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# Premium Exchange Rate and Output Growth in African Oil Producing Countries

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***Abstract:*** *This study investigated the relationship between premium exchange rate and output growth in African oil producing countries between 1995 to 2018 using panel Vector Error Correction as estimation technique Data for the study were sourced from World Bank Development indicator data base, IMF online data base and Central Banks of the selected countries. Finding from the study showed that the responses of output growth and other macroeconomic variables to shocks coming from both oil price and premium exchange rate was direct, negative and significant. The study concludes that premium exchange rate is detrimental to the growth of selected economies. The study therefore, recommends that to achieve sustainable economic growth in the selected countries, the elimination of premium exchange market is needed. This can be achieved through reducing the rationing in the official exchange markets.*

***Keyboards:*** *Premium exchange rate, output growth, world oil price and PVECM.*

**SECTION ONE**

## I. Introduction

Excess demand for foreign currencies has become one of the features of developing economies. As a result, governments place controls on trade and capital flows to reduced this exceed demand over supply through various controls and restrictions. Since restrictions have been placed, monetary authority therefore fixed the rate at which domestic currency should be exchanged for foreign currencies. Not only this, some rules are introduced to be strictly followed in allocating foreign exchange. Based on these restrictions and directives from apex bank, those whose demand are not met at official market sort for a relieve in parallel foreign exchange market though at a rate much higher than the official exchange rate set by the monetary authority and government. Akinbobola, Musbau and Rebecca (2018). Therefore, the monetary difference between official exchange rate and black market exchange rate is known as parallel currency market premium. If this occurs, it has significant effects on macro-economic performance of economies involve. The existence of both official and parallel market simultaneous is as a result of inability of central banks in various African oil producing countries to meet the demand for foreign exchange at the various official markets.

The activities in international oil market may be linked to the behaviour of macroeconomic variables due to relevance of oil in the production input. Oil is one of the production inputs that can have both symmetric and asymmetric effects on economic growth of both oil producing and oil importing countries.

Oil being an internationally traded commodity, changes in its price has impact on exchange rate. Oil producing countries may have their exchange rate appreciates when oil prices increase and have their exchange rate depreciates when oil price falls. If any of these occurs (currency appreciation and currency depreciation) there may be diversion or holding of currencies in the international currency markets. This of course is based on the level of oil price volatility on exchange rate.

Despite the fact that both developed and developing nations have introduced and developed alternative forms of energy, oil still responsible for the largest percentage of energy consumption globally. Therefore, fluctuation in its price remains major external economic factor impacting countries worldwide. This of cause varies according to the level of economic growth and economic development of a country.

Studies have been conducted on the relationship between oil price and macroeconomic variables particularly, inflation, exchange rate and output growth in various oil producing countries in Africa. This has however brought about agitation about actual role plays by oil price in the determination of macroeconomic variables particularly exchange rate and inflation. Take for instances, Olomola and Adejumo (2018), Ogundipe and Ogundipe (2013), Obioma and Eke (2015), Aliyu (2009) Ogunsakin and Oloruntuyi (2017) and several others where they confirmed in their various studies that oil price has predictive power on exchange rate and general price level. That is, when there is an increase in crude oil price at international oil market, exchange rate appreciates, relatively but depreciates significantly when oil price falls. In the view of Obioa and Eke (2015) and

Ogundipe and Egbedokun (2013) the transmission mechanism of oil price effects on inflation is through exchange rate instead of the view of monetarists that says it emanating from oil price which produces negative and significant response from exchange rate which passes through to general price level. However, from some studies Alema, Kapper and Lame, (2015) which was a total departure from the other studies, it says decrease in oil price have an appreciative effects on real effective exchange rate, implying a loss of competitiveness in exchange rate while an increase in oil price, is discovered to have no importance in exchange rate determination. Irrespective of the views of the authors mentioned, the relationship among exchange rate, inflation and oil price in African producing countries is some how paradoxical.. paradox in that oil price increase has no influence neither on general price level non on exchange rate movement, while reduction in oil price has wide negative and significant effects on both inflation and exchange rate that always call for premium exchange market, with this, it is therefore, important to study the impact of premium exchange market on some macroeconomic fundamental because of the following reasons, first, it generates complications to the apex bank in an attempt to manage the foreign exchange market, it impacts the level of international reserves, the position of the economy and portfolio decisions of the public which is used as one of the determinants of domestic prices and official foreign exchange earings of the countries. Akinbobola, Musbau and Rebecca (2018).

