Foreign Assistance and Economic Growth in Nigeria: The Two-Gap Model Framework

Bashir Olayinka Kolawole
Department of Economics, Lagos State University
P.M.B 0001, LASU Post Office, Ojo
Lagos State, Nigeria.

Abstract

This study examines the impact exacted by foreign assistance in the form of official development assistance (ODA) and foreign direct investment (FDI) on real growth in Nigeria over the period 1980 to 2011. Using the Two-Gap model and various econometric techniques which include Augmented Dickey Fuller (ADF) test, Granger causality test, Johansen co-integration test and Error Correction Method (ECM), empirical results reveal that there is Granger no-causality between any pair of the variables. Findings of the study also established a negative relationship between FDI and real growth as ODA exacts no impact on real growth in the country.

Key words: Official development assistance, FDI, Two-Gap, real growth, ECM, parsimonious.

1.0 Introduction

Nigeria is a resource-rich country, with over thirty different minerals, including gold, iron ore, coal and limestone. After a robust economic growth in the average of 7.5 per cent growth experienced over the past decade, the Nigerian economy slowed down in 2012. Despite the robust economic growth, unemployment rate in the country yet increased from 21 per cent in 2010 to 24 per cent in 2011. Also, poverty remains widespread, with a headcount that declined marginally from 48 per cent in 2004 to 46 per cent in 2010. In addition, during the first, second and third quarters of 2012, Nigeria's exports increased while its imports decreased, resulting in a 59 per cent improvement in its trade balance and foreign direct investment (FDI) of 24 per cent relative to 2011. Official Development Assistance (ODA) decreased from USD 2.0 billion in 2010 to USD 1.8 billion in 2011. Total FDI in 2011 was USD 8.9 billion, representing 20 per cent of the total FDI to Africa in 2011. However, these investments are mostly in the oil and gas sector.

Essentially, Nigeria's problem of underdevelopment has, for a long time, been connected to the lack of infrastructural facilities, wrong policy frameworks, hostile environment, backwardness in technology, problem of unemployment and over-dependence on imported products amongst other constraints. Interestingly, National Economic Empowerment and Development Strategy (NEEDS) targeted minimum annual GDP growth rates of 5 per cent in 2004 but achieved 4.2 per cent, while 6 per cent growth rate was targeted in 2005 and 2006 but realized 4.5 per cent and 6.1 per cent growth rates respectively. Also, 7 per cent growth rate was targeted in 2007 but realized 7.4 per cent. On the whole, the remarkable growth narrative is evident in an average annual real growth rate of GDP of over 6 per cent between 2004 and 2012.

These statistics actually depict an improvement in the economic output, but the question begging for an answer is to what extent does this statistics translate to better living standard for the people of Nigeria? Though much attention had been focused on domestic savings and export earnings from crude oil, the potency of these variables to affect economic growth in the country is far from reality. It is along this expectation that the 2-Gap growth model draws that foreign aid should be channeled to those countries that have a balance of payments constraint while foreign direct investment should be directed to augment the domestic savings. Foreign aid and foreign direct investment will therefore be reviewed to palliate the short comings of export earnings and domestic savings respectively.

Although quite a number of studies have discussed the relationship that subsists between foreign assistance and economic growth, majority of such studies have focused on the link between foreign direct investments and growth on the one hand, and between foreign aid and growth on the other.

Larger proportion of these empirical studies concluded that economic growth would be stimulated by FDI (Oyatoye, Arogundade, Adebisi & Oluwakayode 2011; Saibu, Nwosa & Agbeluyi, 2011; and Umoh, Jacob & Chuku, 2011). Also, studies which include Fasanya & Onakoya (2012) and Nkoro & Furo (2012) find a positive relationship between aid and growth while Bakare (2011) establishes a negative relationship. Yet to the best of our knowledge, there is hardly a recognized study on the Two-Gap growth model as it relates to examining economic growth in Nigeria. Thus the relevance of this paper, as it specifically explores the impacts of FDI and ODA on economic growth in the country, for the period 1980 to 2011.

