International Digital Organization for Scientific Research ISSN: 2579-082X
IDOSR JOURNAL OF BANKING, ECONOMICS AND SOCIAL SCIENCES 3(1): 91-104, 2018.

Impact of Exchange Rate on Balance of Payments: Nigerian Case

Chibueze Ekene Onyeke[1] and Ugochukwu Sebastine Ugwuegbe[2]

[1]Department of Banking and Finance, University of Nigeria, Enugu Campus
[2]Caritas University, Enugu, Nigeria

ABSTRACT

This study investigated the effect of exchange rate on balance of payment in Nigerian for the period of 1986-2017. We employed annual data from Central Bank of Nigeria (CBN) statistical bulletin covering 32years. Augmented Dickey Fuller and Philip-Peron test were conducted to test for the properties of time series, Johansen co-integration test were also carried out with evidence of long run relationship between the variables under study. The study adopted and modified the elasticity approach of balance of payment using OLS. The result showed that exchange rate has a negative effect on balance of payment in Nigeria. The result of the granger causality test indicates that there is a unidirectional causality between exchange rate and balance of payment with causation running from exchange rate to balance of payment. Trade openness was also found to granger cause balance of trade. We there for recommend a policy reform that will improve export diversification thus enhancing the nation's foreign exchange earnings capacity.

Keywords: Balance, exchange rate, CBN, payments

INTRODUCTION

One of the most widely debated issues in field of financial economics is the relationship between exchange rate and balance of payments. Perhaps, since the adoption of Structural Adjustment Programme (SAP) in 1986 in Nigeria, this discussion has been burning locally [1].

The Nigerian exchange rate was relatively stable in 1970's as a result of the oil boom. However, Nigeria started recording exchange rate problems and huge balance of payment deficits and very low foreign reserve in the1980's due to slump in oil prices. To cushion the effect of low foreign exchange earnings occasioned by poor oil prices, Nigerian government approached Bretton Wood institutions – World Bank and International Monetary Fund (IMF) for loans [2]. The perception of the World Bank and IMF was that Nigerian currency (naira) was overvalued and needed devaluation in order to correct its balance of payments problems. Due to pressure from World Bank and IMF, Nigerian government under the leadership of Babangida adopted SAP which promised to improve its balance of payments position by changing the

production and consumption patterns of its economy, eliminate price distortions, and diversify its economy away from oil in order to achieve sustainable growth. One of the strategies adopted in order to achieve the above objectives the adoption market-determined exchange rate [3].

Before the adoption of SAP, one ($1) dollar was exchanged for 77kobo (1 naira = 100 kobo), but when SAP was implemented naira depreciated to 1.756 to a dollar the same year. A dollar exchanged for 4.016 naira in 1987, 5.35 naira in 1988, 9.93 naira in 1991, and 22 naira in 1993 [4].

Arguably, J-curve must have been one of the models considered by World Bank and IMF in designing SAP. Because, according to J-curve, devaluation of currency makes imported goods more expensive and consequently discourages its consumption while at the same time, although with lags, increases the volume of exports due to their low prices in the international markets. As a result, such country will begin to record large surplus in trade balance when compared to its position before devaluation. One of the problems of the propositions of J-curve, however, is its inapplicability on import dependent country like Nigeria [5].

The discussion about the relationship between exchange rate and balance of payments has been on-going and many studies has been done in this area although there is no consensus agreement. While some findings show unidirectional causality from exchange rate to balance of payments, others show bidirectional causalities. Again, while some studies find significant impact of exchange rate on balance of payments, some others find insignificant impact. The objective of this study is therefore to investigate the impact of exchange rate on Nigerian balance of payments [6]. The remaining part of the paper after introduction is organised as follows: section 2 does a review of related literature, section 3.....

Theoretical Review

The traditional school of thought argues that if Marshal–Lerner conditions are met, devaluation of exchange rate should improve promote balance of trade, improve balance of payments and consequently expand output and employment. The Marshall–Lerner condition states that if the sum of price elasticity of demand for export and the price elasticity of demand for imports is greater than unity, depreciation wouldlead to expansion in output. The mechanism behind these positive effects is to makeexport industries more competitive in international markets, stimulate domestic production of tradable goods and induce domestic industries to use more domestic inputs [7].

