Research Paper

TRADE, FOREIGN CAPITAL INVESTMENT AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM NIGERIA AND SOUTH AFRICA

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ABSTRACT

This study investigated the impact of trade openness and foreign direct investment on economic growth in Nigeria and South Africa from 1960 to 2013 using Johansen co-integration technique. Results from the vector error correction modelling (VECM) supports the existence of a long run relationship among economic growth, trade openness and FDI in Nigeria and South Africa. The error terms show a speed of adjustment to equilibrium at 45% and 13% of previous shocks. The short-run parameters show that trade openness has impacted negatively on growth in Nigeria but positively in South Africa while FDI has impacted on growth positively in both countries. Expectedly, lending rate impacts negatively on growth in both countries. However, inflation impacts negatively on growth in Nigeria but positively on growth in South Africa. Based on this, the study recommends that Nigeria should implement policies that would boost its volume of trade with the rest of the world. Likewise, South Africa should continue its policy of trade openness as it spurs its growth in the long run. Finally, Nigeria and South Africa should encourage policies that attract FDI as it impacts positively on their economic growths

KEYWORDS: *Globalisation, Foreign Investment, Trade Openness, Economic Growth.*

1. INTRODUCTION

Over the past two decades, globalisation has become a pervading trend and has gained sufficient traction and exposition in literature due to the increasing interconnectedness and strengthening of international linkages, mostly through trade and capital flows (Loto, 2011). In this, considerable theoretical and empirical interest has been developed regarding the issues of whether, and how, globalisation affects economic performance and why integration through trade and capital flows should impact positively on economic growth. Available literature focusing on providing compelling answers to these questions reveals the contention among researchers and policy makers which mostly stem from persistent conflicting results from the empirical than the theoretical side.

Drawing from theory, recent endogenous growth literature considers openness to trade as growth-enhancing because expanding the size of the markets allows economies to reap the gains of increasing returns to scale and exploit the benefits of specialisation (see for example, Romer, 1989; Ades & Glaeser, 1994). On the other hand, there are compelling reasons why integration through capital flows promotes economic growth, especially in developing economies. Neo-classical economists argue that increasing international mobility of capital in the form of foreign direct investment (FDI) complements domestic capital and facilitates the transfer and efficient use of technology in production process as well as strengthen the competitiveness of local firms.

The dominant message from literature supports the claim that there is indeed a positive relationship between globalisation and economic growth (Tahir & Ali, 2014). At least, the phenomenal growth recorded by the Asian giant economies of China and India since the 1970s following their integration into the global economy provides sound support to changes in policies in favour of globalisation especially in developing economies. However, globalisation impacts on economies differently, and can present both positive and adverse consequences to economic growth in different economies around the world (Ogunrinola & Osabuohien 2010). In more precise terms, Yanikkaya (2003) argues that even if global economic growth increases due to economic integration, its distribution may be uneven as globalisation may impact negatively on individual economies if trading partners are not identical in factor endowments and technologies.

It has been variously argued that globalisation presents both opportunities and challenges to the global economy with most of its opportunities accruing to developed economies while developing and less developed economies face the challenges mostly. However, the net-benefit of globalisation is strongly believed by most economists to be positive (Dreher, 2006). Early studies such as Sach & Warner (1995), Edwards (1998) and Frankel & Romer (1999) focused on increases in total factor productivity and concluded that there is a positive and robust relationship between trade openness and growth in developing economies. However, studies by critics of trade openness such as Krugman (1994) and Rodrik (1996) argue that the relationship between openness to trade and economic growth is very weak at its best.

This contention has continued to manifest even in recent empirical studies on globalisation especially with focus on developing economies. For instance, in the case of Nigeria, trade openness and FDI was found to have a long run impact on growth (see; Alimi & Atanda, 2011; Adelowokan & Maku, 2013). Contrarily, Nwakanma & Ibe (2014) found that both openness and FDI has no significant impact on economic growth in Nigeria from 1981 to 2012. Similarly, on South Africa, Loots (2002) found that trade openness and FDI have

contributed positively to growth in South Africa from 1990 to 2001. This result was confirmed by Mosikari & Sikwila (2013) who also found that globalisation promotes growth in South Africa. However, Tsawamuno *et al,* (2007) found that while trade openness stimulated economic growth, FDI did not.

