Analysis of Effect of External Reserves Management on Macroeconomic Stability of Nigeria

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Abstract

The phenomenal rise in the level of Nigeria's external reserves, especially since the beginning of 2004 has generated a lot of interest and debate among the informed and uninformed members of the public on how the reserves should be managed. As a result, this paper focuses on the long run relationship between the macroeconomic variables and external reserve management factors in Nigeria. The result of the VAR model show that the tests point out that EXTR is significant in the current year (-1) but tends to converge in the previous years. On the other hand, the value of the joint significance indicates that the current values of GDP, CPG, NCPG and EXCHR are most influencing factors that determine the current values of EXTR (-1). This is economically evidence that what influence external reserve management in Nigeria is the nature, pattern and level of capital goods (CPG) and Non Capital Goods (NCPG) because the model reveal their direct impact on the EXTR.

Keywords: Reserve, Run, Causality effect, VAR, Goods, Variables

INTRODUCTION

External reserves are variously called International Reserves, Foreign Reserve or Foreign Exchange Reserves. While there are several definitions of international reserves, the most widely accepted is the one proposed by the IMF in its Balance of Payments Manual, 5th edition. It defined international reserves as consisting of official public sector foreign assets that are readily available to, and controlled by the monetary authorities for direct financing of payment imbalances, and directly regulating the magnitude of such imbalances, through intervention in the exchange markets to affect the currency exchange rate and/or for other purposes (CBN, 2007). The level of external reserve in a country is influenced by external sector developments such as international trade transactions, exchange rate, external debt and other related external obligations. However, when foreign reserves are used for financing domestic foreign exchange needs they could exert pressures on the internal monetary environment. Thus, if a country's trade volume increases, banks and other financial intermediaries may exert increasing pressure on her foreign reserves. This scenario calls for a continuous effort by a country at effectively managing her foreign reserves to an optimum level that would sustain her numerous external commitments (CBN, 1997). The stock of reserves has faced a lot of problems over the years. There has been anxiety by the Nigerian public regarding the safety or otherwise of our foreign reserves as over 90 percent of this is denominated in US dollar assets. This problem has increased as the financial crisis on Wall Street deepens. Some financial experts are forced to ask some basic questions regarding this state. Should our monetary authority move our sovereign assets out of the dollar to others, presumably safer currency denominations? Given current realities, to what extent are we to expect the erosion in value of our sovereign assets? (Yuguda, 2003).

The broad objective of this study is to examine the effects of management of external reserves on economic development in Nigeria. The specific objectives are:

i. To examine the relationship between external reserves and the explanatory variables.

ii. To also examine the extent to which external reserves account for macroeconomic instability. In pursuance of the set objectives of this study, the following hypotheses were drawn for testing, where economic development is the dependent variable.

There is no significant relationship between external reserves and the explanatory variables (Gross domestic product, export oil, exchange rate, capital goods and non-capital goods). There is no significant relationship between external reserves and macroeconomic instability.

2. CONCEPT OF EXTERNAL RESERVES

Foreign reserves management is the technique of optimizing a nation's external resources to meet its economic needs. In Nigeria, the Central Bank has the sole responsibility of management of foreign reserves. The components of foreign reserves include monetary gold, reserve position at the International Monetary Fund (IMF), holding of special drawing right (SDRs) and foreign exchange which are convertible currencies of other countries (CBN, 1997). Aluko (2007), observed that External reserves has, in recent times, played significant role in the Nigeria economy. It has increased the level of money supply and therefore impact positively on the level of economic activities as more funds became available for investment in productive activities. Employment was in turn generated, output increased and consumption boosted. With their multiplier effects on the economy coupled with the efficient management of the financial resources, standard of living of the people improved considerably. Also, the contribution of the manufacturing sector to Gross Domestic Product (GDP), which has continued to dip, witnessed a boost.