The significance of this study also stems from the necessity to examine the relevance of the Two-Gap economic growth model in forging growth and development in the Nigerian context. As the government of Nigeria explores the avenues for foreign aid assistance from developed countries, bilateral and multilateral international organizations to develop the economy by providing infrastructures and other developmental projects, it is important to evaluate the extent to which growth could be propelled by filling the savings and foreign exchange gaps in Nigeria. Thus, despite the various economic growth models that have been adopted, the country desires a growth model that would mobilize domestic savings in order to reduce (if not eliminate) excessive foreign borrowing.

The rest of the paper is structured thus: Section two presents the theoretical framework of the two-gap model and empirical reviews, as section three discusses the methodology. Empirical results are presented in section four, while section five concludes.

2.0 Theoretical Framework and Empirical Reviews

2.1 Theoretical Framework of the Two-Gap Model

The idea behind the two-gap approach to economic development is that savings-gap and foreign exchange-gap are two separate and independent constraints to the attainment of a target rate of growth in less developed countries (LDCs). The identity between the two gaps, the investment-savings $(I - S)$ gap and the import-export $(M - X)$ gap, follows from the nature of the accounting procedures. It is a common knowledge that if a country invests more than it saves, a balance-of-payments deficit will result. Or an excess of imports over exports implies an excess of resources used by an economy over resources supplied by it. Such that, Chenery & Strout (1956) assert that foreign aid is a way to filling these two gaps in order to achieve the target growth rate of the economy. Also, following Chenery & Bruno (1962) and Chenery & Adelman (1966), a savings gap arises when the domestic savings rate is less than the investment required to achieve the growth target. The economy can achieve the target growth rate by filling this savings gap with foreign aid. Similarly, a fixed relationship is postulated between targeted foreign exchange requirements and net export earnings. If net export earnings fall short of foreign exchange requirements, a foreign exchange gap appears which can be filled by foreign aid.

Structurally, the two gaps are represented in terms of the national income accounting identities as follow using the aggregate expenditure equals aggregate output approach

$$E - Y \equiv I - S \equiv M - X \equiv F \qquad (1)$$

]where E is national expenditure, Y is national output and income, I is investment, S is saving, M represents imports, X is exports and F represents net capital inflow.

Such that, when aggregate expenditure, E is more than the aggregate output, Y then the economy requires foreign capital inflow or aid, F in order to meet the short fall in income. The short fall, however, would be from domestic savings being less than the required investment, that is, a savings gap $(I - S)$ and from foreign exchange required for import being more than net earnings from export, that is, a foreign exchange gap $(M - X)$. Yet the foreign aid required to fill the gap (short fall) is determined by the dominant gap at a given point in time. If the savings gap is larger than the foreign exchange gap, the economy is said to be in a savings constraint. On the other hand, if the foreign exchange gap is larger than the savings gap, the economy is in a foreign exchange constraint.

Since these gaps are different and independent then the foreign aid required in each gap would be necessarily different. Essentially, if domestic investors (via domestic commercial banks) gain access to world financial markets, the savings gap and foreign exchange gap could be overcome by the financing domestic (excess) investment out of the savings from high income countries (HICs) that is, by the inflow of capital.

The capital inflow can take the form of concessional lending abroad, foreign direct investment (FDI) inflows, portfolio investment by foreigners and official development assistance (ODA). (See Bender & Löwenstein, 2005). Thus, it follows that

$$I - S = F \quad (2)$$

and

$$M - X = F \quad (3)$$

Equations (2) and (3), like (1), express that the gap in each of savings gap and foreign exchange gap is equal to foreign aid.