This study finds motivation in the fact that over the last decade, the economies of Nigeria and South Africa have recorded significant improvements in their economic growth rates following their acceptance of a regime shift in favour of outward looking strategies by liberalising their economies for trade and capital investment. The economy of Nigeria grew throughout the decade from 2003 to 2013 by an average of 7.11% while South Africa grew throughout the decade from 2003 to 2012 by an average of 4.5% (African Economic Outlook, 2014). The aim of this research is therefore to investigate the simultaneous impact of Trade Openness and FDI on economic growth in Nigerian and South African Economies. Following the introduction, the remaining part of this paper consists of section two which presents a comparative analysis of globalisation in Nigeria and South Africa. Section three describes the method of estimation while section four presents that results of our analysis followed by discussion of finding, conclusion and policy issues.

2.TRADE, FOREIGN INVESTMENT AND ECONOMIC GROWTH IN NIGERIA AND SOUTH AFRICA

Fig. 1

Fig.2
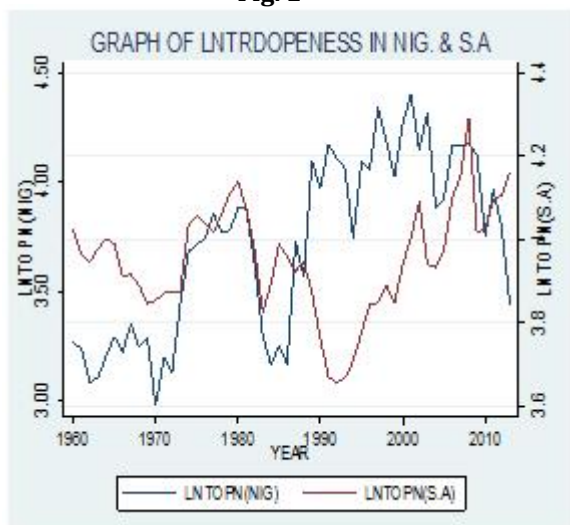
Source: Authors initiative with underlying data obtained from World Bank (2014)

Figure 1 above contain the trends in trade openness and FDI in Nigeria and South Africa. The rationale for this is to compare the pattern using data from 1960 to 2013. From 1960 to 1970, the economy of South Africa was far more open to trade that the economy of Nigeria. But the economy of Nigeria grew more open to trade throughout the decade from 1970 to 1980. At about mid-1970s, the eco nigeria and South Africa were at the same level of trade openness. Throughout the period from 1960 to 1980, index for trade openness in both Nigeria and South Africa maintained a similar trend having moved nealy in the same direction. Throughout the period from 1988 to 2007, trade openness in South Africa was far below the levels in Nigeria. During this period, index for trade openness moved in the same direction in both economies before South Africa grew more open in 2007
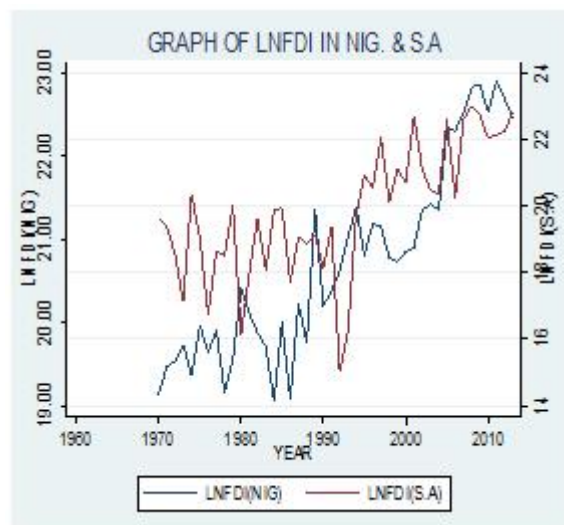
afterwhich openness decreased in both economies. The economy of South Africa has been growing more open since 2010.