In a related study, Obaseki (2007), noted that the uses of external reserves cannot be over emphasized. Essentially, external obligations have to be settled in foreign exchange. Therefore, the stocks of reserves become important as a source of financing external imbalances. Other uses to which external reserves can be put are to intervene in the foreign exchange market, guide against unforeseen volatility and maintain natural wealth for future generations.

Typically, the purpose of holding reserves is to allow the central bank an additional means to stabilize the issued currencies from shocks. In addition to meeting the transaction needs of countries, reserves are used as a precautionary purpose to provide a cushion to absorb unexpected shocks or a sharp deterioration in their terms of trade or to meet unexpected capital outflows, like the negotiated exit payment of the Paris Club Debt by Nigeria. Reserves are also used to manage the exchange rate through intervention in the foreign exchange market. Thus, the motives for holding adequate level of external reserves can therefore be summarized as the reasons why individuals hold money (CBN, 2007).

Sound foreign reserves management practices are important because they can increase a country's overall resilience to shocks as the central bank will have the ability to respond effectively to financial crisis. Sound foreign reserves management can equally support but not substitute for sound macroeconomic management. Similarly, inappropriate economic policies can pose serious risks to the ability to manage foreign reserves. However, the process of foreign reserves management has spanned over the areas of risk management, securitization and the use of derivatives (Anifowose, 1997).

External reserves have impacted significantly on the development of Nigeria economy over the years. According to Ojokwu (2007), Foreign Direct Investment (FDI) into the country increased from \$42.4 million in 1997 to \$540.17 million in 2002 at an exchange rate of \$118 to a dollar, while the level of investment increased in 1999 from \$4.24 billion to \$63.74 billion in 2002. He added that employment increased from 4,093 in 1999 to 10,885 in 2002, while revenue allocation to States and Local Government Areas grew from \$156.06 billion in 1999 to \$440.74 billion at August 2004. Federal Government has also made significant progress in the war against corruption. All these are indicative of progress economically.

The importance of external reserves to any country cannot be overemphasized. It can be said to be the official public sector foreign assets controlled by the central bank of a country. The reserve position of Nigeria at any given time is a reflection of the circumstances prevailing in the international oil market (George, 2007).

The size of Nigeria's external reserves has been fluctuating over the years. Stock of reserve which was US\$7.47 billion at end of December 2003, increased by 127 percent to US\$16.96 billion in 2004, it could finance 18.4 months of imports. The import cover was much higher than the West Africa Monetary Zone (WAMZ) minimum requirement of 6 months.

Prior to the inception of the Central Bank of Nigeria in 1959, the country formed part of the defunct West African Currency Board (WACB). In that period, management of external reserves posed little or no problems to the country because the manner in which the Board operated prevented such problems from arising. Optimal deployment of reserves then was really not an issue since Nigeria's non-sterling earnings were deposited in London in exchange for credit entries in the sterling accounts maintained there (Aizenman, 2005).

Subsequently, the 1959 Act which established the Central Bank of Nigeria (CBN) required the Bank to hold external reserves solely in Gold and Sterling. With the amendment in 1962 of this Act, the Bank acquired the mandate to maintain the country's foreign exchange reserves not only in sterling balance but also in non-sterling assets such as gold coin or bullion, bank balances, bills of exchange, government and government-guaranteed securities of countries other than Britain and treasury bills in other countries. The monetary options available to the country widened upon joining the International Monetary Fund (IMF) in 1961 to include many more assets (Yuguda, 2003).

The problems of reserve management began during the periods of the First National Development Plan in 1962 to 1966 and the Nigerian Civil War of 1967 to 1970. In these periods, financing the plan and the war consumed a large portion of the country's reserves. Also, the tempo in the foreign trade sector dropped, following the disruption of

economic activities in the country. The problems became compounded immediately after the war in the wake of the Federal Government's efforts to reconstruct and reactivate the war ravaged economy which continued to demand immense foreign exchange reserves. Because of the exigencies of this period, the CBN became committed to maintaining an 'adequate' level of external reserves (Olawoyin, 2005).

