# Real Effective Exchange Rate and Non-Oil Exports Performance in Nigeria An Empirical Reflection

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# Abstract

This study has been on Real Effective Exchange Rate and non oil exports in Nigeria. The main objective of the study is thus to empirically evaluate the impact of the Real Effective Exchange Rate on non oil exports in Nigeria. The study covered the period between 1980 to 2014. The cointegration technique was applied to estimate the data. The result of the ADF unit root test indicates that all the variables are I(1). The result of the Johansen cointegration test suggests a long run relationship among the variables. The parsimonious ECM result indicates that the Real Effective Exchange Rate and the degree of openness have positive and significant impact on non-oil exports in Nigeria. The ARCH/GARCH results indicate that the volatility of the REER has influenced the level of non-oil exports in Nigeria. The result recommends further devaluation of the exchange rate backed by increased domestic production through a diversified production base.

Key-Words: Non-oil exports, Real Effective Exchange Rate, Cointegration, economic growth.

# 1. Introduction

The relationship between the Real Effective Exchange Rate (REER) which represents "relative price of foreign goods in terms of domestic goods" and non-oil exports in Nigeria is important from policy perspectives. This is because the REER serves as a measure of the international competitiveness which could be maximized through export promotion, particularly through non-oil exports which is more growth enhancing than oil exports which is the dominant export commodity in Nigeria. Serven and Solimano (1991) and Aron, Elbadawi and Khan (1997) noted in their various studies that the equilibrium real exchange rate has important influence on export growth. A policy focus of the Structural Adjustment Programme (SAP) introduced in 1986 was the expansion of non-oil exports through the diversification of the economy away from oil exports. The depreciation of the effective exchange rate was aimed at boosting agricultural exports through increased domestic production (Adobi and Okunmadewa, 1999). Although the agricultural exports increased marginally as a result of his depreciation, the instability of the REER has hindered the performance of Nigeria's non-oil exports. This is because the goal of a stable exchange rate was not achieved despite the devaluation of the naira (Yimka, Olusegun and Anthony, 2014). The failure of the Nigerian exchange rate to achieve export promotion has been also due to the fact that Nigeria basically imports inputs such as machinery used in the production for exports. This makes nonsense of the devaluation policy since the ensuing high cost of domestic production has hindered the expansion of the non-oil exports. The unpredictability of the exchange rate has negatively affected the operation of the non-oil sector in Nigeria.

Although misalignment of the REER can either be undervaluation or overvaluation, the overvaluation of the REER predominates in developing countries, including Nigeria. This has led to a decline in the tradable good sector and hence lowering capital formation in Nigeria. This has detrimental impact on non-oil exports in Nigeria. The impact of the various exchange rate reforms on the non-oil exports has been unascertained. This is because the non-oil exports which is a measure of the international viability and competitiveness has been quite low. Total exports in Nigeria increased tremendously between the periods of 1986 and 2013. This was partly due to a sharp depreciation of the exchange rate and the introduction of the Second Tier Foreign Exchange Market in 1987 and the increase in the oil price in the last decade. Between 1986 and 1987 alone total exports increased by 240 percent (Akinlo and Adejuma, 2014). The surprising features of this high exports performance were the overwhelming dominance of oil exports accounting for about 90 percent of total exports in Nigeria during the study period. For example, the total non-oil exports in 1986 were N552.1m and increased to 169,709.7m in 2007.

In the Pre-Structural Adjustment Programme (Pre-SAP) period, (between 197f and 1985), agricultural sector contributed about 4.0 percent to the total exports and about 67.0 percent to non-oil exports (Ogun, 2004). In the same period, the manufacturing sector contributed about 1.0 percent to total exports and 12.0 percent to non-oil exports. The main objective of this study is thus to establish the impact of REER on non-oil exports in Nigeria. This is significant because unlike the nominal exchange rate, the REER measures the true international competitiveness of Nigeria's non-oil exports with her major trading partners. The hypothesis is thus that "REER has not significantly influenced the level of non-oil exports in Nigeria. This study is thus expected to suggest policies to promote non-oil exports through proper management of the REER. The international compositeness of the Nigerian economy will thus be highlighted in the study. Other than this introductory section, the rest of the paper is divided into the following sections. The second section reviews literature while the third section borders on the econometric procedure which includes the methodology, model specification as well as the results and findings. The fifth section concludes this paper.

### 2. Literature Review

Theoretically, changes in the REER have been an important factor in increasing the level of exports. Hooper and Kohinagen (1978) noted that increased uncertainty of exchange rate affects trade in a negative way, granted that people are risk averse. De Grauwe (1988) stated that so long people are risk averters, exchange rate influence export performance. Dincer and Kandil (2011) noted that an unanticipated exchange rate appreciation will make exports to be more expensive and imports to be cheaper. They also noted that a positive shock to the local currency through sudden appreciation or overvaluation of it leads to lower interest rates as agents will prefer to hold less domestic currency. Through the influence of the money market. Also a favourable perturbation to the local currency has the tendency to lower the local productivity capacity. Imoughele and Ismaila (2015) studied the impact of exchange rate on Nigeria non-oil exports. The study covered the period between 1986 and 2013. The cointegration technique was used. The study showed that effective exchange rate, money supply, credit to the private sector and economic performance have a significant impact on the growth of non-oil exports. Aliyu (2011) investigated the impact of oil price shock and exchange rate volatility on economic growth in Nigeria. The study showed that appreciation of the exchange rate caused an increase in exports and lowers imports.

The focus of the study by Chukuigwe and Abili (2008) was on the impact of monetary and fiscal policies on nonoil exports in Nigeria. The study covered the period between 1974 and 2005. The study showed using, Ordinary Least Squares (OLS), that exchange rate had negative impact on non-oil exports. Omojimite and Akpokoje (2010) investigated the impact of exchange rate volatility on the imports of ECOWAS member countries. The study which covered the period between 1986 and 2007 revealed that exchange rate reforms are not sufficient to diversify the economy. Akinlo and Adejumo (2014) studied exchange rate volatility and non-oil exports in Nigeria. Their study covered 1986 to 2008 period. Using the dynamic short run analysis, the result showed that foreign income has positive impact on non-oil exports. The result showed further that exchange rate volatility has an insignificant impact on non-oil exports. Nyeadi and Atogenzoyn (2014) examined the impact of exchange rate movement on exports in Ghana. The study which covered the period between 1990 and 2012 used the OLS. The study showed that exchange rate movement has no significant impact on exports of goods and services. Dincer anmd Kandil (2011). Studied the effects of exchange rate fluctuations on sectoral exports in Turkey. Using data covering 1996 and 2005 for 21 sectors of the economy found that exchange rate has a significant impact on export growth. Erdal, Erdal and Esengu (2012) investigated the impact of exchange rate volatility on trade in Turkish agricultural trade.