Figure 2 presents trends in the flow of FDI into Nigeria and South Africa. From the graph, it can be inferred that FDI inflow was much higher in South Africa than in Nigeria in the 1970s. Also, over the decade from 1970 to 1980, the flow of FDI into these economies moved in opposite directions. It can also be inferred that FDI flow into South Africa was much higher in Nigeria than in South Africa in 1980 before decreasing sharply until mid-1980s. At this same period, FDI inflow was on the increase in South Africa. However, FDI flow into Nigeria increased significantly over the years following the liberalisation of the economy in 1986 while it decreased significantly in South Africa from this period

till early 1990s. FDI flow into South Africa increased sharply after economic liberalisation and return to civil rule in 1994. Over the two decades after 1994, FDI flow into South Africa was higher than its flow into Nigeria. Between 2004 and 2006, FDI inflow into Nigeria and South Africa was the same level and increased together before decreasing in South Africa in mid-2000s but continued rising in Nigeria till 2010. FDI flow into Nigeria and South Africa was at the same level in 2013.

Fig.3
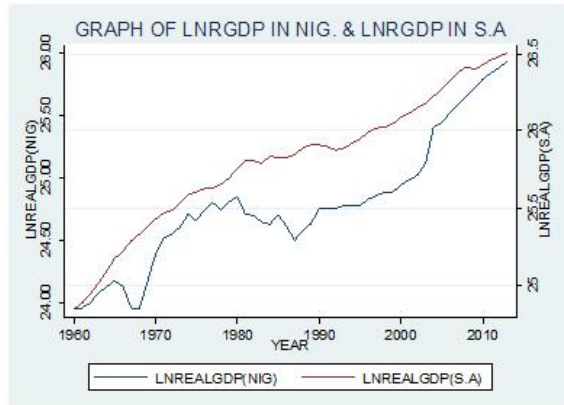
Source: Authors initiative with underlying data obtained from World Bank (2014)

Figure 3 presents a comparison of the trends in economic growth in Nigeria and South Africa. From the graph,

it can be inferred that economic growth has been relatively stable in South Africa than in Nigeria. Economic growth which started off at the same level in both economies in 1960 took a downward trend in Nigeria between 1967 and 1970. This may not be unconnected with the civil war in Nigeria during this period. The Nigerian economy recovered and grew significantly very close to the levels of South African economy at the end of the war till mid-1970s. Economic growth in Nigeria nosedived again throughout the period before mid-1980s but has grown afterwards but continuously below the South African growth levels till 2008. However, over the period from 2008 to 2013, the economy of Nigeria has grown very closely to that of South African.

3. METHOD
3.1 Data and Models

Data for this study cover the period from 1960 to 2013 and are sourced from the World Bank Databank (2014), Central Bank of Nigeria Statistical Bulletin and the South African Reserve Bank Statistical Publications while the empirical model of this study follows Adelowokan & Maku (2013). We retain trade openness (TOP) and FDI but we modify our models such that real GDP replaces GDP per capita while the conditioning set includes an index for financial sector development (FSD) measured as the ratio of domestic credit to private sector to GDP, inflation rate (INF) to measure macroeconomic stability, oil price (OP), gold price (GP), and lending interest rate (LNR). The logarithmic form of the models estimated in this study is expressed thus;

Model 1: Economic Growth Model for Nigeria:

$$LNRGDP_N = \psi_0 + \psi_1 LNTOP + \psi_2 LNFDI + \psi_3 LNOP + \psi_4 LNFSD + \psi_5 LNINF + \psi_6 LNLNR + \mu ..(1)$$

Model 2: Economic Growth Model for South Africa:

$$LNRGDP_S = \psi_0 + \psi_1 LNTOP + \psi_2 LNFDI + \psi_3 LNGP + \psi_4 LNFSD + \psi_5 LNINF + \psi_6 LNLNR + \mu ..(2)$$

3.2 Estimation Technique

The estimation of our econometric models starts with the determination of the time series properties of all variables using the Augmented-Dickey Fuller (ADF) Unit Root Test. After the ADF tests is the test to determine the presence or otherwise of co-integration using the Johansen Test for co-integration. The presence of co-integrating equation(s) in the model enables us to estimate Error Correction Models.