Therefore, the broad objective of this paper is to examine the relationship between premium exchange rate and macro-economic variables in African oil producing countries.

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

## II. Literature Review

Studies have been conducted on the relationship between exchange rate premium and macroeconomic fundamentals. However, the exact direction of causality is still controvertial. Some of these studies are presented here empirically to provide guides and direction for the model of this present study.

Nwafor (2014) investigated the behaviour of the exchange rate in Nigeria using pinto-model within the confines of a reduce form linear stochastic model. Finding from this study showed that there is a long-run co-movement between Nigeria naira and America dollar. In the same line of study, Akinbobola, Saibu and Rebecca (2018) examined the relationship between parallel currency market premium and macroeconomic performance in Nigeria between 1986 – 2015. The study made use of structural vector autoregressive model as estimation technique. Results from this study showed that shocks emanating from PCM on the average produced more variation in macroeconomic variables than response of PCM to shocks coming from macro-economic variables. In advancing literature, Agenor and Taylor (1993). Investigated the causality that runs from official to parallel exchange rate in 19 developing countries using both panel co-integration and panel granger – causality as estimation techniques. Finding from this study showed that there was co-movement between official and parallel exchange market in 14 countries while long-run relationship was not found in the remaining 5 selected countries. Also, Tefer hemma (2004) examined the systemic analysis of the main determinants of the parallel foreign exchange market in Ethiopia. The study employed vector error correction as estimation technique. Results showed that depreciation of the official exchange rate, foreign exchange availability and one period lagged money supply as well as export tax are the main determinants of parallel premium in the short-run. Stamalevi (2015) Investigated the relationship between black market exchange premium and foreign direct investment in Malawi using multiple regression to empirically carry-out the objective of the study. Finding showed that black market exchange premium did not have effect on foreign direct investment. In a similar study, Ogun (2015) studied the determinants of parallel market exchange rate premium in liberalized economies. findings from this study showed both fundamentals and nominal determinants of the parallel market premium. Juannah (2016) studied the relationship between parallel exchange market and macroeconomic variables, a comparative study of oil producing and non oil producing countries in selected developing countries using panel vector error correction as estimation technique. Finding from this study showed that macro-economic variables reacted to shocks from oil price more negatively than the way macroeconomic variables reacted to shocks from oil price in non-oil producing countries. Samuel (2017) investigated the relationship between exchange rate and oil price in both developed and developing countries between 2000 to 2014 using panel Granger causality. Finding showed that bi-directional relationship exists between exchange rate and oil price both in developed and developing countries. Godwin, (2018) studied the relationship among exchange rate, premium exchange rate and interest rate in Nigeria using co-integration as estimation technique. Finding showed that there was long-run co-movement among the variables of interest. Besides , results further showed that foreign interest rate, output gap, real effective exchange rate and general price level are major determinants of premium exchange rate in Nigeria. In the same line of study, Girigori, (2016) examined the causal relationship between premium exchange rate and real effective exchange rate in Nigeria using pairwire granger causality test as estimation technique. Result from this study showed a bi-directional relationship between the two variables. Akinbobola