In a related development, (Odozi, 2000) noted that in addition to the problem of depleting reserves, Nigeria faced a new scenario with reserve management. Following the admission into the organisation of Petroleum Exporting Countries (OPEC) in 1973 and the oil boom of the era, the problem of reserve management switched from that of 'inadequate' to that of 'excess reserves'. This remained so until 1981 when the country was hit by the global economic recession that led to a consistent decline in her external reserves. In the light of this development, economic stabilisation measures revolving stringent exchange control, which ran from April 1982 to June, 1986 (when accretion to external reserves was low), were introduced. By the end of 1985, it was evident that the use of stringent economic control was ineffective in restraining external reserves depletion. To this end, exchange and trade controls were discontinued in 1986, following the adoption of market based policy measures, the Structural Adjustment Programme (SAP) in July 1986. However, after more than seven years of liberation, government felt that the overall performance of the economy was unsatisfactory. Hence, in January 1994, some measures of control were re-introduced which saw the CBN as the sole custodian of foreign exchange and together with its designated agents. Again the trade and exchange policies in 1994 failed to substantially achieve the desired objectives. The guided deregulation introduced in 1995, among other things, abolished the 1962 Exchange Control Act, in a bid to enhance the flow of capital and the reserves position of the country. Other measures aimed at boosting external reserves included the introduction of an Autonomous Foreign Exchange Market (AFEM) for the purpose of trading in foreign currencies at market determined rates and further liberation of the foreign exchange system in 1997 and the trade and exchange regime in 1998.

3.0 RESEARCH METHODOLOGY

This section specifically deals with the methodology of the study attention has been focused on source of data, model formulation and method of data analysis. The data used in this study were mainly secondary data. They covered the period of (1981 – 2010) and obtained from CBN statistical bulletin (2009 and 2011) and economic journals. Others were obtained from textbooks and websites.

3.1.1 Model Specification

The study adopted the econometric model in evaluating the management of external reserves in the Nigeria economy. The econometric model used was to determine the relationship between external reserves and selected macroeconomic variables (gross domestic product, export oil, Exchange rate, Capital goods, Non-capital goods) towards adopting a policy option. In the modification, import was also broken into two, that is, capital goods and non-capital goods because these are also the major components of import (for details, see CBN 2010). In addition to the modification of Evans and Egwakhe (2008), GDP was included because it captures the level of economic activity.

Based on this specification, a functional model was specified as follows:

EXTR = f(GDP, EXOIL, CPG, NCPG, EXCHR)1 where: EXTR -External reserves GDP -Gross domestic product EXOIL -Oil export CPG -Capital goods NCPG-Non-capital goods EXCHR -Exchange Rate $\Delta Extr_{t} = \beta_{1} + \beta_{2} \sum_{i=1}^{n} GDP_{t-i} + \beta_{3} \sum_{i=1}^{n} EXOIL_{t-1} + \beta_{4} \sum_{i=1}^{n} EXCHR_{t-1} + \beta_{5} \sum_{i=1}^{n} NCPG_{t-1} + \beta_{5} \sum$

$$\beta_{6} \sum_{i=1}^{n} CPG_{t-1} + \varepsilon_{t}$$
2

3.1.2Estimation of Model Procedure

We shall apply VAR model for multivariate analysis of EXTR on the macroeconomic variables to determine the long run relationship and also to test the significance effect of macroeconomic instability on the external reserve management between the years (1980-2009). To further investigate the influence (effect and causes) of macroeconomic variables on external reserve management granger causality was adopted. Unit root test procedure was used to find out the order of time series variable stationarity. Test of Significance of Parameter Estimates (t-statistics) will be carried out at 5% level. This will enable us compare the probability of computed t-statistic or F-statistic at various situation of empirical analysis with the critical value at 5% to establish significance. When the computed t-statistic probability associated with it is greater than the critical value at 5%, the parameter is statistically significant but otherwise is not significant.