The regression equation used by ADF in which the coefficient of X is tested is expressed as follows:

$$\Delta X_I = \psi_0 + \psi_1 X_{t-1} + \psi_2 \Delta_{t-1} + \psi_3 t + \varepsilon_t \qquad ...(3)$$

The decision to either accept or reject the null hypotheses is taken by comparing the ADF test statistics against the Mackinnon values. Here, the null hypothesis that

is tested is of the existence of a unit root (non-stationary) against the alternative of no unit root (stationary) and is expressed as;

$$H_0 = X_{t-1} (1)$$

$$H_1 = X_{t-1} (0)$$

4. RESULTS AND DISCUSSION
4.1 ADF test results

Table 1 below present results from the unit root tests on all variables in both the Nigerian and South African Models.. The Tables show that all the variables in both the Nigerian and South African models are non-stationary at level but are stationary when converted to first difference. This also implies that there are integrated of order one.

Table 1: ADF unit root test for variables in Nigerian and South African model							
	ADF Values				Mackinnon Critical Values	Order of Integration	
Series	At Levels		First Difference		5%		
	Nigeria	South Africa	Nigeria	South AFRICA	Nigeria	South Africa	Nigeria	South Africa
LNRGDP	-0.865	-3.153	-5.204	-4.434	-3.497	-3.497	1(1)	1(1)
LNTOP	-2.304	-2.038	-9.152	-6.586	-3.498	-3.498	1(1)	1(1)
LNFDI	-2.306	-2.927	-8.584	-9.591	-3.528	-2.950	1(1)	1(1)
LNFSD	-2.59	-3.155	-6.47	-7.883	-3.497	-3.508	1(1)	1(1)
LNOP	-2.394		-9.068		-3.498		1(1)	
LNGP		-1.346		-4.506		-3.497		1(1)
LNINF	-3.371	-2.153	-6.924	-7.237	-3.497	-3.499	1(1)	1(1)
LNR	-1.508	-1.166	-6.798	-5.656	-3.498	-3.497	1(1)	1(1)

4.2 Results from Johansen Co-integration Tests

The estimation of our models starts with tests for lag order section. From the test results which are presented in the appendix section, according to Table 2 and 3 more test statistics, namely, LR, FPE, AIC and HQIC unanimously suggest lag four as the appropriate lag for our both models. Lag four was therefore used for the Johansen tests for co-integration which is presented in Table 4 for Nigeria and Table 5 for South Africa. From Table 4, the null hypothesis of three co-integrating equation cannot be rejected because the trace statistic of 21.53 is less than the 5% critical value of 29.68. Therefore, there is a vector of three co-integrating equations in the Nigerian growth model.

Similarly, the null hypothesis of five co-integrating equation cannot be rejected because the trace statistic of 2.46 is less than the 5% critical value of 3.76. Therefore, there is a vector of five co-integrating equations in the South African model. The implication of these results is that long run relationships exist among economic growth and other variables in our models.

4.3 Results from Vector Error Correction Models

The result of Error Correction Model for Nigeria in Table 6 supports the existence of long run relationship among the variables because a lag of the error correction term (ce1) in the dependent variable -real GDP is negative and significant at 5%. The error correction term shows the speed of adjustment of each of the variables back to equilibrium at 45% in the case of temporary shocks. On the short-run parameters, the coefficient of trade openness is unexpectedly negative but conforms to earlier results that openness has impacted negatively on economic growth in Nigeria while FDI has impacted positively on growth and its coefficient in the result is positive and significant. The coefficient of lending rate is as expected negative and significant while inflation is negative at second lag but not significant. The coefficient of financial deepening is negative is only significant at lag two. The tests for serial correlation for the Nigerian model presented in Table 8 shows that at lags one and two, the null hypothesis of the existence of no autocorrelation cannot be rejected. This is because the probabilities of 30% and 41% are higher than 5% critical value. Therefore, there is no serial correlation in the model.