(1996) studied the determinants of parallel currency market premium in Nigeria using multiple regression as estimation technique. Results showed that macroeconomic fundamentals are the major determinants of black market exchange premium in Nigeria during the study period. Moris (1993) studied the dynamics and the parallel market for foreign exchange in Uganda. Finding from the study revealed how unification of official and parallel market exchange rates cause increase steady – state inflation based on the impact of fiscal policy on the real official exchange rate changes. Onvoha (2014) investigated effect of exchange rate variation and inflation on the growth of Nigerian economy using co-integration and error correction as estimation technique. Finding from this study showed a positive but not statistical significant relationship between inflation and exchange rate. In summary, consensus is yet to be reached as regards the exact relationship between exchange rate premium and other macroeconomic variables. While some studies conclude that interest rate and inflation are major determinants of premium exchange rate, some authors were of the views that activities in the international oil market, that is, oil price, foreign interest rate and world gross domestic product are the major determinants of premium exchange rate. Besides, most of the studies revealed were country specific, it is essential to a carry out a panel study to actually establish the direction of causality among variables of interest to provide a rational avenue for critical comparison.

## III. Methods and material

**Model specification.**

The parallel exchange market is considered to be a financial transaction that are carried out illegally due to insufficient foreign currencies in official or authorized currency market and trade restriction. In this regards and to specify model for this study, some assumptions are being considered. First, prices of traded goods are externally given, second, the existence of a non-traded goods sector, third, there is full employment in the economy and monetary disequilibrium does not affect the rate of growth of real income. Based on these assumptions, equation 3.1 is specified to estimate relationship between premium exchange rate and macroeconomic variables in African oil producing countries.

$RGDPgr = \beta_o + \beta_1 wop_t + \beta_2 PEXR_t + \beta_3 R$
$EXR_t + \beta_4 INF_t + \beta_5 FIR_t + \beta_6 DIR_t + e_t$ ---- 3.1

Where = RGDPgr = Real Gross domestic product growth rate.
WOP = World Oil Price
PEXR = Parallel Exchange Market
REXR = Official Exchange Market
INF = Inflation Rate
FIR = Foreign Interest Rate
DIR = Domestic Interest Rate
$\beta_o + \beta_1$ Coefficients
$e_t$ = Error term
E = Time variant

**Estimation Techniques**

The study employs panel Vector Error Correction model.

**Sources of Data**

Data for this study were sourced from world Development Indicators published by the World Bank, IMF online Database and Central Banks of the selected countries.

## IV. Results And Discussion

PANEL UNIT ROOT TEST

Table 4.1: Panel Unit Root Test Result

| | TEST AT LEVEL | | | TEST AT FIRST DIFFERENCE | | |
|---|---|---|---|---|---|---|
| Variables | LLC | BT | IPS | LLC | BT | IPS |
| RGDPgr | -4.2841* | -5.5957* | 6.8457* | -10.2785* | -6.4707* | -11.3272* |
| PEXR | 6.5183 | -3.78563* | 0.1865 | -8.1441* | -6.4715* | -6.1359* |
| REXR | -6.1870* | 2.7944 | -4.0380* | -7.6159* | -3.3024* | -8.1499* |
| INF | -3.6182* | -4.5334* | -3.5692* | -9.9491* | -7.6539* | -9.9902* |
| WOP | -0.7270 | -0.8457 | 2.0963 | -7.6726* | -7.9752* | -7.8901* |
| FIR | -5.0532* | -0.4362 | -2.9025* | -11.3399* | -3.5888* | -5.7198* |
| DIR | 0.6655 | -2.6872* | -3.11536* | -5.4395* | -4.8455* | -5.6265* |

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

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

Table 4.1 presents results of Levin-Lin-Chu test (LLC), Breitung test (BT) and Im-Pesaran-Shin test (IPS) panel unit root test conducted in the study, both at level and at first difference. As reported in table 4.1, from one of the tests conducted showed that most of the variables used in the study are stationary at level except world oil price that became stationary at first difference. Based on this, all the variables of interest were subjected to first difference. In this regards they all became stationary

Table 4.2: Panel Cointegraton test:

| Kao Test | | |
|---|---|---|
| | Test Value | Prob |
| t-statistics | -0.817208 | 0.2069 |
| Pedroni Test | | |
| | Test Values | Prob |
| Panel v-Statistic | -1.369618 | 0.9146 |
| Panel rho-Statistic | -0.269874 | 0.3936 |

Source: *Author' s Computation (2020)*

With reflection of stationarity at level based on at least one of the unit root test result, 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, both Kao cointegration test and pedroni co-integtaion 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 and thus employed panel vector autoregressive (PVAR) estimation.