3.2.2 Unit Root Test

The unit root test is evaluated using the Phillips-Perron test which can be determined as:

$$\Delta Y_{t} = \alpha + \beta t + \delta Y_{t-1} + \gamma \sum_{i=1}^{m} \Delta Y_{t-1} + \varepsilon$$

Where α represents the drift, t represents deterministic trend and m is a lag length large enough to ensure that \mathcal{E}_t is a white noise process. If the variables are stationary and integrated of order one I(0) or otherwise, we test for the possibility of a co-integrating relationship using Eagle and Granger (1987) two stage Var Auto-Regression (VAR). **3.2.3 VAR Model**

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The study employs the Var Auto-Regression (VAR) because it is an appropriate in the estimation technique that captures the relationship among the inflows variables. More so, the endogenous and exogenous The specification is expressed as function:

External Reserve= *f* (macroeconomic variables)

Hence VAR model used in this study is specified as:

$$\Delta Extr_{t+1} = \beta_1 + \beta_2 \sum_{i=1}^n GDP_{t-i} + \beta_3 \sum_{i=1}^n EXOIL_{t-1} + \beta_4 \sum_{i=1}^n EXCHR_{t-1} + \beta_5 \sum_{i=1}^n NCPG_{t-1} + \beta_6 \sum_{i=1}^n CPG_{t-1} + \delta_1 VAR(-1) + \varepsilon_t$$
3

where EXTR is External Reserve, is macroeconomic instability and VAR(-1) is VAR term and U_t is Error term.

The short run effects are captured through the individual coefficients of the differenced terms. That is β_1 captures the impact while the coefficient of the VAR variable contains information about whether the past values of variables affect the current values of the variables under study. The size and statistical significance of the coefficient of the residual correction term measures the tendency of each variable to return to the equilibrium. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes ∂_1 captures the long-run impact.

3.2.4 Granger Causality Test

Generally, the variables forecasting have the ability to measure the effect or influence of one variable on the other (Granger, 1987). If a variable, or group of variables, Y_2 then Y_1 is said to Granger cause Y_2 otherwise does not granger causes Y_2 . Formally, Y_1 fails to granger cause Y_2 if for all s > 0 the MSE of a forecast of $Y_{2,t+s}$ based on $(Y_{2,t}, Y_{2,t-1},...)$ is the same as the MSE of a forecast of $Y_{2,t+s}$ based on $(Y_{1,t}, Y_{1,t-1},...)$ and $(Y_{2,t}, Y_{2,t-1},...)$. In this study, the variables both the dependent and the independents shall be subjected to Granger Causality test procedure to measure at one point or the other the influence of such variables in short and long run or both which require terms.

Mathematically,

$$\Delta Y_2 \rightarrow \Delta Y_1$$
 Or $\Delta Y_1 \rightarrow \Delta Y_2$

The hypothesis is expressed as: $H_0: \Delta Y_2 \rightarrow \Delta Y_1$ or $\Delta Y_1 \rightarrow \Delta Y_2$.

4 EMPIRICAL ANALYSIS RESULT

The results of the empirical study are discussed as follows: **Table 1: Summary of Result of Unit Root Test using Phillips Perron (PP)**

Table 1. Gammary of Recard of Gine Root Joer Joer Jong Timper Strong (11)						
Variables	PP Test	5%	Decision	Conclusion		
		Critical Value				
D(GDP) I(1)	-5.1526	-2.9665	No Unit Root	It is Stationary		
D(EXTR) I(1)	4.7626	-2.9665	No Unit Root	It is Stationary		
D(EXOIL)I(0)	5.6788	-2.9627	No Unit Root	It is Stationary		
D(CPG) I(1)	-5.1800	-2.9665	No Unit Root	It is Stationary		
D(NCPG) I(1)	4.6108	-2.9627	No Unit Root	It is Stationary		
D(EXCHR)I(1)	4.5354	-2.9627	No Unit Root	It is Stationary		