Similarly, the results presented in Table 7 confirms the existence of a long run relationship among the variables in the South African growth model because the error correction term (ce1) in the dependent variable -real GDP is negative and significant. The error term shows a speed of adjustment to equilibrium of 13% of previous distortion. On the short-run parameters, the coefficient of trade openness is negative

and significant at lag one but positive and also significant at lag three while the coefficient for FDI is positive and significant at all the selected lags. Expectedly, the coefficient of Gold price is positive and significant at lag one while the coefficient of lending rate is negative and significant at lag two and three. However, the coefficient of inflation is positive and significant at all lags. The tests for serial correlation presented in Table 9 shows that at lag one and two, the null hypothesis of the existence of no autocorrelation cannot be rejected. This is because the probabilities of 13% and 54% are higher than 5% critical value. Therefore, there is no serial correlation in the model.

Findings from the growth model for Nigeria confirms the empirical studies of Alimi & Atanda (2011), Adelowokan & Maku (2013), Loto (2011), Nwakanma & Ibe (2014) and Akinbobola (2014) that also found that trade has not impacted positively on growth. The coefficient of FDI which is positive and significant implying that it impacts positively on growth in Nigeria is also in agreement with Loto (2011). Similarly, for South Africa, the result confirms the empirical studies of Mosikari & Sikwila (2013) which shows that openness is positive and significant. The positive effects of FDI and gold price on growth are also in line with the empirical studies of Loots (2002), Tsawamuno et al, (2007) and Mosikari & Sikwila (2013).

5. CONCLUSION AND POLICY ISSUES

This study has explored the effect of globalisation on the economies of Nigeria and South Africa. Using Error Correction Modelling, it has been established that the indicator for trade openness is negative for Nigeria while FDI is positive. The study fails to reject the null hypothesis that trade openness has had no positive effect on growth in Nigeria. However, the study rejects the null hypothesis that FDI has had no positive effect on growth. This study concludes that while trade openness has not impacted positively on growth, FDI has contributed positively on growth in Nigeria. For South Africa, this study rejects the null hypotheses that trade openness and FDI have had no positive effect on growth and concludes that openness and FDI have impacted positively on economic growth. However, the growth effect of openness occurs in the long run.

The implication of these findings is that viewed from the dimension of trade, Nigeria has not gained from globalisation. This outcome may not be unconnected with the fact that the ratio of trade to GDP in Nigeria is still below the level required for its impact on growth to be positive. Also, Nigerian economy is yet to get fully integrated into the global economic system. In this context, the study recommends that Nigeria should face this current wave of globalisation

through suitable policy changes and restructuring of its economy to facilitate the manufacturing of products that can compete favourably at the international market and raise the ratio of its total trade to GDP. Similarly, for South Africa, the study recommends that policies that promote openness totrade in the economy be continued as this spurs growth in the long run. The findings of this study also imply that Nigeria and South Africa have benefitted from globalisation in terms of FDI. In this, the study recommends that policies that attract FDI into these economies should be pursued as this is very crucial for their economic growth.

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APPENDIX

```
Table 2
. tsset YEAR, yearly
        time variable:  YEAR, 1960 to 2013
                delta:  1 year

. varsoc LNRGDP LNTOP LNFDI LNFSD LNINF LNLNR

  Sample:  1966 - 2010                        Number of obs       =       45
  +---------------------------------------------------------------------------+
  |lag |    LL       LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  | 0  | -1743.11                         2.3e+26   77.7384  77.8282  77.9793  |
  | 1  | -1552.21   381.81   36  0.000    2.4e+23   70.8537  71.4823  72.5399* |
  | 2  | -1501.09   102.24   36  0.000    1.3e+23   70.1818  71.3492  73.3133  |
  | 3  | -1462.6    76.983   36  0.000    1.5e+23   70.0711  71.7773  74.6479  |
  | 4  | -1404.81   115.58*  36  0.000    9.7e+22*  69.1025* 71.3475* 75.1247  |
  +---------------------------------------------------------------------------+

  Endogenous: LNRGDP LNTOP LNFDI LNFSD LNINF LNLNR
```