The study which covered the period between 1995 and 2007 showed that REER volatility have a positive long run impact on agricultural exports and a negative long run relationship with agricultural imports. Onaforowa and Owoye (2008) on their study on exchange rate volatility between Nigeria and the United States used data covering the period between 1980 and 2011. The study showed a long run relationship among real exports, real foreign income, relative export prices and Real Exchange Rate volatility. The result shows also that Real Exchange Rate (RER) has a negative impact on exports in both short run and long run. Yaqub (2010) examined exchange rate change and output performance in Nigeria using data between 1970 and 2007. The study found that exchange rate has significant and contractionary impact on agricultural and manufactur8ng output.

# 3. Econometric Procedure

The cointegration technique was used in this study. This commenced with the determination of whether the variables used in the analysis has a unit root. The Augmented Dickey Fuller (ADF) unit root test which has the advantages of correcting for possible serial correlation was used for this purpose. The second stage was to test for the long run relationship among the variables. This was done with the use of the cointegration test. The Johansen methodology which has the advantages amongst others for allowing for more than one cointegrating equation was used for this purpose. The next test will be the estimation of the overparameterize and the parsimonious ECM models. The various diagnostic checks will follow before an estimation of the variance decomposition.

# 4. Results and Findings

The result of the unit root test is shown in the table below:

Variables	Level data	First	1% Critical	5% Critical	10% Critical	Order of
		Difference	Value	Value	Value	Integration
REER	-2.61	-4.82*	-3.66	-2.96	-2.62	I(1)
GDP	1.65	4.95*	-3.66	-2.96	-2.62	I(1)
OPEN	-1.95	4.28*	-3.66	-2.96	-2.62	I(1)
NOEX	2.51	-5.36*	-3.66	-2.96	-2.62	I(1)

Table 1: Summary of ADF Unit root test result

**NB:** \* indicates statistical significance at the 1 percent level

The result of the ADF unit root test result indicates that all the variables have a unit root. They however became stationary after the first difference was taken. They are thus I(1). All the variables were stationary at the 1 percent level. The Johansen cointegration test was adopted to test for the long run relationship among the variables. The result of the Johansen cointegration test is shown below:

Trace	5 Percent	1 Percent		
Statistic	Critical Value	Critical Value		
49.36334	47.21	54.46		
17.16879	29.68	35.65		
6.229140	15.41	20.04		
1.035254	3.76	6.65		
Max-Eigen	5 Percent	1 Percent		
Statistic	Critical Value	Critical Value		
29.19455	27.07	32.24		
10.93965	20.97	25.52		
5.193886	14.07	18.63		
1.035254	3.76	6.65		

### Table2: Johansen cointegration test result

The result of the Johansen cointegration test indicates one cointegrating equation by both the Max-Eigen statistic and the trace statistic. This is an indication of the existence of a long run equilibrium relationship among the variables. This led us to the estimation of the overparmatyerize and the parsimonious ECM models.

Variable	Coefficient	Std. Error	t-Statistic	Prob.	
DLGDP	5.024753	2.183062	2.301700	0.0322	
DLGDP(-1)	-2.431805	1.924608	-1.263533	0.2209	
DLGDP(-2)	0.701078	0.650769	1.077307	0.2942	
DLREER	-0.003487	0.001666	-2.093362	0.0493	
DLREER(-1)	0.000232	0.001567	0.148099	0.8837	
DLREER(-2)	-0.000829	0.001524	-0.543990	0.5925	
OPEN	0.513713	0.514831	0.997830	0.3303	
OPEN(-1)	0.761909	0.094144	8.093023	0.0000	
OPEN(-2)	0.326860	0.668114	0.489228	0.6300	
ECM(-1)	-0.483866	0.105696	-4.577960	0.0001	
С	-0.140742	0.326502	-0.431060	0.6710	
	=	=	=	=	

The results of the over parameterize ECM is shown below:

#### Table 3: Over parameterize ECM MODEL. Dependent Variable: DLNOEXP

R<sup>2</sup>= 0.57, AIC= 1.30, SC= 1.81, DW=2.21

The parsimonious ECM was gotten by deleting the insignificant variables from the over parameterize ECM and the analysis re-conducted. The result of the parsimonious ECM result is shown in the table below:

Table 4. I ar simolious Devit Result. Dependent Variable. DEITOEX					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
DLGDP	0.619668	0.133588	4.638657	0.0001	
DLREER	0.459182	0.200251	2.293030	0.0290	
OPEN(-1)	0.454316	0.167069	2.989855	0.0053	
ECM(-1)	-0.286662	0.097155	-2.950553	0.0062	
С	0.295459	0.233820	1.263616	0.2176	
	_	=	=	=	

### Table 4. Parsimonious ECM Result Dependent Variable: DLNOEX

R<sup>2</sup>= 0.59, AIC= -1.24, SC= -1.47, DW=2.10

The  $R^2$  shows that 59 [percent of the total variation in non-oil exports have been explained by the level of economic growth, Real Effective Exchange Rate and the openness of the Nigerian economy to the outside world taken together. 41 percent of the variation was explained outside the model. The result shows that the REER has a significant and positive impact on the level of non oil exports in Nigeria. An indication that the depreciation of the REER has improved the level of non oil exports in Nigeria. The result indicates that a depreciation of the REER by 1 percent increased non-oil exports by 0.46 percent. The openness of the Nigerian economy to the outside World has significant and positive impact on non-oil exports. This is an indication that trade liberalization provides an avenue for expansion in non-oil exports. The result indicates also that the level of economic growth has a significant and positive impact on the level of non-oil exports in Nigeria. An increase in economic growth by 1 percent increased non-oil exports by 62 percent. The statistical significance of the ECM provides an indication of a satisfactory speed of adjustment and a further confirmation of the existence of a long run equilibrium relationship among the variables. The results of the diagnostic checks are shown below:



White Heter oskedasticity test					
F statistic	1.27	Probability	0.31		
Breus F statistic	ch – Godfrey Serial C 0.07	Correlation LM test Probability	0.94		
-	Jarque-bera				
Jarque-bera	0.92	Probability	0.63		

The result of the Jarque bera normality test with a probability of 0.63 indicates a validation of the null hypothesis that the residuals are normally distributed. The result of the Breusch-Godfrey serial correlation LM test indicates that the residuals are not serially correlated. The white heteroskedasticity test with a probability of 0.31 indicates that the residuals are homoskedastic. The results of the Cumulative Sum of Recursive Residuals(CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMQ)stability tests are shown in the figures below:





Thee result of the Cholesky variance decomposition is shown below:



Residual stability was shown by both the CUSUM and CUSUMQ stability tests since both the CUSUM and CUSUMQ lines did not cut the 5 percent lines. The results of the diagnostic checks paved the way for the estimation of the variance decomposition which is shown in the table below:

#### Variance Decomposition of LGDP:

### **Table6: Cholesky Variance Decomposition**

1         0.041455         100.0000         0.000000         0.000000           2         0.068206         96.00766         0.020706         3.944433         0.023148           3         0.092277         90.95298         0.011776         7.767429         6.810334           5         0.137801         84.62548         0.102180         5.755956         9.516385           6         0.156324         84.25545         0.205724         5.118592         10.44023           7         0.172129         84.39479         0.237759         4.870522         10.49693           8         0.185669         84.61118         0.228617         4.832253         10.36655           9         0.198415         84.77993         0.215588         4.840181         10.16430           10         0.21062         84.85451         0.207607         4.850247         10.08764           Variance Decomposition of LNOEX:         Period         S.F.         IGP         I.NOEX         I.REFR         OPEN           1         0.463861         12.04726         87.95724         0.000000         0.000000           2         0.600232         12.30107         86.31685         1.38117         0.000000	Period	S.E.	LGDP	LNOEX	LREER	OPEN
2         0.068206         96.00766         0.020706         3.94483         0.021148           3         0.092277         90.95298         0.011776         7.237490         1.797750           4         0.116304         86.41472         0.007517         6.767429         6.810334           5         0.137801         84.62548         0.102180         5.759956         9.516385           6         0.156324         84.23545         0.20779         4.870522         10.49093           8         0.189969         84.61118         0.228617         4.830247         10.03695           9         0.198415         84.77993         0.21588         4.340181         10.16430           10         0.21062         84.8451         0.207607         4.830247         10.008764           Variance Decomposition of LNOEX:         Premod         S.E         LGDP         LNOEX         LREER         OPEN           1         0.463861         12.04726         87.95274         0.000000         0.000000           2         0.666322         15.350670         81.6945         1.8114         0.009094           3         0.758960         15.3564         82.99440         1.165748         0.4838417 <td>1</td> <td>0.041455</td> <td>100.0000</td> <td>0.000000</td> <td>0.000000</td> <td>0.000000</td>	1	0.041455	100.0000	0.000000	0.000000	0.000000
3         0.09227         90.95298         0.011776         7.237490         1.797750           4         0.116304         86.41472         0.007517         6.767429         6.810334           5         0.137801         84.62548         0.102180         5.753955         9.516385           6         0.156324         84.23545         0.2037724         5.1185922         10.44023           7         0.172129         84.39479         0.237759         4.870522         10.34963           9         0.198415         84.77993         0.215588         4.840181         10.16430           10         0.210062         84.85451         0.207607         4.850247         10.008764           Variance Decomposition of LNOEX:         PEN         NOEX         REFER         OPEN           1         0.463861         1.204726         87.95274         0.000000         0.000000           2         0.666232         12.30107         86.31685         1.381174         0.000904           3         0.758960         1.3.35664         82.99440         1.165748         0.483217           4         0.85422         15.9245         82.06418         1.1292548         0.848417           5	2	0.068206	96.00766	0.020706	3.948483	0.023148
4         0.113301         86.41472         0.007517         6.767429         6.810334           5         0.137801         84.62548         0.102180         5.75595         9.516385           6         0.156324         84.23545         0.205724         5.118592         10.44023           7         0.172129         84.39479         0.237759         4.870522         10.36695           9         0.198415         84.77993         0.215588         4.840181         10.16430           10         0.210062         84.85451         0.207607         4.850247         10.08764           Variance Decomposition of LNOEX:         E         LINOEX         LREER         OPEN           11         0.463861         12.04726         87.95274         0.000000         0.000000           2         0.666232         1.230107         86.31685         1.381174         0.009004           2         0.666232         1.530164         81.5475         0.981835         1.169235           4         0.855422         15.92245         82.06418         1.128548         0.884817           5         0.938426         1.628463         81.5475         0.981835         1.169235           6 <td< td=""><td>3</td><td>0.092277</td><td>90.95298</td><td>0.011776</td><td>7.237490</td><td>1.797750</td></td<>	3	0.092277	90.95298	0.011776	7.237490	1.797750
5         0.137801         84.62548         0.102180         5.755956         9.516385           6         0.156324         84.23545         0.205724         5.118592         10.44023           7         0.172129         84.39479         0.237759         4.870522         10.49693           8         0.189969         84.61118         0.221677         4.823253         10.33695           9         0.19415         84.77993         0.215858         4.840181         10.16430           10         0.20062         84.85451         0.207607         4.850247         10.08764           Variance Decomposition of LNOEX:         Period         S.E         IGP         LNOEX         LREER         OPEN           2         0.606232         12.30107         86.31685         1.381174         0.000000           2         0.606232         15.92245         82.06418         1.128548         0.884817           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50514         81.32473         0.774397         2.745732           8         1.139908         14.78651         81.56285         0.716949         2.01056     <	4	0.116304	86.41472	0.007517	6.767429	6.810334
6         0.156324         84.23545         0.2037759         4.870522         10.40023           7         0.172129         84.39479         0.237759         4.870522         10.49693           8         0.185969         84.61118         0.228617         4.832323         10.33695           9         0.198415         84.77993         0.215588         4.840181         10.16430           Variance Decomposition of LNOEX:         Pereomposition of LNOEX:         Pereomposition of LNOEX         IREER         OPEN           1         0.463861         12.04726         87.95274         0.000000         0.000000           2         0.6606232         12.30107         86.31858         1.381174         0.000904           3         0.758960         15.35664         82.99440         1.165748         0.483217           4         0.855422         15.92245         82.06418         1.128548         0.848417           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.32473         0.774397         2.745732 </td <td>5</td> <td>0.137801</td> <td>84.62548</td> <td>0.102180</td> <td>5.755956</td> <td>9.516385</td>	5	0.137801	84.62548	0.102180	5.755956	9.516385
7         0.172129         84.39479         0.237759         4.870522         10.49093           8         0.183969         84.61118         0.228617         4.823253         10.3695           9         0.198415         54.77993         0.215588         4.840181         10.16430           10         0.210062         84.85451         0.207607         4.850247         10.08764           Variance         Period         S.E         IGDP         LNOEX         LREER         OPEN           2         0.660232         12.30107         86.31685         1.381174         0.000000          3         0.758960         15.35664         82.99440         1.165748         0.483217           4         0.855422         15.92245         82.06418         1.128548         0.884817           5         0.938426         16.28463         81.6475         0.981385         1.169235           6         1.01613         15.05514         81.32473         0.774397         2.745732           8         1.39908         14.78551         81.5825         0.717989         2.912658           9         1.201564         14.75589         81.7992.0         0.685184         2.795724           10 <td>6</td> <td>0.156324</td> <td>84.23545</td> <td>0.205724</td> <td>5.118592</td> <td>10.44023</td>	6	0.156324	84.23545	0.205724	5.118592	10.44023