*significant at 5% level, PP test > Critical value, then the variable is stationary Source: E-Views 4.0

The table 1 showed that there is no unit among the time series variables when subjected to PP test at various level and order difference 1. GDP, EXTR, CPG, EXCHR and NCPG are statistically significant and they are stationary at first order difference while EXOIL is significant at level at 5% level as the value of PP-test statistic is greater than the critical value at 5%.

Table2

Vector Autoregression Estimates Date: 09/23/12 Time: 01:50 Sample(adjusted): 1982 2010 Included observations: 29 after adjusting endpoints Standard errors in () & t-statistics in []

	EXTR
EXTR(-1)	2.998858
	(1.21247)
	[2.47334]
EXTR(-2)	-2.401465
	(1.23648)
	[-1.94217]
EXOIL	-0.076601
	(0.01825)
	[-4.19825]
CDP	-0.034280
GBI	-0.034200
	[-2 42157]
	[-2.42107]
CPG	0.084437
	(0.04360)
	[1.93671]
NCPG	224.5084
	(43.3968)
	[5.17339]
EXCHR	-109.2231
	(56.8086)
	[-1.92265]
R-squared	0.998065
Adj. R-squared	0.997538
Sum sq. resids	1.33E+11
S.E. equation	77829.23
F-statistic	1891.735
Log likelihood	-363.7494
Akaike AIC	25.56893
Schwarz SC	25.89896
Mean dependent	660037.1
S.D. dependent	1568520.

Estimation Proc:

LS 1 2 EXTR @ EXOIL GDP CPG NCPG EXCHR

VAR Model:

VAR Model - Substituted Coefficients:

EXTR = 2.998858136*EXTR(-1) - 2.401464801*EXTR(-2) - 0.07660089972*EXOIL - 0.03427970233*GDP + 0.08443733044*CPG + 224.5083829*NCPG - 109.223088*EXCHR

Source: E-Views 4.0 Result Output

The result of the VAR model show that the tests point out that EXTR is significant in the current year (-1) but tends to converge in the previous years. On the other hand, the value of the joint significance indicates that the current values of GDP, CPG, NCPG and EXCHR are most influencing factors that determine the current values of EXTR (-1). This is economically evidence that what influence external reserve management in Nigeria is the nature, pattern and level of capital goods (CPG) and Non Capital Goods (NCPG) because the model reveal direct impact on the EXTR while EXOIL, EXCHR and GDP have negatively affected the external reserve management in Nigeria. The estimated model present individual magnitudes effects of the independent variable on the dependent variable by a unit change in the exogenous variables: CPG and NCPG can capture correspondent 8.4% and 22.4% increase in EXTR while relative change in EXOIL, EXCHR and GDP will result in about 7.6%, 3.4% and 10.9% decrease in EXTR respectively. Adjusted R-squared value implies that the independent variables can explain the dependent variable by 99.7% and the model of the estimated parameter are fitted at 99%. In addition, the possibility of convergence from the short-run dynamics to the long-run equilibrium between the selected variables; however, the speeds of adjustment among the variables were observed to be slow but empirically evidence **Table 3:**

Pairwise Granger Causality Tests Date: 09/23/12 Time: 01:54 Sample: 1980 2010 Lags: 2

Null Hypothesis:	Obs	F-Statistic	Probability
GDP does not Granger Cause EXTR	29	230.822	2.1E-16
EXTR does not Granger Cause GDP		4.14183	0.02849
EXOIL does not Granger Cause EXTR	29	19.3082	1.0E-05
EXTR does not Granger Cause EXOIL		9.52637	0.00090
CPG does not Granger Cause EXTR	29	14.0669	9.1E-05
EXTR does not Granger Cause CPG		9.69034	0.00082

Source: E-Views 4.0 Result Output

The causality points out effect of macroeconomic variables are significant in explaining the causal effect on the EXTR management. In other words, GDP Granger causes EXTR and EXTR does granger cause GDP. This means that there is bi-directional relationship between GDP and EXTR. More so, both EXOIL and EXTR both grangers cause each. More so Capital Goods and EXTR equally grangers cause each other in the long run. While NCPG and EXCHR do not imply any run causality effect of external reserve management in the Nigerian.