The monetarists on the other hand argue than in the long-run, exchange rate volatility have no effect on realvariables.Consequently, exchange rate depreciation affects real magnitudes mainly
through real balance effect in the short run but leaves all real variables unchanged in the long-run [8] This view is based on the assumption of the purchasing power parity, which predictsthat in the short run, devaluation improves the level of output, but in the long run the monetaryconsequence of the devaluation ensures that the increase in output and improvement in BOP isneutralized by the rise in prices.

Another school of thought is the IS-LM model, in which exchange rate is viewed as not having direct effects on output, but indirectly through the import–export and the money supply channels. In the model, the relationship between exchange rate changes and gross domestic product cannot be determined a priori because its effect can be either positive or negative due to the impact of exchange rate depreciation on the domestic economy's interest rate. In this model, depreciation is theoretically expected to have positive effect on export since it makes domestic goods cheaperto foreign consumers. It is expected that depreciation would reduce import as a result of the higherrelative price of imported goods, thus increasing net export and income where the Marshall–Lernercondition is satisfied. Where this condition holds, domestic income (output) would increase withdepreciation through the goods market. Exchange rate can also affect domestic money supply andthrough it domestic income. Depreciation is theoretically expected to be accompanied by increasein money supply, leading to a reduction in interest rate and an improvement in investment [9, 10].

Given the national income identity, increase in investment would lead to increase in national income and output. The negative relationship between the exchange rate and GDP can be throughinterest rate effect of exchange rate changes. With depreciation and the consequent reduction ininterest rate due to its expansionary effect on money supply, domestic interest rate becomeslower relative to international interest rate. [11] posits that this is expected to lead to capital flight and accordinglylead to domestic income and output decrease.

Empirical Review

[1] study the impact of exchange rate on balance of payment in Pakistan economy using ARDL and find a positive and significant impact of the former on the latter. They however advised that stability of exchange rate motivates investment

which in turn leads to improved balance of payment position. [13] investigate how balance of payments is influenced by exchange rate fluctuations as they relate to developing and developed economies. His findings show that flexible exchange rate regime, currency depreciation leads to balance of payments deterioration as against appreciation due to import dependency of most developing countries. On the developed economies on the other hand, he find that either of currency appreciation or depreciation leave the balance of payments almost unchanged. He showed that during the period of currency depreciation, the effect of low exports is netted off by corresponding low imports. Likewise, during currency appreciation regime, both export and imports increase leaving the balance of payments in almost the same position. The situation is, however, different under fixed exchange rate regime [14].

[13] suggest the existence of a causalrelationship. In particular, that a current account is an important element inexchange rate determination. On the other hand, Martin (2016) used a panelof 180 countries over the 1960–2007 period and found evidence for a reversedrelationship, which holds especially in non-industrial countries – flexibleexchange rate arrangements deliver a faster current account adjustment.

According to [11], the relationship has the nature of a two-waycausality. In particular, that exchange rate determines the current account,and the current account, in turn, determines the exchange rate.A financial account and the nominal exchange rate are connected throughcapital flows. An inflow of foreign capital will increase the demand for domesticcurrency, and, subsequently, cause an appreciation of the domestic currency.An outflow of foreign capital will increase the supply of domestic currency, and,subsequently, cause a depreciation of the domestic currency. Again, thedirection of causality can differ across the economies under study.

Using Ordinary Least Square, [9] assess the impact of exchange rate on Nigeria balance of payment between 1970 and 2008. They find that the Nigerian balance of payment position is significantly impact by exchange rate. Specifically, they find that the depreciation of exchange rate results in the improved Nigerian balance of payment position albeit if fiscal discipline is imposed. Their finding is in line with the theory, however, Nigeria is an import dependent economy and as such a further inquiry may be in order to establish the actual driver of the balance of payment position in Nigeria.

Using multivariate vector error correction model, [10] investigate how Nigerian balance of payments was influenced by exchange rate depreciation from 1961 to 2012. Their preliminary findings show both a long run equilibrium relationship between exchange and balance of payments and bidirectional causality between the variables. Their IRF result shows that a one standard deviation innovation on exchange rate decreases positive balance of payments in the medium and long run. The variance decomposition result, however, shows that not significant changes in the balance of payments is explained by variations in exchange rates. They therefore conclude that exchange rates is not one of the important determinants of Nigerian balance of payments.