8         0.185969         84.61118         0.228617         4.823253         10.33695           9         0.198415         84.77993         0.215588         4.840181         10.16430           Variance Decomposition of LNOEX:         Privation of LNOEX:         LREER         OPEN           1         0.463861         12.04726         87.95274         0.000000         0.000001           2         0.606232         12.30107         86.31685         1.381174         0.000904           3         0.758960         15.35664         82.99440         1.165748         0.483217           4         0.85422         15.92245         82.06418         1.128548         0.884817           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.39473         0.774997         2.912658           9         1.201564         14.75589         81.9920         0.665184         2.759724           10         1.261592         14.71339         81.91183         0.666204         2.70873           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN	7	0.172129	84.39479	0.237759	4.870522	10.49693
9         0.198415         84.77993         0.215588         4.840181         10.16430           10         0.210062         84.85451         0.207607         4.850247         10.08764           Variance Decomposition of LNOEX:         ERE         LGDP         LNOEX         LREER         OPEN           11         0.463861         12.04726         87.95274         0.000000         0.000000           2         0.606232         12.30107         86.31685         1.381174         0.000904           2         0.606232         15.35664         82.99440         1.165748         0.483217           4         0.855422         15.9245         82.06418         1.128548         0.483217           5         0.938426         16.28463         81.56475         0.981485         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.32473         0.774397         2.745732           8         1.139908         14.78589         81.79920         0.681184         2.759724           10         1.261592         14.71339         81.91183         0.666204         2.708573	8	0.185969	84.61118	0.228617	4.823253	10.33695
10         0.21062         84.85451         0.207607         4.850247         10.08764           Variance Decomposition of LNOEX:         LRDP         LNOEX         LREER         OPEN           1         0.463861         1.2.04726         87.95274         0.000000         0.000000           2         0.606232         12.30107         86.31685         1.381174         0.000904           3         0.758960         15.35664         82.99440         1.165748         0.483217           4         0.855422         15.92245         82.06418         1.128548         0.884817           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           9         1.201564         14.75589         81.79920         0.685184         2.709573           10         1.261592         14.7139         81.91183         0.66024         2.708573           11         0.398055         4.682500         35.87376         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           2	9	0.198415	84.77993	0.215588	4.840181	10.16430
Variance Decomposition of LNOEX:         LGDP         LNOEX         LREER         OPEN           1         0.463861         12.04726         87.95274         0.000000         0.000000           2         0.660532         12.30107         86.31685         1.381174         0.000000           3         0.758960         15.35664         82.99440         1.165748         0.483217           4         0.855422         15.92245         82.06418         1.128548         0.384817           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.352473         0.771397         2.745732           8         1.139908         14.78651         81.5825         0.717989         2.912658           9         1.201564         14.75589         81.19920         0.685184         2.759724           10         1.261592         1.4.1339         81.91183         0.666204         2.708573           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN <td>10</td> <td>0.210062</td> <td>84.85451</td> <td>0.207607</td> <td>4.850247</td> <td>10.08764</td>	10	0.210062	84.85451	0.207607	4.850247	10.08764
Variance Decomposition of LNOEX.         LRER         OPEN           1         0.463861         12.04726         87.95274         0.00000         0.000000           2         0.606232         12.30107         86.31685         1.381174         0.000904           3         0.758960         15.35664         82.99440         1.165748         0.483217           4         0.855422         15.92245         82.06418         1.128548         0.884817           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.32473         0.774397         2.745732           8         1.139908         14.78651         81.58285         0.717989         2.912658           9         1.201564         14.75589         81.79920         0.686184         2.708573           Variance Decomposition of LREER:           Period         S.E         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000	Variance D	acomposition of INOEV				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Period	S.E.	LGDP	LNOEX	LREER	OPEN
2         0.606232         1.2.0107         86.31685         1.381174         0.000904           3         0.758960         15.35664         82.99440         1.165748         0.483217           4         0.855422         15.92245         82.06418         1.128548         0.483217           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.32473         0.771997         2.745732           8         1.139908         14.78651         81.58285         0.717989         2.912658           9         1.201564         14.75589         81.91920         0.6685184         2.759724           10         1.261592         14.71339         81.91183         0.666204         2.708573           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109	1	0 463861	12,04726	87 95274	0.00000	0.000000
2         0.002100         12.007         0.001007         11.05748         0.483217           3         0.758960         15.33664         82.99440         1.165748         0.483217           4         0.855422         15.92245         82.06418         1.128548         0.884817           5         0.938426         16.28463         81.56475         0.931885         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.32473         0.774397         2.745732           8         1.139908         14.78651         81.58285         0.717989         2.912658           9         1.201564         14.75589         81.79920         0.685184         2.798724           10         1.261592         14.71339         81.91183         0.666204         2.708573           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109	2	0.606232	12.30107	86 31685	1 381174	0.000904
5         6.0.5070         11.59245         82.06418         1.128548         0.884817           5         0.938426         16.28463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.32473         0.774397         2.745732           8         1.139908         14.78651         81.58285         0.717989         2.912658           9         1.201564         14.7589         81.79920         0.6685184         2.759724           10         1.261592         14.71339         81.91183         0.666204         2.708573           Variance Decomposition of LREER:           Period         S.E         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186 <t< td=""><td>3</td><td>0.758960</td><td>15 35664</td><td>82 99440</td><td>1.165748</td><td>0.483217</td></t<>	3	0.758960	15 35664	82 99440	1.165748	0.483217
1         0.02412         16.22463         81.56475         0.981385         1.169235           6         1.011613         15.50870         81.09856         0.864486         2.528258           7         1.076785         15.15514         81.32473         0.774397         2.745732           8         1.139908         14.78651         81.58285         0.717989         2.912658           9         1.201564         14.75589         81.79920         0.685184         2.759724           10         1.261592         14.71339         81.91183         0.666204         2.708573           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186         36.81857         3.527519           5         1.224264         3.341509         55.95680         37.69446         3.007227	3 4	0.855422	15 92245	82.06418	1 128548	0.884817
5         0.50100         10.2000         0.1007.0         0.1007.0         10.1012.0           6         1.011613         15.50870         81.09856         0.864486         2.52828           7         1.076785         15.15514         81.32473         0.774397         2.745732           8         1.139908         14.78651         81.58285         0.717989         2.912658           9         1.201564         14.75589         81.79920         0.685184         2.759724           10         1.261592         14.71339         81.91183         0.666204         2.708573           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.55680         37.69446         3.007227           6         1.334668         3.004648         56.28544         37.95176         2.75336	5	0.938426	16 28463	81 56475	0.981385	1 169235