As such, if FDI is the aid required for savings gap and ODA is necessary for filling the foreign exchange gap, then it holds that

$$F = FDI + ODA \quad (4)$$

2.2 Empirical Review of FDI-Growth Nexus

Most economic rationale for granting special incentives for attracting FDI is based on the belief that FDI bridges the 'idea gaps' between rich and the poor nations in addition to the generation of technological transfers and spillovers. Theoretically, FDI affects economic growth in a number of ways. Apart from the standard Solow-type neoclassical model which suggests that FDI improves economic growth through adding to the capital stock, most micro-based studies (see, for example, Haddad & Harrison, 1993; and Aitken & Harrison, 1999) suggest that foreign-owned production is more productive than domestically owned production. This view, based on the models of Grossman & Helpman (1991) and Rivera-Batiz & Romer (1991) underpins the theoretical postulation in the literature. Following Romer (1990) and Aghion & Howitt (1992), this approach also seeks to link FDI flows to the relationship between international trade, technological change and growth. (see Driffield & Jones, 2013).

Yet, despite Görg & Greenway (2004) opinion that only 6 out of 25 studies have found a positive relationship between FDI and growth, the impact represents a situation called a 'stylised fact' by Herzer, Klasen, & Nowak-Lehmann (2007) as it might, for instance, be the case that FDI just crowds out domestic investment. In the view of Agosin & Machado (2005), this may be a just transfer of resources from domestic to foreign residents with no resulting impact on domestic productivity via spillovers. Following this path, Ayadi (2009) concludes that the link between FDI and economic growth in Nigeria is very weak, but FDI is found to be related to export growth.

Meanwhile, Oyatoye *et al* (2011) establish that there is a positive relationship between direct foreign investment and gross domestic product (GDP) in Nigeria. Further, Umoh, Jacob & Chuku (2012) show that FDI and economic growth are jointly determined in Nigeria and there is positive feedback from FDI to growth and from growth to FDI. The overall policy implication of the result is that policies that attract more foreign direct investments to the economy, greater openness and increased private participation will need to be pursued and reinforced to ensure that the domestic economy captures greater spillovers from FDI inflows and attains higher economic growth rates. Also, Ekperiware & Adepoju (2013) concludes that foreign direct investment drives economic growth significantly in Nigeria. Other studies on FDI include Eragha (2009) and Ajide & Adeniyi (2010).

2.3 Empirical Review of Foreign Aid-Growth Nexus

Foreign aid or capital enters a country in the form of private capital and/or public capital. However, public foreign aid is more important for accelerating economic development than private foreign capital. The financial needs of LDCs are so great that private foreign investment can only partially solve the problem of financing. For instance, private foreign investment has nothing to do with social expenditures in such spheres as education, public health, medical programmes, technical training, research and so forth. Such schemes though indirectly contributing to economic efficiency and productivity of the economy in the long-run yield no direct returns, and could, therefore be financed with the help of grants received from advanced countries and international organizations. Thus, foreign aid helps in industrialization, in building up economic overhead capital, and creating larger employment opportunities.

Yet, according to Griffin and Enos (1970), aid causes a reduction in domestic savings while Papanek (1972, 1973) empirically shows that in some countries, aid stimulates savings so that each dollar of inflow results in more than one dollar of investment, while in some other countries they discourage savings and a dollar of aid inflow leads to much less than a dollar of investment. It is often felt that opponents of aid take the view that it is a form of wealth distribution, whereby poor people in rich countries send money directly to rich people in poor countries (Bauer, 1972). Burnside & Dollar (2000) and Easterly, Levine & Roodman (2004) find that on its own aid has no effect on growth, although when it is interacted with a 'sound' monetary and fiscal policy environment there is a conditional effect. In addition, Bauer (1991) argued that aid has serious, distorting consequences on the political life of recipient countries. Alesina & Weder (2002) find that more corrupt countries do not receive less aid. This result is attenuated by Brautigam & Knack (2004) who show that high levels of aid in Africa are associated with deterioration in governance. Along this line, Bakare (2011) finds a negative relationship between foreign aid and output growth in Nigeria, which imply that foreign aid tend to worsen output growth in the country rather than improving it.

Nevertheless, proponents of ODA (for example, Stern, 1974), have more optimistic view on the impact of foreign aid on growth. In corroboration, Fasanya & Onakoya (2012) find a significant positive impact of foreign aid on economic growth in Nigeria as Nkoro & Furo (2012) also show that there is a significantly positive effect of foreign aid on real GDP in the country.

