alpha[Xe^{gt} - (\text{oilX}, \text{NoilX})Y] \quad (6)$$

According to (Mesagan, Unar, Idowu, & Alamu, 2019; Salehi-Isfahani, 1989), since oil import is a major aspect of their foreign exchange transactions that affect their net foreign exchange earnings and our interest in this study, the model expressed in equation 5 is re-written as follows:

$$y = \alpha[\text{X}e^{gt} - oilY] \quad (7)$$

Equation 7 is an indication that the output growth rate of the non-oil producing countries in Africa can be expressed as a function of oil import which is ultimately determined by oil price (oilp) (KILISHI, 2010; Mesagan et al., 2019). Consequently we re-specified the model such that:

$$y = \alpha[olip, \delta] \quad (8)$$

Where y is the economic growth, oilp is the oil price and δ represents other shift factors of economic growth which may include macroeconomic variables as well as propensity to import). It should be noted that by default according to the neoclassical growth model, production function with one variable input necessitate the inclusion

of capital k in the model (Baldwin & Forslid, 2000; Solow, 1999, 2005). Consequently equation 7 becomes;

$$y = \alpha[k, olip, \delta] \tag{9}$$

Where k is the capital input in production.

Considering the shift factor variable δ , this study, apart from the GDP growth rate which is the dependent variable, includes exchange rate, monetary policy variables (Interest rate and money supply) and inflation rate as major macroeconomic variables which are very important to Nigerian economic performance as an oil dependent country (Iwayemi & Fowowe, 2011). According to (Udeaja & Isah, 2019), inflation and exchange rate are very key macroeconomic variables in any oil import dependent economy because they play major roles in the determination of the macroeconomic stability of the economy while monetary policy variables are relevant because it is the focus of this study. On this note equation 9 is expanded further and stated more explicitly to accommodate these two macroeconomic variables

$$y = \alpha[k, olip, Mp, exr, inf] \tag{10}$$

Where exr, Mp and inf are exchange rate, monetary policy variables and inflation rate respectively. All other variables are as defined before.

When the model is linearized it becomes;

$$y = \alpha_0 + \alpha_1 k + \alpha_2 oilp + \alpha_3 Mp + \alpha_4 exr + \alpha_5 inf + \mu_i \tag{11}$$

All variables in equation 11 are as defined above. Their description and sources are included in the following section.

Model Specification

Following equations 11 our model is expressed thus

$$G_{i,t} = \varpi_0 + \varpi_j \sum_{j=2}^{7} \varpi_j K_{i,t} \varpi_j \, M_{pi,t} + \varpi_j OIL_{pi,t} + \mu_{i,t} \tag{12}$$

Where $G_{i,t}$is the growth rate of output of country *i* at time *t*, $M_{pi,t}$ comprises of the monetary policy instruments; real money balance measured by real money supply and real interest rate. It also comprises of policy variables such as real exchange rate, and inflation rate in country *i* at time *t*, while $K_{i,t}$ is the capital of country *i* at time *t* $OIL_{p,t}$ is crude oil price at time t and $\mu_{i,t}$ represents the country specific stochastic variable. However, since the study is more interested in oil price movement, oil price volatility is developed via GARCH process and it is used to replace the oil price in the model as shown in equation 13,

$$gdpgr_{i,t} = \vartheta_{i,t} + \beta_{i,t} intr + \alpha_{i,t} msgr + \theta_{i,t} exr + \delta_{i,t} infr + \\ + \rho_{,t} oilvol + \pi_{i,t} + \mu_{i,t} \quad (13)$$

Equation 13 will be estimated using Panel ARDL model. The method of analysis is described as follows:

Panel ARDL approach to cointegration

It had been argued that the long-run relationships exist only in the context of co-integration among integrated variables (Johansen 1995; Philips and Hansen 1990). However, Pesaran and Smith (1995), who introduced the mean group, and Pesaran, Shin and Smith (1999), who introduced the pooled mean group, provided a new technique that has made it possible to derive consistent and efficient estimates of the parameters in a long-run relationship between both integrated and stationary variables in a panel data structure. These two concepts are discussed in turn as follows:

1). The Pooled Mean Group (PMG) is defined as the average of unrestricted single country coefficients and it is a good alternative to the other estimators for the panel like Dynamic OLS and FMOLS (Shin 1998). The main characteristic of PMG is that it allows the short-run coefficients, including the intercepts, the speed of adjustment to the long-run equilibrium values and error variances to be heterogeneous country by country, while the long-run slope coefficients are homogeneous across countries. This is particularly useful when there are reasons to expect that the long-run equilibrium relationship between the variables is similar across countries or, at least, a sub-set of them. The short-run adjustment is allowed to be country-specific. However, there are several requirements for the validity, consistency and efficiency of this methodology.

First, the existence of a long-run relationship among the variables of interest requires the coefficient on the error-correction term to be negative and not lower than -2. Second, one important assumption for the consistency of the ARDL model is that the resulting residuals of the error-correction model be serially uncorrelated and the explanatory variables be treated as exogenous. Such conditions can be fulfilled by including the ARDL (p, q) lags for the dependent (p) and independent variables (q) in error correction form. Third, the relative size of T and N is crucial: both of them should be large to use the dynamic panel technique to avoid the bias in the average estimators and resolve the issue of heterogeneity. Therefore, failing to fulfil these conditions will produce inconsistent estimation in PMG.

2). The second technique **Mean Group (MG)** introduced by Pesaran and Smith (1995) calls for estimating separate regressions for each country and calculating the

coefficients as unweighted means of the estimated coefficients. This does not impose any restrictions. It allows for all coefficients to vary and be heterogeneous in the long run and short run. However, the necessary condition for the consistency and validity of this approach is to have a sufficiently large time-series dimension of the data. The cross-country dimension should also be large (at least 20–30 countries). In addition, for small N, the MG estimator is sensitive to outliers and small model permutations (Favara, 2003).

3. Empirical Results

The results are presented, interpreted and discussed under this section of the paper and, based on the outcomes, inferences are made.

Results of the Panel Unit Root Tests

This aspect looks into the time series properties of the variables in order to understand the individual nature of the variables and also to affirm their suitability for the estimation techniques adopted for this study. This is done by testing the stationarity of the variables which is also known as the unit root test. It is very important to determine the order of integration before embarking on the panel cointegration test. This is as a result of the fact that a non-stationary series contains unit roots and such series has the tendency of sustaining shocks. This is quite different in the case for a stationary series, that is, a series that does not contain unit roots. It is equally important that all the series are integrated of the same order before proceeding to the error correction based panel cointegration. Therefore, in order to perform the unit root test and determine the order of integration of all variables, this study employs the Im, Pesaran and Shin (IPS) unit root test as follows:

Table 1

Im Pesaran and Shin (IPS) Unit Root Test

Variables	t-statistics	p-value	Order of integration
GDPgr	-5.6711	0.0000 ***	I (1)
EXR	-4.1826	0.0000 ***	I (1)
FFR	-3.1844	0.0000 ***	I (0)
GCF	-3.1953	0.0000 ***	I (1)
INFR	-4.5257	0.0000 ***	I (1)
INTR	-4.4707	0.0000 ***	I (1)
MSGR	-4.9656	0.0000 ***	I (1)
WOPvol	-3.2537	0.0000 ***	I (0)

(***) represents statistical significance at 1%. Each model includes trend and constant term.
Source: *Authors' computation*.

The results in table 1 above showed that some of the series are stationary at levels while some are stationary after the first difference. For instance FFR and WOP vol are stationary at levels while the remaining variables in the model are stationary after the first difference. These results have set a tone for the application of Panel-ARDL.