0         1.011013         15.0010         01.00300         0.004400         2.20220           7         1.076785         15.15514         81.32473         0.771497         2.745732           8         1.139908         14.78651         81.58285         0.717989         2.912658           9         1.201564         14.75589         81.79920         0.685184         2.759724           10         1.261592         14.71339         81.91183         0.666204         2.708573           Variance Decomposition of LREER:           Period         S.E         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.55186         36.81857         3.527519           5         1.22464         3.341509         55.95680         37.69446         3.007227           6         1.334668         3.004685         56.28544         37.95176	6	1.011613	15 50870	81.09856	0.864486	2 528258
1 + 0.0005 $12.1014$ $0.1.2473$ $0.74273$ $2.74573$ $8 + 1.139908$ $14.78651$ $81.58285$ $0.717989$ $2.912658$ $9 + 1.201564$ $14.75589$ $81.79920$ $0.685184$ $2.759724$ $10 + 1.261592$ $14.71339$ $81.91183$ $0.666204$ $2.708573$ Variance Decomposition of LREER:PeriodS.E.LGDPLNOEXLREEROPEN $1 + 0.398055$ $4.682650$ $35.83736$ $59.47999$ $0.000000$ $2 + 0.771059$ $6.481372$ $49.01985$ $38.10067$ $6.398109$ $3 + 0.961060$ $5.202342$ $54.18670$ $36.45181$ $4.159147$ $4 + 1.102109$ $4.092045$ $55.56186$ $36.81857$ $3.527519$ $5 + 1.224264$ $3.341509$ $55.95680$ $37.69446$ $3.007227$ $6 + 1.334668$ $3.006468$ $56.28544$ $37.95176$ $2.756336$ $7 + 1.431054$ $2.951980$ $56.48791$ $37.83620$ $2.723917$ $8 + 1.519417$ $3.023403$ $56.59126$ $37.70164$ $2.683690$ $9 + 1.603301$ $3.018627$ $56.77469$ $37.72260$ $2.484085$ $10 + 1.685931$ $2.959658$ $56.96616$ $37.78935$ $2.284841$ Variance Decomposition of OPEN:PeriodS.E.LGDPLNOEXLREEROPEN $1 + 0.17447$ $8.729501$ $10.71236$ $2.042643$ $78.51550$ $2 - 0.190626$ $11.10513$ $11.40970$ $4.762191$ $72.$	7	1.076785	15.15514	81.07050	0.77/397	2.528258
o         1.15906         14.76301         61.3623         0.71799         2.91203           9         1.201564         14.75589         81.79920         0.685184         2.759724           10         1.261592         14.71339         81.99183         0.666204         2.708573           Variance Decomposition of LREER:           Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186         36.81857         3.527519           5         1.224264         3.341509         55.95680         37.69446         3.007227           6         1.334668         3.006468         56.28544         37.95176         2.756336           7         1.431054         2.951980         56.48791         37.84200         2.484085           10         1.685931         2.959658         56.96616         37.78935 <td>0</td> <td>1.120008</td> <td>14 79651</td> <td>81.52475</td> <td>0.774397</td> <td>2.743732</td>	0	1.120008	14 79651	81.52475	0.774397	2.743732
9         1201104         1471339         81.9320         0.003/104         2.13724           10         1.261592         1471339         81.9183         0.666204         2.708573           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186         36.81857         3.527519           5         1.224264         3.341509         55.95680         37.69446         3.007227           6         1.334668         3.006468         56.28544         37.95176         2.756336           7         1.431054         2.951980         56.48791         37.83620         2.723917           8         1.519417         3.023403         56.59126         37.70164         2.683690           9         1.603301         3.018627         56.77469         37.72260         2.484085     <	0	1.139908	14.76031	81.38283	0.717989	2.912038
10         1.201992         14.71339         81.91133         0.000204         2.708373           Variance Decomposition of LREER:         Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186         36.81857         3.527519           5         1.224264         3.341509         55.95680         37.69446         3.007227           6         1.334668         3.006468         56.28544         37.95176         2.723917           8         1.519417         3.023403         56.59126         37.70164         2.683690           9         1.603301         3.018627         56.77469         37.72260         2.484085           10         1.685931         2.959658         56.96616         37.78935         2.284841           Variance Decomposition of OPEN:         Period         S.E.         LGDP         LNOEX	2 10	1.201504	14.75565	81.73320	0.0001104	2.739724
Variance Decomposition of LREER:         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186         36.81857         3.527519           5         1.224264         3.341509         55.95680         37.69446         3.007227           6         1.334668         3.006468         56.28544         37.95176         2.756336           7         1.431054         2.951980         56.48791         37.83620         2.723917           8         1.519417         3.023403         56.59126         37.70164         2.683690           9         1.603301         3.018627         56.777469         37.72260         2.484085           10         1.685931         2.959658         56.96616         37.78935         2.284841           Variance Decomposition of OPEN:         Period         S.E.         LGDP         LNOEX         LREER         OPEN	10	1.201392	14./1337	81.91105	0.000204	2.706575
Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.398055         4.682650         35.83736         59.47999         0.000000           2         0.771059         6.481372         49.01985         38.10067         6.398109           3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186         36.81857         3.527519           5         1.224264         3.341509         55.95680         37.69446         3.007227           6         1.334668         3.006468         56.28544         37.95176         2.756336           7         1.431054         2.951980         56.48791         37.83620         2.723917           8         1.519417         3.023403         56.59126         37.70164         2.683690           9         1.603301         3.018627         56.77469         37.72260         2.484085           10         1.685931         2.959658         56.96616         37.78935         2.284841           Variance Decomposition of OPEN:         Period         S.E.         LGDP         LNOEX         LREER         OPEN	Variance D	ecomposition of LREER:				
1       0.398055       4.682650       35.83736       59.47999       0.00000         2       0.771059       6.481372       49.01985       38.10067       6.398109         3       0.961060       5.202342       54.18670       36.45181       4.159147         4       1.102109       4.092045       55.56186       36.81857       3.527519         5       1.224264       3.341509       55.95680       37.69446       3.007227         6       1.334668       3.006468       56.28544       37.95176       2.756336         7       1.431054       2.951980       56.48791       37.83620       2.723917         8       1.519417       3.023403       56.59126       37.70164       2.683690         9       1.603301       3.018627       56.77469       37.72260       2.484085         10       1.685931       2.959658       56.96616       37.78935       2.284841         Variance Decomposition of OPEN:         Period       S.E.       LGDP       LNOEX       LREER       OPEN         1       0.174147       8.729501       10.71236       2.042643       78.51550         2       0.190626       11.10513       11.40970		-				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Period	S.E.	LGDP	LNOEX	LREER	OPEN
3         0.961060         5.202342         54.18670         36.45181         4.159147           4         1.102109         4.092045         55.56186         36.81857         3.527519           5         1.224264         3.341509         55.95680         37.69446         3.007227           6         1.334668         3.006468         56.28544         37.95176         2.756336           7         1.431054         2.951980         56.48791         37.83620         2.723917           8         1.519417         3.023403         56.59126         37.70164         2.683690           9         1.603301         3.018627         56.77469         37.72260         2.484085           10         1.685931         2.959658         56.96616         37.78935         2.284841           Variance Decomposition of OPEN:           Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.174147         8.729501         10.71236         2.042643         78.51550           2         0.190626         11.10513         11.40970         4.762191         72.72297           3         0.205491         12.18437         14.09616 <t< td=""><td>Period 1</td><td>S.E. 0.398055</td><td>LGDP 4.682650</td><td>LNOEX 35.83736</td><td>LREER 59.47999</td><td>OPEN 0.000000</td></t<>	Period 1	S.E. 0.398055	LGDP 4.682650	LNOEX 35.83736	LREER 59.47999	OPEN 0.000000