Summary of Findings

The findings of the research are summarized as follows:

- i) The empirical analysis shows a direct relationship between external reserves and some explanatory variables. The variables include capital and non capital goods.
- ii) The study has also shown that an inverse relationship exist between external reserves and EXOIL, EXCHR and GDP
- iii) External reserves were also observed to be inversely related to macroeconomic instability.

5.0 CONCLUSION

The empirical results demonstrated a direct relationship between some explanatory variables (Non Capital Goods and Capital Goods) and external reserves management in Nigeria. CPG and NCPG can capture correspondent 8.4% and 22.4 % increase in EXTR while relative change in EXOIL, EXCHR and GDP will result in about 7.6%, 3.4% and 10.9% decrease in EXTR respectively. Adjusted R-squared value implies that the independent variables can capture and explain the dependent variable by 99.7% and the model of the estimated parameters are fitted at 99%. In addition, the possibility of convergence from the short-run dynamics to the long-run equilibrium between the selected variables; Conclusively, the inverse relationship between EXTR and (EXOIL GDP and EXCHR) do not portend effective management of EXTR. The findings demonstrated that there is causal effect of Non capital goods, Oil Export and GDP. Hence, long run relationship exists among them and external reserves management in Nigeria.

6.0 RECOMMENDATIONS

From the empirical findings of the study, the following recommendations are made:

- 1. External reserve is found to be related to GDP and EXOIL negatively. It is therefore important for appropriate policy formulation and implementation of such policies to encourage and boost these variables for effective management of external reserves. Hence, direct relationship between external reserve, GDP and EXOIL is needed to diversify the economy base to enhance productive activities in Nigeria and better future reserve.
- 2. From the result, an inverse relationship is established between External reserves and Non-capital goods and Capital goods. To this end, government should be proactive in ensuring the survival of these key sectors by enacting policies to encourage importation with a view to boosting the nation's infant industries. This will in turn generate employment and income for Nigerian populace.
- 3. Against our apriori expectation, EXCHR was inversely related to external reserves. It is therefore the opinion of the researcher that government should try to sustain our nascent democracy and good market atmosphere and environment that encourages investors to enhance exchange rate and growth of the economic. These, in the long run, will guarantee hope and the future of our generation.
- 4. Government should take drastic action in the diversification of the economy so that the country can export primary agricultural products in which we have comparative advantage. Government should also invest on capital goods because of their present and future investment purpose, which in turn, will generate employment for our youths.