[9] examine the long run impact of exchange rate depreciation on Nigeria balance of trade between 1970 and 2010. Their result show that exchange rate devaluation leads to the deterioration of Nigerian trade balance. They suggest the reason for this result outcome may not be unconnected to import dependency nature of Nigeria with little to export. They, therefore, opine that until export volume of Nigerian is enhanced, currency devaluation will not improve its trade balance.

[7] assess the performance of Nigerian trade in response to the exchange rate reform. They find that currency devaluation marginally improved Nigerian export position but at the same, instead of discouraging imports increased it although insignificantly. They, therefore, concluded that the devaluation of exchange is not sufficient policy to increase Nigerian trade balance but diversification into non-oil exports.

[2] investigate the causal relationship between the Nigerian exchange rate and its balance of payments with data from 1970 to 2015. The find a bidirectional causality between the two variables implying exchange rate can influence balance of payments just as much as balance of payments can influence exchange rates. Based on their findings they suggested that Nigeria can improve its balance of payments position by adopting strict trade openness especially on those goods can be locally produced. They also suggested that economy diversification away from oil and effective expenditure switching policy could be avenues of improving its balance of payments positions.

[8] examine the impact of exchange rate on Nigerian aggregate balance of payments, current account and capital account using ARDL model. They find that naira appreciation leads to significant deterioration of aggregate balance of payment position and current account but insignificant in the case capital account.

METHODOLOGY

This study seeks to provide empirical evidence on the impact of exchange rate on balance of payment and as well establish the direction of causation between exchange rate and balance of payment in Nigerian for the period of 1986 to 2017. To achieve these objectives, the study adopted the elasticity approach of trade balances which was predicated onMarshall Learner condition, and modified to suite our current study. The modified model is specified as follows:

$$BP_t = (\Delta ER, TOP, FDI, GEX, RGDP) \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (1)$$

$$BP_t = \delta_0 + \delta_1 \Delta ER + \delta_2 TOP + \delta_3 FDI + \delta_4 GEX + \delta_5 RGDP + \varepsilon_t \ldots \ldots \ldots \ldots \ldots \ldots (2)$$

Where, BP is balance of payment, ΔER is the change in exchange rate, TOP is trade openness while FDI represent foreign direct investment, and GEX stands for government expenditure, and RGDP represent real gross domestic product. It is important to note at this point that TOP, FDI, GEX and RGDP were included in the model as control variables. And so, to smoothen the data we will apply natural logarithm in all the variables in the model resulting to a log-log model.

Meanwhile to estimate this model annual secondary data was generated from Central Bank of Nigeria statistical bulletin amounting to 32 yearly observations.

Estimation Techniques

The first step in our estimation technique is to establish the properties of time series which will enable us ascertain whether the variable in the model are stationary or not. The presence of stationarity or non-stationarity of time series data has gained prominence in econometrics analysis due to the inherent inferential problem associated with non-stationary variable in empirical study. However, including non-stationary variables in a model most often results to spurious regression. To address the problem of non-stationarity, all the variables in the model will be test for unit root using Augmented Dickey Fuller (ADF) and Philip-Peron (PP) test. The second step is to conduct the co-integration test using Johansen and Juselius (1990) system equation, while Engle and Granger test for co-integration will also be conducted to determine the specific equation with co-integrating characteristics.After establishing the existence of co-integration and the specific equation that exhibited the characteristics of co-integration, we will perform the error correction mechanisms (ECM) so as to ascertain the speed of

adjustment from short-run disequilibrium to long-run equilibrium.

Granger Causality Test

Most often variables that exhibited long run relationship tends to granger cause the movement in each other. In this section, we conducted the granger causality test with a view to determine the direction of causation between the variables under consideration. The models below represent a system equation which will be used to determine the direction of causality among the dependent and the independent variables.

$$BP_t = \delta_0 + \sum_{i=1}^{j} \delta_{1t} BP_{1-t} + \sum_{i=1}^{j} \delta_{2t} \Delta ER_{1-t} + \sum_{i=1}^{j} \delta_{3t} TOP_{1-t} + \sum_{i=1}^{j} \delta_{4t} RGDP_{1-t} + \varepsilon_t \dots \dots (3)$$

$$ER_t = \beta_0 + \sum_{i=1}^{j} \beta_{1t} \Delta ER_{1-t} + \sum_{i=1}^{j} \beta_{2t} BP_{1-t} + + \sum_{i=1}^{j} \beta_{3t} TOP_{1-t} + \sum_{i=1}^{j} \beta_{4t} RGDP_{1-t} + \varepsilon_t \dots (4)$$