## V. Impulse Response Analysis

The panel VAR estimation discussed in the light of impulse response of variable of interest to shock in other endogenous variables in the VAR system. The impulse response overview as presented in figure 4.1 showed how an identified variable of interest response to one standard deviation shock in other variables over a span of periods. Notably, the analysis in the study covered a 10 year period which reflects the immediate and intermediate response of corresponding variables to innovative shock. Notably, this study largely focused on the response of economic growth measured in terms of real gross domestic product growth rate.

Overview of the response of real GDP growth rate and other endogenous variables in the system as shown in the last column of figure 4.1, revealed that on the immediate and intermediate period between period 1 and period 10., growth rate of real gross domestic product in African oil producing countries declines in response to one standard deviation shock in both prime exchange rate and real official exchange rate. Also shock in variables including domestic interest rate (DIR), foreign interest rate (FIR), culminate into decline in the growth rate of real gross domestic product of oil producing countries in Africa ceteris paribus especially on the intermediate period between period 5 and period 10.

On the other hand, however, real GDP growth in the selected oil producing African countries responded positively to one standard deviation shock in inflation rate and world oil price, rising progressively from period 1 through period 10. By implication, impulse response result reflect that the rate of economic growth in oil producing Africa countries responded negatively and progressively to innovative shock in prime exchange rate and real official exchange rate, as well as shock in world oil price, domestic interest rate and foreign interest rate. This could be attributed to the fact that oil production and distribution tends to be fundamental to capital inflow into most of African oil producing countries, and with its price controlled on a global scale, this could have dynamics effects on both premium exchange rate and official exchange which could be detrimental to the economic growth of the selected countries.