Panel Cointegration test

The Pedroni panel cointegration test is conducted to investigate the existence of cointegration among the variable before the panel estimation. The results are presented as follows:

Table 2

Pedroni residual cointegration test

Trend assumption: Deterministic intercept and trend					
Alternative hypothesis: common AR coefs. (within-dimension)					
				Weighted	
		Statistic	Prob.	Statistic	Prob.
Panel v-Statistic		-4.409747	0.0000	-5.683189	0.0000
Panel rho-Statistic		2.223432	0.9869	2.989966	0.9986
Panel PP-Statistic		-10.28970	0.0000	-14.22063	0.0000
Panel ADF-Statistic		-3.109016	0.0009	-3.705988	0.0001
Alternative hypothesis: individual AR coefs. (between-dimension)					
		Statistic	Prob.		
Group rho-Statistic		3.697161	0.9999		
Group PP-Statistic		-21.18280	0.0000		
Group ADF-Statistic		-3.637596	0.0001		

Source: *Authors' computation.*

Results in table three have shown that out of all the 11 panel and group cointegartion tests, the null hypothesis of no cointegration is rejected in 8. This is an indication that there exists cointegration among the variables included in the panel model. The next effort is to estimate the Panel ARDL model. Both the long and short run results are presented in tables 4 and 5.

Table 3

Long-run Panel ARDL Model

Variables	Coefficient	Standard Error	Probability
EXR	0.22622	0.3614184	0.535
FFR	-0.076696	0.3158904	0.809
GCF	0.0218524	0.0760735	0.774
INFR	0.1697015	0.1164747	0.148
INTR	-0.2897462	0.11163	0.011
MSGR	0.0828275	0.0375509	0.029
WOPvol	-0.068891	0.172832	0.691

Table 3

Short-run Panel ARDL Model

DGDPGR	-0.007772	0.063570	0.000
DEXR	-0.3691257	0.5396225	0.495
DFFR	-0.6688541	0.356611	0.036
DGCF	0.1908208	0.0849789	0.027
DINFR	-0.1218408	0.888362	0.017
DINTR	-0.993143	0.632204	0.019
DMSGR	0.342926	0.247652	0.069
DWOPvol	-0.999722	0.342861	0.004
COINTEQ01	-1.024997	0.018	0.000

Source: *Authors' computation.*

The results are in two segments, that is, the long and short-run relationships. The first segment exhibited the variables in their non-differenced forms and this indicated long-run relationship, while the second segment showed the variables in their differenced forms showing the short-run relationships. With respect to the long-run model segment, the empirical results therein indicated that just INTR and MSGR out of all the macroeconomic variables examined have significant long-run relationship with the output growth (GDPgr) in the selected non-oil producing countries in Africa during the period under review. The results equally revealed that other variables such as EXR, FFR, GCF, INFR and WOP do not have significant impacts on output

growth (GDPgr). However, this is quite different in the case of the short-run model segment in which the results showed that FFR, GCF, INFR, INTR, MSGR and WOP now have significant impacts on output growth (GDPgr). Only EXR does not have significant impact on output growth. The results also revealed that FFR, INFR, INTR and WOP exhibited negative and significant impact on output growth (GDPgr) while GCF and MSGR have positive and significant impact on output growth (GDPgr) while GCF and MSGR have positive and significant impact on output growth (GDPgr). This is a strong indication that macroeconomic variables appear to have more significant influence on output growth in the short-run than in the long-run in the selected non-oil producing countries during the period under review.

The overall R-square value of 82% in these results implies that the model in this study satisfied the requirement for goodness of fit. The computed statistics exhibited that 82% of the total variation in output growth (GDPgr) is accounted for by all the macroeconomic variables examined in this study while 18% of the changes in output growth (GDPgr) are attached to the influence of other factors not included in the regression equation. The Fixed Effect estimated model is also statistically significant judging by the F-statistics p-value of 0.00021 which is less than 1%. This is an indication that the macroeconomic variables may jointly have a significant impact on output growth (GDPgr) in the selected non-oil producing countries in Africa during the period under review.

4. Discussions of Results

Findings from the study revealed that there is a long-run relationship between output growth, oil price volatility and some selected macroeconomic variables including monetary policy variables INTR and MSGR which are monetary policy instruments have significant long-run relationship with the output growth; while the short run model segment showed that all the macroeconomic variables (FFR, GCF, INFR, INTR, MSGR and WOP) except EXR have significant impacts on output growth in the selected non-oil producing countries in Africa during the period under review.