$$TOP_t = \alpha_0 + \sum_{i=1}^{j} \alpha_{1t} TOP_{1-t} + \sum_{i=1}^{j} \alpha_{2t} \Delta ER_{1-t} + \sum_{i=1}^{j} \alpha_{3t} BP_{1-t} + \sum_{i=1}^{j} \alpha_{4t} RGDP_{1-t} + \varepsilon_t \dots (5)$$

$$RGDP_t = \gamma_0 + \sum_{i=1}^{j} \gamma_{1t} RGDP_{1-t} + \sum_{i=1}^{j} \gamma_{2t} \Delta ER_{1-t} + \sum_{i=1}^{j} \gamma_{3t} TOP_{1-t} + \sum_{i=1}^{j} \gamma_{4t} BP_{1-t} + \varepsilon_t \dots (6)$$

The parameters are $(\delta, \beta, \alpha, \gamma)$ if the probability values of the coefficient of these parameters are less than 0.05 in all equations, we conclude that there is causality relationship between the variables otherwise there is no causal relationship among the variables.

RESULT PRESENTATION AND INTERPRETATION

Result of Unit Root test

The result of level and first difference of the ADF and PP test for unit root is hereby presented.

Table 1. Unit root test result

Variables	ADF@ Level	ADF@ 1st Diff	Order of Int.	PP@ level	PP@ first Diff	Order of Int.
BP/gdp	-1.307	-6.182	I(1)	-0.658	-3.795	I(1)
(P-Val)	(0.213)	(0.000)		(0.987)	(0.031)	
lnRGDP	-0.630	-3.062	I(1)	-0.889	-3.062	I(1)
(P-Val)	(0.849)	(0.041)		(0.960)	(0.041)	
lnTOP	-2.349	-7.401	I(1)	-2.328	-20.065	I(1)
(P-Val)	(0.397)	(0.000)		(0.407)	(0.000)	
lnEXR	-2.435	-5.572	I(1)	-2.878	-5.571	I(1)
(P-Val)	(0.141)	(0.000)		(0.059)	(0.000)	

The result of unit root test conducted using ADF and PP test as presented in table 1 indicate that apart all the variables included in this model are non-stationary at level form but after first differencing, the rest showed that all the variables are stationary after first differencing.

Table 2.Result of Johansen Co-integration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.625831	51.90049	47.85613	0.0199
At most 1	0.349881	22.40903	29.79707	0.2763
At most 2	0.216602	9.491037	15.49471	0.3219
At most 3	0.069705	2.167603	3.841466	0.1409

The result of Johansen co-integration indicates that there is one co-integrating equation at 5% level of significant. Since Johansen is a system equation and do not report clearly which of the equation co-integrates, Engle and Granger test for co integration was performed to determine which of the equation exhibits long run relationship. And the result indicates that equation 2 is the only equation in the system with co-integration.

Having established the existence of co-integration in the model we move on to estimate the Error Correction Model (ECM) so as to ascertain the short run dynamics

of the model. The ECM result will indicate the speed of adjustment.

Table 3.THE RESULT OF SHORT RUN DYNAMICS OF THE MODEL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.049071	0.342436	0.1433	0.8872
D(LNEXR)	-0.69509	0.595979	-1.1663	0.2541
D(LNRGDP)	1.203843	4.796394	0.250989	0.8038
D(LNTOP)	0.053581	0.470176	0.11396	0.9101
ECM(-1)	-0.73259	0.190252	-3.85061	0.0007

The result of the short run model indicates that exchange rate has a negative but insignificant effect on balance of payment in Nigeria, implying that a percentage increase in exchange rate will lead to 0.70 percentage decrease in balance of payment in Nigeria. The coefficient of the ECM is negative and statistically significant; suggesting that any drift in the equilibrium position in the short run will be corrected in the long run. The ECM co efficient of -0.73 indicates that about 73% of the disequilibrium will be corrected annually.