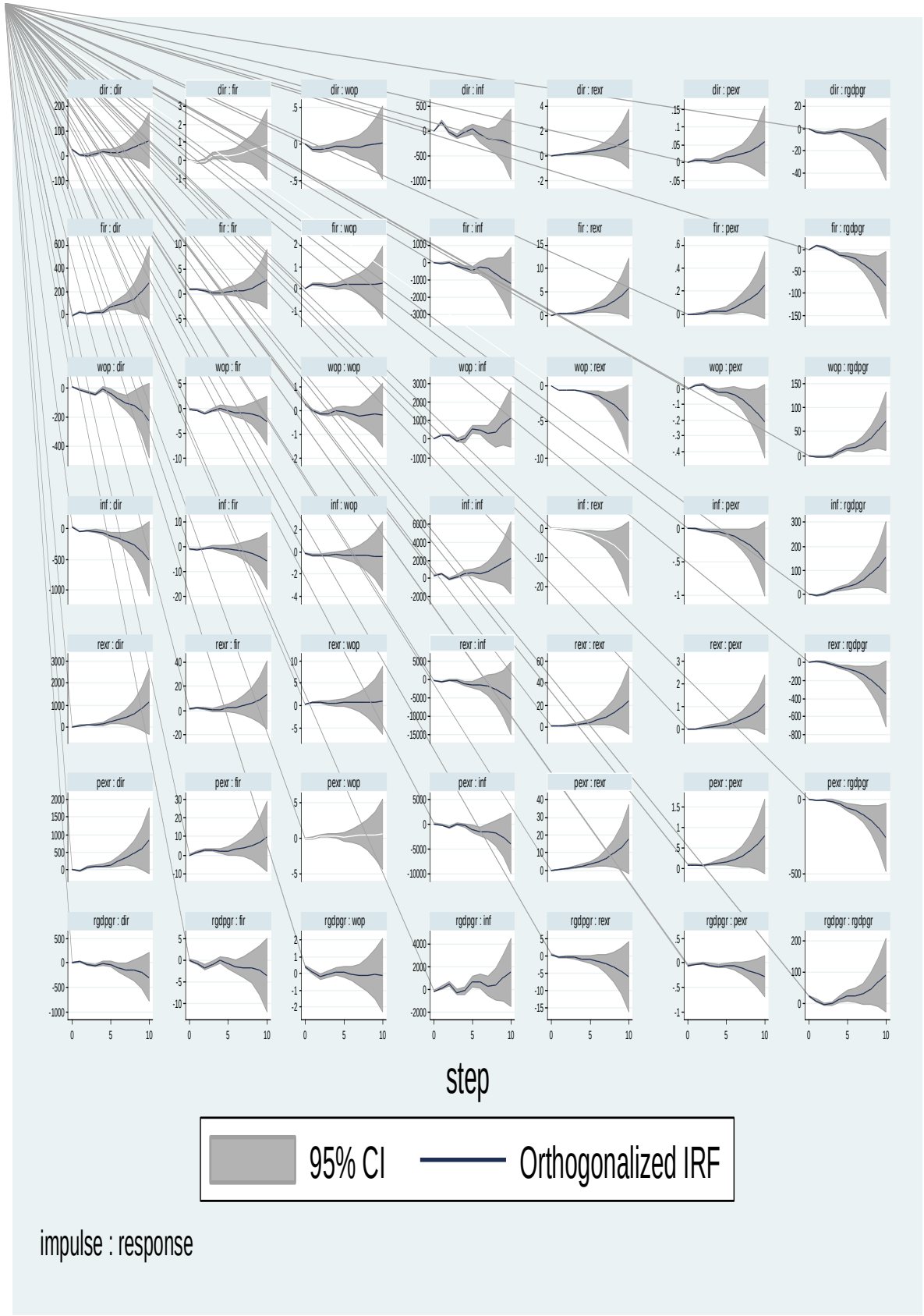


Figure 4.3: Impulse Response Analysis

FORECAST ERROR DECOMPOSITION ANALYSIS

Table 3: *Summary of Variance decomposition*

| Variance Decomposition of RGDPgr | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Period* | RGDPgr | PEXR | REXR | INF | WOP | FIR | DIR |
| 1 | 100 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 10 | 3.66173 | 27.5002 | 53.4097 | 10.28734 | 1.96562 | 3.02992 | 0.14549 |
| Variance Decomposition of PEXR | | | | | | | |
| *Period* | RGDPgr | PEXR | REXR | INF | WOP | FIR | DIR |
| 1 | 23.10883 | 76.89117 | 0.000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 10 | 4.07013 | 31.01597 | 50.403 | 9.8924 | 1.8061 | 2.6413 | 0.1712 |
| Variance Decomposition of REXR | | | | | | | |
| *Period* | RGDPgr | PEXR | REXR | INF | WOP | FIR | DIR |
| 1 | 13.37078 | 3.84743 | 82.782 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 10 | 3.64629 | 28.28412 | 53.219 | 9.5715 | 2.2210 | 2.8813 | 0.1766 |
| Variance Decomposition of INF | | | | | | | |
| *Period* | RGDPgr | PEXR | REXR | INF | WOP | FIR | DIR |
| 1 | 9.193 | 2.985 | 46.134 | 41.6871 | 0.0000 | 0.0000 | 0.0000 |
| 10 | 4.385 | 26.969 | 52.478 | 10.2229 | 2.4569 | 3.2597 | 0.2284 |
| Variance Decomposition of WOP | | | | | | | |
| *Period* | RGDPgr | PEXR | REXR | INF | WOP | FIR | DIR |
| 1 | 45.024 | 4.029 | 22.954 | 6.5595 | 21.4335 | 0.0000 | 0.0000 |
| 10 | 3.846 | 10.955 | 64.103 | 12.6672 | 3.3229 | 4.8060 | 0.3002 |
| Variance Decomposition of FIR | | | | | | | |
| *Period* | RGDPgr | PEXR | REXR | INF | WOP | FIR | DIR |
| 1 | 0.273 | 0.362 | 45.749 | 23.5248 | 0.7553 | 29.3358 | 0.0000 |
| 10 | 6.013 | 37.343 | 42.787 | 8.5927 | 2.1452 | 2.7192 | 0.4008 |
| Variance Decomposition of DIR | | | | | | | |
| *Period* | RGDPgr | PEXR | REXR | INF | WOP | FIR | DIR |
| 1 | 0.020 | 1.035 | 2.098 | 61.3116 | 1.6811 | 5.3744 | 28.4799 |
| 10 | 3.493 | 28.079 | 52.888 | 10.1627 | 2.1978 | 2.9891 | 0.1903 |