Table 3

```
. tsset YEAR, yearly
        time variable:  YEAR, 1960 to 2013
                delta:  1 year

. varsoc LNRGDP LNTROP LNFDI LNGP LNINF LNLNR
```

Sample: 1974 - 2013   Number of obs   =   40

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-56.3913				9.1e-07	3.11957	3.21116	3.3729
1	153.113	419.01	36	0.000	1.6e-10	-5.55566	-4.91448	-3.78234*
2	195.714	85.202	36	0.000	1.3e-10	-5.88571	-4.69495	-2.5924
3	236.971	82.513	36	0.000	1.4e-10	-6.14854	-4.4082	-1.33523
4	330.793	187.64*	36	0.000	1.7e-11*	-9.03964*	-6.74972*	-2.70634

Endogenous: LNRGDP LNTOP LNFDI LNGP LNINF LNLNR

Table 4

```
. vecrank LNRGDP LNTOP LNFDI LNOP LNINF LNLNR, trend(constant) l
> ags (4) max
```

Trend: constant   Number of obs =   46
Sample: 1965 - 2010   Lags =   3

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	78	-1563.07	.	140.7517	94.15
1	89	-1535.0678	0.70403	84.7473	68.52
2	98	-1517.0123	0.54389	48.6362	47.21
3	105	-1503.4595	0.44526	21.5306*	29.68
4	110	-1496.7533	0.25291	8.1183	15.41
5	113	-1493.8476	0.11868	2.3069	3.76
6	114	-1492.6942	0.04891		

Table 5

```
. vecrank LNRGDP LNTOP LNFDI LNGP LNINF LNLNR, trend(constant) l
> ags (4) max
```

Trend: constant   Number of obs =   40
Sample: 1974 - 2013   Lags =   4

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	114	202.16913	.	257.2474	94.15
1	125	250.14537	0.90917	161.2949	68.52
2	134	287.57965	0.84614	86.4264	47.21
3	141	308.17573	0.64292	45.2342	29.68
4	146	321.94587	0.49767	17.6939	15.41
5	149	329.5628	0.31672	2.4601*	3.76
6	150	330.79284	0.05965		

Table 6: Vector error-correction model for Nigeria

```
. vec REALGDP TRADEOPENNESS FDI FSD INF LNR, trend(constant) rank(3) lags(3)
```

```
Sample:  1965 - 2010                              No. of obs     =        46
                                                  AIC            =  69.93302
Log likelihood = -1503.459                        HQIC           =  71.49665
Det(Sigma_ml)  =  9.86e+20                         SBIC           =  74.10709
```

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_REALGDP	16	26823.6	0.6062	44.6365	0.0002
D_TRADEOPENNESS	16	121.712	0.6965	66.553	0.0000
D_FDI	16	668.849	0.5285	32.50843	0.0086
D_FSD	16	2.97252	0.4857	27.38436	0.0374
D_INF	16	9.78474	0.6783	61.15009	0.0000
D_LNR	16	3.26515	0.3807	17.82897	0.3340