Table 4. THE RESULT OF THE LONG RUN REGRESSION MODEL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.083134	6.793289	0.012238	0.9903
lnEXR	-0.18371	0.424685	-0.43257	0.6686
lnRGDP	-0.26892	0.780494	-0.34455	0.733
lnTOP	0.388243	0.321627	1.207121	0.2375

The result of our analysis indicates that exchange rate at both short and long run has a negative effect on balance of payment in Nigeria. The magnitude of the negative effect is higher in the short run compares to that of the long run even though it is statistically insignificant at both instances. This study however corroborated the findings of [3] who also found a negative relationship between exchange rate volatility and balance of payment in Nigeria.The result of other variable included in the model especially RGDP provided mixed evidence by showing positive effect on balance of payment in the short run while in the long run it showed negative and statistically insignificant. On the other hand trade

openness was shown to have positive effect on balance of payment at short run and long run.

TABLE 5. RESULT OF GRANGER CAUSALITY TEST

Null Hypothesis:	Obs	F-Statistic	Prob.
LNEXR does not Granger Cause LNBP	30	3.31380	0.0529
LNBP does not Granger Cause LNEXR		0.70947	0.5015
LNRGDP does not Granger Cause LNBP	30	2.09504	0.1441
LNBP does not Granger Cause LNRGDP		1.24190	0.306
LNTOP does not Granger Cause LNBP	30	3.75753	0.0374
LNBP does not Granger Cause LNTOP		1.24943	0.304
LNRGDP does not Granger Cause LNEXR	30	0.53767	0.5907
LNEXR does not Granger Cause LNRGDP		2.34942	0.1161
LNTOP does not Granger Cause LNEXR	30	3.40263	0.0493
LNEXR does not Granger Cause LNTOP		2.25806	0.1255
LNTOP does not Granger Cause LNRGDP	30	0.82784	0.4486
LNRGDP does not Granger Cause LNTOP		0.08228	0.9213

The result of the granger causality test indicates a unidirectional causality at 10% level of significant with causation running from exchange rate to balance of payment and not the other way round. Similarly, there is also a unidirectional causality between trade openness and balance of payment with causation also running from trade openness to balance of payment and not the other way round. Meanwhile, unidirectional causality exists between trade openness and exchange rate with causation running from trade openness to exchange rate. The result however suggests that exchange rate and trade openness granger causes balance of payment while trade openness also granger causes exchange rate.

CONCLUSION AND RECOMMENDATIONS

In this study we examined the effect of exchange rate on balance of payment in Nigeria, and as well established the direction of causation between them. The study empirically reveals that exchange rate has a negative effect on balance of payment in Nigeria both in the long and short run. This however suggests that a high volatile exchange rate portends adverse effect on balance of payment position of Nigeria. The result of the granger causality test also indicates that it is exchange rate that dives the change in balance of payment and not balance of payment driving exchange rate. Trade openness drives both exchange rate and balance of payment in Nigeria.

Based on these findings, we therefore recommend that government should ensure stable exchange rate in Nigeria through robust economic policy that will stimulate export diversification so as to generate sufficient exchange rate to maintain trade surplus which will strengthen the nation's balance of payment.

REFERENCES

1. Abdullahi, I.B., Fakunmoju, S.K., Abubarkar, M.A., &Giwa, K.O. (2017). Evaluating the Causality Effect of Exchange Rate and Nigeria Balance of Payment: An Empirical Analysis. *Journal of Management and Social Sciences.*

2. Ahmad N., Ahmed R. R., Khoso I., Palwishah R. I., &Raza U. (2014). Impact of ExchangeRate on Balance of Payment: An Investigation from Pakistan.*Research Journal of Finance and Accounting Vol.5*, No.13. www.iiste.org ISSN 2222-1697 (Paper) ISSN 2222-2847.

3. Domac, I. (1977). Are devaluation contractionary: Evidence from Turkey? *Journal of Economic Development, 22*, 145–163

4. Dornbusch, R. & Fischer, S. (1980). Exchange Rates and the Current Account. *The American Economic Review*, 70(5), 960-971.

5. Iyoboyi M. &Muftau O. (2014). Impact of exchange rate depreciation on the balance of payments: Empirical evidence from Nigeria. *Cogent Economics & Finance,* 2: 923323 http://dx.doi.org/10.1080/23322039.2014.923323

6. Kandil, M. (2004). Exchange rate fluctuation and economic activities in developing countries: Theory and evidence. *Journal of Economic Development, 29*, 85–155.

7. Kandil, M. (2009). Exchange Rate Fluctuations and the Balance of Payments: Channels of Interaction in Developing and Developed

Countries. *Journal of Economic Integration*, *24*(1), 151-174.