4 $1.102109$ $4.092045$ $55.56186$ $36.81857$ $3.527519$ 5 $1.224264$ $3.341509$ $55.95680$ $37.69446$ $3.007227$ 6 $1.334668$ $3.006468$ $56.28544$ $37.95176$ $2.756336$ 7 $1.431054$ $2.951980$ $56.48791$ $37.83620$ $2.723917$ 8 $1.519417$ $3.023403$ $56.59126$ $37.70164$ $2.683690$ 9 $1.603301$ $3.018627$ $56.77469$ $37.72260$ $2.484085$ 10 $1.685931$ $2.959658$ $56.96616$ $37.78935$ $2.284841$ Variance Decomposition of OPEN:PeriodS.E.LGDPLNOEXLREEROPEN1 $0.174147$ $8.729501$ $10.71236$ $2.042643$ $78.51550$ 2 $0.190626$ $11.10513$ $11.40970$ $4.762191$ $72.72297$ 3 $0.205491$ $12.18437$ $14.09616$ $5.737296$ $67.98217$ 4 $0.211501$ $11.71527$ $18.20579$ $5.898738$ $64.18020$ 5 $0.220622$ $11.00321$ $22.75926$ $5.675226$ $60.56230$ 6 $0.228306$ $10.38605$ $26.065711$ $5.722412$ $57.82582$ 7 $0.238324$ $9.950225$ $27.68529$ $5.847769$ $56.51672$ 8 $0.247038$ $9.722594$ $28.87895$ $6.127022$ $55.27143$	Period 1 2	S.E. 0.398055 0.771059	LGDP 4.682650 6.481372	LNOEX 35.83736 49.01985	LREER 59.47999 38.10067	OPEN 0.000000 6.398109
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Period 1 2 3	S.E. 0.398055 0.771059 0.961060	LGDP 4.682650 6.481372 5.202342	LNOEX 35.83736 49.01985 54.18670	LREER 59.47999 38.10067 36.45181	OPEN 0.000000 6.398109 4.159147
6 $1.334668$ $3.006468$ $56.28544$ $37.95176$ $2.756336$ 7 $1.431054$ $2.951980$ $56.48791$ $37.83620$ $2.723917$ 8 $1.519417$ $3.023403$ $56.59126$ $37.70164$ $2.683690$ 9 $1.603301$ $3.018627$ $56.77469$ $37.72260$ $2.484085$ 10 $1.685931$ $2.959658$ $56.96616$ $37.78935$ $2.284841$ Variance Decomposition of OPEN:PeriodS.E.LGDPLNOEXLREEROPEN1 $0.174147$ $8.729501$ $10.71236$ $2.042643$ $78.51550$ 2 $0.190626$ $11.10513$ $11.40970$ $4.762191$ $72.72297$ 3 $0.205491$ $12.18437$ $14.09616$ $5.737296$ $67.98217$ 4 $0.211501$ $11.71527$ $18.20579$ $5.898738$ $64.18020$ 5 $0.220622$ $11.00321$ $22.75926$ $5.675226$ $60.56230$ 6 $0.228306$ $10.38605$ $26.06571$ $5.722412$ $57.82582$ 7 $0.238324$ $9.950225$ $27.68529$ $5.847769$ $56.1672$ 8 $0.247038$ $9.722594$ $28.78955$ $6.127022$ $55.27143$	Period 1 2 3 4	S.E. 0.398055 0.771059 0.961060 1.102109	LGDP 4.682650 6.481372 5.202342 4.092045	LNOEX 35.83736 49.01985 54.18670 55.56186	LREER 59.47999 38.10067 36.45181 36.81857	OPEN 0.000000 6.398109 4.159147 3.527519
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Period 1 2 3 4 5	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680	LREER 59.47999 38.10067 36.45181 36.81857 37.69446	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227
8       1.519417       3.023403       56.59126       37.70164       2.683690         9       1.603301       3.018627       56.77469       37.72260       2.484085         10       1.685931       2.959658       56.96616       37.78935       2.284841         Variance Decomposition of OPEN:         Period       S.E.       LGDP       LNOEX       LREER       OPEN         1       0.174147       8.729501       10.71236       2.042643       78.51550         2       0.190626       11.10513       11.40970       4.762191       72.72297         3       0.205491       12.18437       14.09616       5.737296       67.98217         4       0.211501       11.71527       18.20579       5.898738       64.18020         5       0.220622       11.00321       22.75926       5.675226       60.56230         6       0.228306       10.38605       26.06571       5.722412       57.82582         7       0.238324       9.950225       27.68529       5.847769       56.51672         8       0.247038       9.722594       28.87895       6.127022       55.27143	Period 1 2 3 4 5 6	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336
9       1.603301       3.018627       56.77469       37.72260       2.484085         10       1.685931       2.959658       56.96616       37.78935       2.284841         Variance Decomposition of OPEN:         Period       S.E.       LGDP       LNOEX       LREER       OPEN         1       0.174147       8.729501       10.71236       2.042643       78.51550         2       0.190626       11.10513       11.40970       4.762191       72.72297         3       0.205491       12.18437       14.09616       5.737296       67.98217         4       0.211501       11.71527       18.20579       5.898738       64.18020         5       0.220622       11.00321       22.75926       5.675226       60.56230         6       0.228306       10.38605       26.06571       5.722412       57.82582         7       0.238324       9.950225       27.68529       5.847769       56.51672         8       0.247038       9.722594       28.87895       6.127022       55.27143	Period 1 2 3 4 5 6 7	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668 1.431054	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336 2.723917
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Variance Decomposition of OPEN:           Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.174147         8.729501         10.71236         2.042643         78.51550           2         0.190626         11.10513         11.40970         4.762191         72.72297           3         0.205491         12.18437         14.09616         5.737296         67.98217           4         0.211501         11.71527         18.20579         5.898738         64.18020           5         0.220622         11.00321         22.75926         5.675226         60.56230           6         0.228306         10.38605         26.06571         5.722412         57.82582           7         0.238324         9.950225         27.68529         5.847769         56.51672           8         0.247038         9.722594         28.87895         6.127022         55.27143	Period 1 2 3 4 5 6 7 8 9	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668 1.431054 1.519417 1.603301	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336 2.723917 2.683690 2.484085
Period         S.E.         LGDP         LNOEX         LREER         OPEN           1         0.174147         8.729501         10.71236         2.042643         78.51550           2         0.190626         11.10513         11.40970         4.762191         72.72297           3         0.205491         12.18437         14.09616         5.737296         67.98217           4         0.211501         11.71527         18.20579         5.898738         64.18020           5         0.220622         11.00321         22.75926         5.675226         60.56230           6         0.228306         10.38605         26.06571         5.722412         57.82582           7         0.238324         9.950225         27.68529         5.847769         56.51672           8         0.247038         9.722594         28.87895         6.127022         55.27143	Period 1 2 3 4 5 6 7 8 9 10	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668 1.431054 1.519417 1.603301 1.685931	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.78935	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336 2.723917 2.683690 2.484085 2.284841
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2       0.190626       11.10513       11.40970       4.762191       72.72297         3       0.205491       12.18437       14.09616       5.737296       67.98217         4       0.211501       11.71527       18.20579       5.898738       64.18020         5       0.220622       11.00321       22.75926       5.675226       60.56230         6       0.228306       10.38605       26.06571       5.722412       57.82582         7       0.238324       9.950225       27.68529       5.847769       56.51672         8       0.247038       9.722594       28.87895       6.127022       55.27143	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668 1.431054 1.519417 1.603301 1.685931 ecomposition of OPEN: S.E.	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.78935 LREER	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336 2.723917 2.683690 2.484085 2.284841 OPEN
3       0.205491       12.18437       14.09616       5.737296       67.98217         4       0.211501       11.71527       18.20579       5.898738       64.18020         5       0.220622       11.00321       22.75926       5.675226       60.56230         6       0.228306       10.38605       26.06571       5.722412       57.82582         7       0.238324       9.950225       27.68529       5.847769       56.51672         8       0.247038       9.722594       28.87895       6.127022       55.27143	Period  1  2  3  4  5  6  7  8  9  10  Variance De Period  1	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668 1.431054 1.519417 1.603301 1.685931 ecomposition of OPEN: S.E. 0.174147	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.72260 37.78935 LREER 2.042643	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336 2.723917 2.683690 2.484085 2.284841 OPEN 78.51550
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5       0.220622       11.00321       22.75926       5.675226       60.56230         6       0.228306       10.38605       26.06571       5.722412       57.82582         7       0.238324       9.950225       27.68529       5.847769       56.51672         8       0.247038       9.722594       28.87895       6.127022       55.27143         0       0.25656       0.641085       20.70200       6.204601       51.26122	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3	S.E.         0.398055         0.771059         0.961060         1.102109         1.224264         1.334668         1.431054         1.519417         1.603301         1.685931         ecomposition of OPEN:         S.E.         0.174147         0.190626         0.205491	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.72260 37.78935 LREER 2.042643 4.762191 5.737296	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336 2.723917 2.683690 2.484085 2.284841 OPEN 78.51550 72.72297 67.98217