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
D_REALGDP						
_ce1						
L1.	-.4565917	.1316544	-3.47	0.001	-.7146296	-.1985538
REALGDP						
LD.	.1025437	.1691756	0.61	0.544	-.2290344	.4341218
L2D.	.1119684	.1836423	0.61	0.542	-.2479639	.4719007
TRADEOPENNESS						
LD.	-.1182101	59.17935	-2.00	0.046	-234.1996	-2.220747
L2D.	-.3570582	49.06147	-0.73	0.467	-131.8645	60.45289
FDI						
LD.	.3020524	11.82693	2.55	0.011	7.024887	53.3856
L2D.	.1497416	8.885326	1.69	0.092	-2.440762	32.38908
FSD						
LD.	-.3681013	1940.396	-1.90	0.058	-7484.12	122.0934
L2D.	-.5981921	2172.166	-2.75	0.006	-10239.29	-1724.553
INF						
LD.	.2106344	407.9724	0.52	0.606	-588.9769	1010.246
L2D.	-.1142434	480.3388	-0.24	0.812	-1055.69	827.2033
LNR						
LD.	-.6841615	2452.911	-2.79	0.005	-11649.23	-2033.998
L2D.	-.5895009	2403.388	-2.45	0.014	-10605.56	-1184.455
_cons	.0084264	7512.183	0.00	1.000	-14723.6	14723.62

Table 7: Vector error-correction model for South Africa

```
. vec LNRGDPSA LNTROPSA LNFDISA LNGOPRSA LNINFSA LNLNRSA, trend(constant) rank
> (5) lags (4)
```

```
Sample:  1974 - 2013                              No. of obs     =        40
                                                  AIC            =  -9.02814
Log likelihood =  329.5628                        HQIC           =  -6.753485
Det(Sigma_ml)  =  2.81e-15                         SBIC           =  -2.737064
```

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_LNRGDPSA	24	.007051	0.9818	863.0141	0.0000
D_LNTROPSA	24	.037192	0.9242	195.221	0.0000
D_LNFDISA	24	1.28817	0.7867	59.00351	0.0001
D_LNGOPRSA	24	.163584	0.7624	51.32958	0.0010
D_LNINFSA	24	.308329	0.7002	37.36201	0.0403
D_LNLNRSA	24	.098998	0.8683	105.4877	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
D_LNRGDPSA						
_ce1						
L1.	-.138324	.0318207	-4.35	0.000	-.2006914	-.0759566
LNRGDPSA						
LD.	-.3475954	.1641181	-2.12	0.034	-.669261	-.0259299
L2D.	-.2068703	.1540274	-1.34	0.179	-.5087586	.0950179
L3D.	-.3218586	.1307392	-2.46	0.014	-.5781027	-.0656144
LNTROPSA						
LD.	-.1344663	.0318126	-4.23	0.000	-.1968178	-.0721147
L2D.	.0024266	.0283367	0.09	0.932	-.0531122	.0579655
L3D.	.0832112	.0309626	2.69	0.007	.0225256	.1438969
LNFDISA						
LD.	.0053888	.0018423	2.93	0.003	.001778	.0089996
L2D.	.0070286	.0015655	4.49	0.000	.0039603	.010097
L3D.	.0057342	.0011434	5.01	0.000	.0034931	.0079753
LNGOPRSA						
LD.	.0404691	.0122353	3.31	0.001	.0164883	.0644499
L2D.	-.0101814	.0143134	-0.71	0.477	-.0382352	.0178723
L3D.	-.0213196	.0117741	-1.81	0.070	-.0443965	.0017573
LNINFSA						
LD.	.0592837	.0128858	4.60	0.000	.034028	.0845394
L2D.	.0223164	.0084784	2.63	0.008	.005699	.0389338
L3D.	.0227866	.0064083	3.56	0.000	.0102266	.0353466
LNLNRSA						
LD.	-.0197582	.0160777	-1.23	0.219	-.0512699	.0117536
L2D.	-.0312665	.0146204	-2.14	0.032	-.0599219	-.0026111
L3D.	-.0713745	.0141075	-5.06	0.000	-.0990247	-.0437243
_cons	.0506082	.0090166	5.61	0.000	.032936	.0682805

Table 8: Test for autocorrelation for Nigeria

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Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	39.8874	36	0.30132
2	37.1181	36	0.41726

H0: no autocorrelation at lag order

Table 9: Test for autocorrelation for South Africa

. veclmar

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	45.5642	36	0.13189
2	34.3987	36	0.54483

H0: no autocorrelation at lag order