8. Larrain, M. (2003). Central bank intervention, the current account, and exchange rates. *International Advances in Economic Research*, 9(3), 196-205.
9. Martin, F. E. (2016). Exchange rate regimes and current account adjustment: An empirical investigation. *Journal of International Money and Finance*, 65, 69-93.
10. Ogbimi F. E. (1996). Structural adjustment is the wrong policy. *African Technology Forum, vol. 5*, number 1.
11. Oladipupo, A. O &Onotaniyohuwo, F. O. (2011). Impact of exchange rate on balance of payment in Nigeria. *An International Multidisciplinary Journal, Ethiopia Vol. 5*(4), 21, 73-88.
12. Olanipekun D. B. &Ogunsola A. J. (2017). Balance of payment crises in Nigeria: The role of exchange rate. *International Journal of Economics, Commerce and Management Vol. V*, Issue 5.
13. Ogundipe A. A., Ojeaga P., &Ogundipe O. M. (2013). Estimating the long run effects of exchange rate devaluation on the trade balance of Nigeria. *European Scientific Journal vol.9*, No.25 1857 – 7881 (Print) e - ISSN 1857- 7431.
14. Omojimite B. U. &Akpokodje G. (2010). The Impact of Exchange Rate Reforms onTrade Performance in Nigeria. *Journal of Social Science, 23*(1), 53-62.
Uche C. U. (2000). Banking regulation in era of structural adjustment: The case of Nigeria. *Journal of Financial Regulation and Compliance, vol. 8*, number 2.

Dependent Variable: LNBP
Method: Least Squares
Date: 09/25/18 Time: 17:32
Sample: 1986 2017
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.083134	6.793289	0.012238	0.9903

LNEXR	-0.183706	0.424685	-0.432569	0.6686
LNRGDP	-0.268920	0.780494	-0.344551	0.7330
LNTOP	0.388243	0.321627	1.207121	0.2375
R-squared	0.226211	Mean dependent var		-0.394238
Adjusted R-squared	0.143305	S.D. dependent var		1.012466
S.E. of regression	0.937116	Akaike info criterion		2.824450
Sum squared resid	24.58924	Schwarz criterion		3.007667
Log likelihood	-41.19120	Hannan-Quinn criter.		2.885181
F-statistic	2.728525	Durbin-Watson stat		1.498717
Prob(F-statistic)	0.032803			

Dependent Variable: D(LNBP)
Method: Least Squares
Date: 09/25/18 Time: 17:30
Sample (adjusted): 1987 2017
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.049071	0.342436	0.143300	0.8872
D(LNEXR)	-0.695090	0.595979	-1.166299	0.2541
D(LNRGDP)	1.203843	4.796394	0.250989	0.8038
D(LNTOP)	0.053581	0.470176	0.113960	0.9101
ECM(-1)	-0.732585	0.190252	-3.850610	0.0007
R-squared	0.426350	Mean dependent var		0.008055
Adjusted R-squared	0.338096	S.D. dependent var		1.078718

S.E. of regression	0.877618	Akaike info criterion	2.723479
Sum squared resid	20.02554	Schwarz criterion	2.954767
Log likelihood	-37.21392	Hannan-Quinn criter.	2.798873
F-statistic	4.830948	Durbin-Watson stat	1.873225
Prob(F-statistic)	0.004766		

Pairwise Granger Causality Tests
Date: 09/25/18 Time: 17:43
Sample: 1986 2017
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNEXR does not Granger Cause LNBP	30	3.31380	0.0529
LNBP does not Granger Cause LNEXR		0.70947	0.5015
LNRGDP does not Granger Cause LNBP	30	2.09504	0.1441
LNBP does not Granger Cause LNRGDP		1.24190	0.3060
LNTOP does not Granger Cause LNBP	30	3.75753	0.0374
LNBP does not Granger Cause LNTOP		1.24943	0.3040
LNRGDP does not Granger Cause LNEXR	30	0.53767	0.5907
LNEXR does not Granger Cause LNRGDP		2.34942	0.1161
LNTOP does not Granger Cause LNEXR	30	3.40263	0.0493
LNEXR does not Granger Cause LNTOP		2.25806	0.1255
LNTOP does not Granger Cause LNRGDP	30	0.82784	0.4486
LNRGDP does not Granger Cause LNTOP		0.08228	0.9213