6       0.228306       10.38605       26.06571       5.722412       57.82582         7       0.238324       9.950225       27.68529       5.847769       56.51672         8       0.247038       9.722594       28.87895       6.127022       55.27143         0       0.25656       0.641085       20.70200       6.204601       54.26122	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4	S.E.         0.398055         0.771059         0.961060         1.102109         1.224264         1.334668         1.431054         1.519417         1.603301         1.685931         ecomposition of OPEN:         S.E.         0.174147         0.190626         0.205491         0.211501	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437 11.71527	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738	OPEN         0.000000         6.398109         4.159147         3.527519         3.007227         2.756336         2.723917         2.683690         2.484085         2.284841         OPEN         78.51550         72.72297         67.98217         64.18020
7       0.238324       9.950225       27.68529       5.847769       56.51672         8       0.247038       9.722594       28.87895       6.127022       55.27143         0       0.25656       0.641085       20.70200       6.204601       54.26122	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4  5	S.E.         0.398055         0.771059         0.961060         1.102109         1.224264         1.334668         1.431054         1.519417         1.603301         1.685931         ecomposition of OPEN:         S.E.         0.174147         0.190626         0.205491         0.211501         0.220622	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437 11.71527 11.00321	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579 22.75926	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738 5.675226	OPEN 0.000000 6.398109 4.159147 3.527519 3.007227 2.756336 2.723917 2.683690 2.484085 2.284841 OPEN 78.51550 72.72297 67.98217 64.18020 60.56230
8         0.247038         9.722594         28.87895         6.127022         55.27143           0         0.25755         0.611085         0.20200         51.27123	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4  5  6	S.E.         0.398055         0.771059         0.961060         1.102109         1.224264         1.334668         1.431054         1.519417         1.603301         1.685931         ecomposition of OPEN:         S.E.         0.174147         0.205491         0.211501         0.220622         0.228306	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437 11.71527 11.00321 10.38605	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579 22.75926 26.06571	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738 5.675226 5.722412	OPEN           0.000000           6.398109           4.159147           3.527519           3.007227           2.756336           2.723917           2.683690           2.484085           2.284841           OPEN           78.51550           72.72297           67.98217           64.18020           60.56230           57.82582
	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4  5  6  7	S.E.         0.398055         0.771059         0.961060         1.102109         1.224264         1.334668         1.431054         1.519417         1.603301         1.685931         ecomposition of OPEN:         S.E.         0.174147         0.190626         0.205491         0.211501         0.220622         0.228306         0.238324	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437 11.71527 11.00321 10.38605 9.950225	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579 22.75926 26.06571 27.68529	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738 5.675226 5.722412 5.847769	OPEN           0.000000           6.398109           4.159147           3.527519           3.007227           2.756336           2.723917           2.683690           2.484085           2.284841           OPEN           78.51550           72.72297           67.98217           64.18020           60.56230           57.82582           56.51672
<u>9 0.20000 9.041980 29.79200 6.304691 54.26133</u>	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4  5  6  7  8	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668 1.431054 1.519417 1.603301 1.685931 ecomposition of OPEN: S.E. 0.174147 0.190626 0.205491 0.211501 0.220622 0.228306 0.238324 0.247038	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437 11.71527 11.00321 10.38605 9.950225 9.722594	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579 22.75926 26.06571 27.68529 28.87895	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738 5.675226 5.722412 5.847769 6.127022	OPEN           0.000000           6.398109           4.159147           3.527519           3.007227           2.756336           2.723917           2.683690           2.484085           2.284841           OPEN           78.51550           72.72297           67.98217           64.18020           60.56230           57.82582           56.51672           55.27143
10 0.264202 9.542249 30.98827 6.469236 53.00025	Period  1  2  3  4  5  6  7  8  9  10  Variance De Period  1  2  3  4  5  6  7  8  9  10  Variance De Period  1  2  3  4  5  6  7  8  9	S.E. 0.398055 0.771059 0.961060 1.102109 1.224264 1.334668 1.431054 1.519417 1.603301 1.685931 ecomposition of OPEN: S.E. 0.174147 0.190626 0.205491 0.211501 0.220622 0.228306 0.238324 0.247038 0.256356	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437 11.71527 11.00321 10.38605 9.950225 9.722594 9.641985	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579 22.75926 26.06571 27.68529 28.87895 29.79200	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738 5.675226 5.7322412 5.847769 6.127022 6.304691	OPEN           0.000000           6.398109           4.159147           3.527519           3.007227           2.756336           2.723917           2.683690           2.484085           2.284841           OPEN           78.51550           72.72297           67.98217           64.18020           60.56230           57.82582           56.51672           55.27143           54.26133
	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4  5  6  7  8  9  10	S.E.         0.398055         0.771059         0.961060         1.102109         1.224264         1.334668         1.431054         1.519417         1.603301         1.685931         ecomposition of OPEN:         S.E.         0.174147         0.190626         0.205491         0.211501         0.228306         0.238324         0.247038         0.264202	LGDP 4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658 LGDP 8.729501 11.10513 12.18437 11.71527 11.00321 10.38605 9.950225 9.722594 9.641985 9.542249	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579 22.75926 26.06571 27.68529 28.87895 29.79200 30.98827	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738 5.675226 5.722412 5.847769 6.127022 6.304691 6.469236	OPEN           0.000000           6.398109           4.159147           3.527519           3.007227           2.756336           2.723917           2.683690           2.484085           2.284841           OPEN           78.51550           72.72297           67.98217           64.18020           60.56230           57.82582           56.51672           55.27143           54.26133           53.00025
	Period  1  2  3  4  5  6  7  8  9  10  Variance Do Period  1  2  3  4  5  6  7  8  9  10  Variance June Period  1  2  3  4  5  6  7  8  9  10	S.E.         0.398055         0.771059         0.961060         1.102109         1.224264         1.334668         1.431054         1.519417         1.603301         1.685931         ecomposition of OPEN:         S.E.         0.174147         0.205491         0.211501         0.220622         0.228306         0.238324         0.247038         0.264202	LGDP  4.682650 6.481372 5.202342 4.092045 3.341509 3.006468 2.951980 3.023403 3.018627 2.959658  LGDP  8.729501 11.10513 12.18437 11.71527 11.00321 10.38605 9.950225 9.722594 9.641985 9.542249	LNOEX 35.83736 49.01985 54.18670 55.56186 55.95680 56.28544 56.48791 56.59126 56.77469 56.96616 LNOEX 10.71236 11.40970 14.09616 18.20579 22.75926 26.06571 27.68529 28.87895 29.79200 30.98827	LREER 59.47999 38.10067 36.45181 36.81857 37.69446 37.95176 37.83620 37.70164 37.72260 37.72260 37.78935 LREER 2.042643 4.762191 5.737296 5.898738 5.675226 5.722412 5.847769 6.127022 6.304691 6.469236	OPEN           0.000000           6.398109           4.159147           3.527519           3.007227           2.756336           2.723917           2.683690           2.484085           2.284841           OPEN           78.51550           72.72297           67.98217           64.18020           60.56230           57.82582           56.51672           55.27143           54.26133           53.00025