The implication of this finding is that both oil price volatility and monetary policy predict output growth more in the short-run than in the long-run. The possible reason behind this finding might not be unconnected with the nature of the emerging economies in Africa particularly the non-oil producing countries in Africa as their economies are not fully efficient and therefore do not incorporate all the given information to allow long-term co-movement between monetary policy, oil price volatility and output growth. This finding corroborates the report of Al-Fayoumi

(2009) who confirmed that the lack of long-run relationship between macroeconomic variables and output growth might be linked to the inability of the non-oil producing economies to fully capture all information relevant to the variation in the macroeconomic variables.

Oil price volatility has been shown to have more of a transitory effect on economic growth and the effect is negative. The implication is that oil price uncertainty portends danger for the economies of Africa's non-oil producing countries, but the effect might not go beyond the short run period.

Moreover, the results showed that domestic interest rate has negative and significant impact on output growth in non-oil producing countries in Africa. The implication of this finding is that when interest rate which is the cost of borrowing is high, it will lead to disincentive in borrowing; which will eventually discourage investment and thus a declining output growth rate. This finding aligns with the work of Irfan and Ume (2011) and Hameed Gul et al. (2012).

Also, the results of both long-run and short-run model segment of the Panel ARDL regression revealed that Money supply growth rate (MSGR) exerted positive and significant impacts on output growth in non-oil producing countries in Africa. This finding conforms with the economic theory stating that money supply is an increasing function of economic growth, which means that as money supply increases, output growth also increases. This finding also agrees with the works of Ahmad and Suleiman (2011) and Mishra (2012) who posited in their research works that expansionary monetary policy through increase in money supply is a declining function of interest rate which eventually triggers investment and leads to output growth increment.

Although the findings run contrary to the findings of Omolade and Ngalawa (2014), who concluded that the increase in money supply is not the best during the positive oil price volatility in an oil producing economy like Nigeria, due to the inflation tendency of such expansionary monetary policy. According to them, a positive oil price movement, that is, a sudden increase in price of oil will improve oil revenue to an oil producing country, which means more money to spend. Therefore, increasing money supply again will further compound the inflation problem of such an economy. It should be noted that this study made use of non-oil producing economies in Africa as the case study hence, positive oil price movement will have an opposite effect on their economies by reducing their revenue since they have to pay more for importation of oil therefore reducing their domestic expenditure capacity.

In addition, the results also show that Gross Capital Formation (GCF) has positive and significant impact on output growth in non-oil producing countries in

Africa. This particular finding indicates that there can be no significant output growth without investments in fixed and productive capital. This finding also corroborates the assertions of Adjasi and Biekpe (2009) and Gutierrez (2005) who posited that [with] private capital increases in productive areas, output growth will equally be increased.

5. Conclusions and Recommendations

Findings from the study have again brought to the fore the debate on the super-neutrality of money as the result brought about a conclusion that money supply and interest rate together with other macroeconomic variables have more of a short-run effect on output than long-run effect. Hence it supports the school of thought which argued for the existence of super-neutrality of money.

Another important conclusion from the study is the fact that oil price volatility has been shown to have more of a transitory effect than permanent effect. It further indicates that incessant boom and bursts in the oil market usually have short-term effect on the output of Non-oil producing countries' economies. This might not be unconnected with the frequency in the changes which will not allow the output to adjust before another change comes up.

The study also concludes that reduction in the cost of borrowing and increase in money supply can jointly stimulate output in non-oil producing countries. The implication is that expansionary monetary policy is a potent policy that can improve the domestic output even in the face of oil price volatility.

It is recommended that expansionary monetary policy that will boost domestic investment is necessary for economic growth during the period of oil price volatility. This is pertinent because an upward movement in oil price will reduce investment expenditure therefore expansionary monetary policy expectedly is required to stimulate investment in such an economy during this period.

The limitation of the study lies in the period covered which starts from 1983 and ends in 2018. This is because of the data availability on the variables of interest in the study.

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