*SOURCE: Author' s Computation (2020)*

Variance decomposition reflect the contribution of each of the endogenous variables to forecast error variance in a given variable of interest, the summary as presented in table 4.3 reported the 1st and 10th period contribution of each corresponding variables to forecast error variance of the variable of interest.

Table 4.3 showed that 100% and 3.66178% of the forecast error variance in gross domestic product growth rate can be accounted for by itself in period 1 and period 10 respectively, which reflects that real GDP growth rate of the sampled oil producing countries is strongly endogenous in the short run but become weakly endogenous in predicting its own variation on the long run. On the other hand, prime exchange rate accounted for 0% at period 1, and 27.50% at period 10, exchange rate account for 0% of the variation in real gross domestic product at period 1, and 53.54% at period 10, while inflation rate, world oil [rice foreign interest rate and domestic interest rate accounted for 0% respectively in period 1, but 10.28%, 1.96%, 3.029% and 0.14% respectively in period 10.

Overview of the forecast error variance decomposition showed that both prime exchange rate and official exchange rate have strong influence on the growth rate of real gross domestic product especially on the long as they both account for about 80.90% of forecast error variance in the growth rate of real gross domestic product of oil producing counties sampled in the study. in a nutshell, prime exchange rate and real official exchange rate account for significant variation in the level of economic growth of oil producing African countries ceteris paribus.

Result also showed that real GDP growth rate accounted for 23.10% of the forecast error variance in prime exchange rate in period 1, but at period 10 it only accounted for 4.07% of the variance. However prime exchange accounted for 76.89% and 31.01% of forecast error variance in itself in period 1 and period 10 respectively.

In the case of real official exchange rate, real GDP growth rate accounted for 13.37% of forecast error variance in real official exchange rate in period 1 and both it only accounted for 3.64% in period 10, while real exchange rate accounted for 82.78% and 53.21% of forecast error variance in itself in period 1 and 10 respectively.

## VI. Discussion of Results

The empirical analysis of this study started by subjecting variables of interest to stationarity test. Results from this show that variables of interest became stationary at their first difference. Thereafter, panel co-integration test was conducted through kao and pedroni co integration tests. Result obtained from this reveals that there is no enough evidence to reject the null hypothesis of no co-integration. This finding is intandem with finding of Tefera (2004) in a similar study. Results from Impulse response function show that response of real GDP growth to standard deviation shocks from inflation and world oil price was negative but significant. This finding is equally compatible with the results obtained by Raidwan (2016) in a related study. Response of output growth rate to standard deficit shocks from parallel exchange rate, domestic interest rate and official interest rate was negative but significant. This finding is in line with result obtained by Godwin (2018) in a similar study but negative the finding of Juannuh (2016) in the same study but country specific.

Post Estimation Test

Summary and conclusion

## VII. Section Five

In this paper, the relationship between parallel currency market premium and economic growth in African oil producing countries was examined. Data for the study were sourced from World Bank' s Development Indicators (WDI), International monetary fund online Data base and Central Banks of the selected countries. The study employed panel VECM as estimation technique. Results from our empirical estimations showed that premium exchange rate has a direct and significant effects on output growth in African oil producing countries. This is based on the fact that the average response of output growth rate and other macroeconomic variables to shocks emanated from premium exchange rate was direct, significant and negative. Based on these findings, the study therefore concludes that premium exchange rate is detrimental to macroeconomic performance in African oil producing countries. The study recommends that performance of official foreign exchange market should be enhanced by reducing foreign currencies rationing. If that is done, the level of patronage in black currency market will be reduced.

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