Shocks to non-oil exports explained about 88 percent of changes in itself in the first period.

This was reduced to 82 percent in the last period. Shocks to REER explained 1percent of changes in non oil exports in the second period. The figure didn't change in most of the period. Shocks to economic growth explained about 12 percent of the changes in the level of non oil exports in the first period. This increased to 15 percent in the last period. Shocks to openness explained about 3 percent of changes in non-oil exports in the sixth period through the tenth period. Shocks to non-oil exports explained about 36 percent of changes in REER in the first period. This increased to 57 percent in the last period.

### Table7: GARCH/ARCH Result

Variance Equation						
С	0.039359	0.032693	1.203905	0.2286		
ARCH(1)	-0.143584	0.075482	-1.902214	0.0571		
GARCH(1)	0.926405	0.144729	6.400984	0.0000		

The result of the Autoregressive Conditional Heteroskedasticity (ARCH) and the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) shows that the volatility of the REER has hindered the performance of non-oil exports in Nigeria.

### 4. Conclusion and Recommendations

The study attempts to evaluate the impact of the REER on non-oil exports in Nigeria. This has become necessary given the dwindling level of non oil exports and more importantly since the REER denotes the international competitiveness of the Nigerian economy with her major trading partners. The ADF unit root test indicates that all the variables were I(1). The result of the Johansen cointegration test indicated that a long run relationship exists among the variables. The result of the parsimonious ECM indicates that the depreciation of the REER marginally improved the level of non-oil exports in Nigeria. The ARCH/ GARCH result indicates that volatility of the REER has influenced non oil sector performance in Nigeria. This seems to give some level of credibility to the government's and monetary authority's policy of REER devaluation. The study thus recommends further devaluation of the productive base and previously imported inputs will further increase the level of non-oil exports in Nigeria. Thus, the REER matters for the international competitiveness and the performance of the Non-oil sector in Nigeria.

# References

- Adubi, A. and Okunmadowa, P. (1999). "Price exchange rate volatility and Nigeria's agricultural trade flow: A dynamic analysis. African Economic Research Consortium (AERC), 87.
- Akinlo, A. E. and Adejumo, V. A. (2014). "Exchange rate volatility and non-oil exports in Nigeria: 1986-2008" International Business and Management, 9(2).
- Aliyu, S.R.U. (2011). Impact of oil price shock and exchange rate volatility on economic growth in Nigeria. An empirical investigation". Research Journal of international Studies, 11(3).
- Aron, J., Elbadawi, I. A. and Kahn B., (1997). "Determinants of the real exchange rate in South Africa". Oxford: CSAE. [online]. Available: www.csae.ox.ac.ukresprogs/ smmsae/pdfslsmmsae-2002-1 3.pdf.
- Chkuigwe, E.C. and Abili, I.D. (2008). An econometric analysis of the impact of monetary and fiscal policies on non-oil exports in Nigeria: 1974-2003 '. African Economic and Business Review, 6(2).
- De-Grauwe, P. (1988). Exchange rate variability and the slowdown in growth of international trade". International Monetary Fund Staff Paper, 35.
- Dincer, N. and Kandil, L.M. (2011). "The effects of exchange rate fluctuations on exports. A sectoral analysis of Turkey". The Journal of International Trade and Economic Development, 20(6).
- Erdal, N., Erdal, H. and Esengu, K. (2012). "The effects of exchange rate volatility on trade: Evidence from Turkish agricultural trade." Applied Economics Letter, 19.
- Hooper, P. and Kohinagen, S.W. (1978). "The effect of exchange rates uncertainty on the prices and volume of international trade". Journal of International Economics, 8 Imoughele, L. E. and Ismaila, M. (2015). "The impact of exchange rate on Nigeria non-oil exports". International Journal of Academic Research in Accounting, Finance and Management Sciences, 5(11).
- Nyeadi, J.O., Attia, O. and Atogenzua, C.A. (2014). "The impact of exchange rate movement on exports Empirical evidence from Ghana". International Journal of Academic Research in Accounting, Finance and Management Sciences, 4(3).
- Ogun, O. (2004). "Real exchange rate behaviour and non-oil export growth in Nigeria". African Journal Economic Policy, 11 (1).
- Omojimite, B.U. and Akpokoje, G. (2010). "The effect of exchange rate volatility on the imports of ECOWAS countries. Journal of Social Sciences, 4(2).
- Onaforowa, O.A. and Owoye, O. (2008). "Exchange rate volatility and export growth in Nigeria". Applied Economics, 40.
- Serven, L. and Solimano, A., (1991). "An empirical macroeconomic model for policy design: The case of Chile". Policy Research Working Paper Series 709. Washington: World Bank.
- Yaqub, J.O. (2010). "Exchange rate change and output performance in Nigeria: A sectoral analysis. Pakistan Journal of Social Sciences, 7(5).
- Yimka, A.S., Olusegun, A.A. and Anthony, J.O. (2014). "Foreign exchange rate regimes and non-oil export performance in Nigeria". International Journal of Business and Behavioural Sciences, 4(1).