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Appendix1 Data Presentation

YEAR	EXTR	GDP	EXOIL	CPG	NCPG	EXCHR
1980	5445.6	49632.3	13632.3	56.920	39.640	5462.30
1981	2424.8	47619.7	10680.5	99.290	42.460	2441.60
1982	1026.5	49069.3	8003.2	99.090	65.850	1043.30
1983	781.7	53107.4	7201.2	87.490	107.460	798.50
1984	1143.8	59622.5	8840.6	151.040	148.490	1160.60
1985	1641.1	67908.6	11223.7	225.040	171.390	1657.90
1986	3587.4	69147	8368.5	225.460	194.750	3604.20
1987	4643.3	105222.8	28208.6	341.280	291.400	4660.10
1988	3272.7	139085.3	28435.4	442.500	351.200	3289.60
1989	13457.1	216797.5	55016.8	711.950	542.460	13473.90
1990	34953.1	267550	106626.5	853.240	683.050	34969.90
1991	44249.6	312139.7	116858.1	997.690	766.050	44266.30
1992	13992.5	532613.8	102383.9	1023.100	783.670	49554.20
1993	67245.6	683869.8	213778.8	1110.010	834.100	61893.10
1994	30455.9	899863.2	200710.2	1306.190	883.950	30497.10
1995	40333.2	1933212	927565.3	1705.580	1155.690	31640.40
1996	174309.9	2702719	1286215.9	1977.480	1273.890	174326.70
1997	262198.5	2801973	1212499.4	2037.580	1300.520	264798.50
1998	226702.4	2708431	717786.5	2044.100	1303.080	144538.70
1999	546873.1	3194015	1169476.9	2050.620	1305.610	539997.60
2000	1090148.0	4582127	1920900.4	2050.620	1305.610	1090164.50
2001	1181652.0	4725086	1839945.3	2052.470	1307.410	1181668.80
2002	1013514.0	6912381	1649445.8	2462.970	1568.890	1013530.80
2003	1065093.0	8487032	2993110.0	3940.750	2510.230	1065109.80
2004	2232837.0	11411067	4489472.2	4728.900	3012.270	2478733.80
2005	3647998.7	14572239	6266096.6	6147.570	5422.090	3835449.20
2006	5425578.6	18564595	5619152.9	9836.110	8675.350	8.80
2007	6055717.0	20657318	7191086.0	12292.640	10844.180	113.45
2008	7025727.7	24296329	9659773.0	10819.720	8892.100	166.25
2009	536428.3	24794239	8543261.0	10983.820	9470.540	88199.95
2010	448268.5	29205783	9456721.3	68953.690	53798.860	987674.6

Source: CBN Statistical Bulletin, 2011.

Appendix 2
Pairwise Granger Causality Tests
Date: 09/23/12 Time: 01:54
Sample: 1980 2010
Lags: 2

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CPG does not Granger Cause EXTR	29	14.0669	9.1E-05
EXTR does not Granger Cause CPG		9.69034	0.00082
NCPG does not Granger Cause EXTR	29	1.22339	0.31193
EXTR does not Granger Cause NCPG		0.39460	0.67824
EXCHR does not Granger Cause EXTR	29	0.47908	0.62515
EXTR does not Granger Cause EXCHR		0.41941	0.66216
EXOIL does not Granger Cause GDP	29	5.02859	0.01500
GDP does not Granger Cause EXOIL		7.98921	0.00219
CPG does not Granger Cause GDP	29	2.48856	0.10420
GDP does not Granger Cause CPG		0.24949	0.78119
NCPG does not Granger Cause GDP	29	40.2900	2.1E-08
GDP does not Granger Cause NCPG		117.066	4.2E-13
EXCHR does not Granger Cause GDP	29	61.6398	3.5E-10
GDP does not Granger Cause EXCHR		106.171	1.2E-12

CPG does not Granger Cause EXOIL	29	0.20060	0.81960
EXOIL does not Granger Cause CPG		26.0809	9.6E-07
NCPG does not Granger Cause EXOIL	29	9.28439	0.00103
EXOIL does not Granger Cause NCPG		33.9749	1.0E-07
EXCHR does not Granger Cause EXOIL	29	19.6564	8.8E-06
EXOIL does not Granger Cause EXCHR		31.3682	2.0E-07
NCPG does not Granger Cause CPG	29	12.0335	0.00024
CPG does not Granger Cause NCPG		22.9885	2.6E-06
EXCHR does not Granger Cause CPG	29	5.61313	0.01000
CPG does not Granger Cause EXCHR		23.5480	2.2E-06
EXCHR does not Granger Cause NCPG	29	3.16050	0.06048
NCPG does not Granger Cause EXCHR		4.07097	0.03004