3.0 Methodology

The variables employed in this study are necessarily relevant following the theoretical postulations of the Two-Gap model of economic growth coupled with an open economy assumption. Thus, real income or output (RGDP), log of domestic investment (LINV), foreign direct investment (FDI), log of export (LXPT), log of import (LIMP), and log of official development assistance (LODA) are the variables considered for the research. As the effect of foreign assistance on economic growth is implied, therefore, RGDP is the dependent variable while other variables are the regressors. Also, data for all variables are collated from international financial statistics (IFS) and Central Bank of Nigeria (CBN) official bulletin.

As such, in order to capture the impact of foreign assistance, openness of the economy and domestic investment on growth in Nigeria along the line of thought of the Two-Gap postulation, the below semi-log model is stated as

$$RGDP_t = \beta_0 + \beta_1 LINV_t + \beta_2 FDI_t + \beta_3 LXPT_t + \beta_4 LIMP_t + \beta_5 LODA_t + \varepsilon_t \quad (5)$$

where the $\beta_0, \ldots, \beta_5$ are coefficients, ε is the error term while t represents time.

4.0 Empirical Results and Discussion

Since carrying out regression on non-stationary time series data would lead to spurious regression outcomes, therefore the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1979) was employed to ascertain the stationarity of the data. This is conducted at level and at first difference as depicted in table 1. As shown in the table, real GDP and LODA are stationary at level while the log of domestic investment and foreign direct investment are stationary at level with intercept. The log of Import and log of export are, however, stationary at first difference[1] which makes the series, I(1) series.

Having establish that the series are I(1) we adopted the Johansen method to test for cointegration among the variables and the possibility of a long-run relationship among the variables. According to this approach, there is need to first determine the lag length of the VAR which must be small enough to allow estimation and high enough to ensure that errors are approximately of white noise. Therefore, using five different information criteria viz: sequential modified LR test Statistic (LR), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC), and Hannan-Quinn information criterion (HQ), it is concluded that the optimal lag length for the series is zero (0) as shown in appendix (i). Also, the results of the trace and maximal Eigenvalue of the unrestricted cointegration rank test indicate two (2) and one (1) cointegrating equations, respectively at the 5% level of significance.

[1] *The results, not reported for the sake of brevity, obtained using the Phillips-Peron as well as DF-GLS unit root tests are similar to the Augmented Dickey Fuller statistics.*

Essentially, after the cointegration test, the pairwise causality between variables in the series is determined using the Granger causality test as defined by Granger (1969, 1988). The results, as shown in appendix (ii), accept the null hypothesis that one variable does not Granger cause the other variable in all thirty observations at the lag length of two (2). This implies that the variables are exogenous of one another.

Finally, we proceeded to estimating the error correction model (ECM) to equilibrate the speed of adjustment between the short run dynamics and long run equilibrium. This involves specification and estimation of an over parameterized model which includes as many as possible lag structure as determined by the model's degree of freedom. As the model is estimated and re-estimated the variables with the least significance are removed sequentially (one at a time), while the Schwartz Information Criteria or Akaike Information Criteria is monitored, until the insignificant lag structures are removed and parsimony is achieved.

In the parsimonious result obtained, as presented in appendix (iii), it shows that the error correction term is negative and significant. This implies that there is a feedback effect from the long run relationship to the short run dynamics of the model. It also shows that if there is a disturbance to the model, the variables in the model will jointly respond to ensure that the model converges back to its mean value in the long run.

5.0 Conclusion

This study has employed the error correction mechanism (ECM) to examine the impact of foreign direct investment and official development assistance on growth in Nigeria, using the Two-Gap model framework. Part of the findings of the study reveals a granger no-causality between each pair of the variables considered. Broadly, however, the results show that foreign direct investment impacts negatively while official development assistance has no effect on real growth in the country. Also, the study finds that imports have a significant negative effect whereas domestic investment and exports impact positively on real growth in Nigeria. The intuition behind the results lies on the catalytic roles domestic investment and exports play in propelling real growth in the Nigerian economy. By implication, the results establish that the bulk of foreign assistance meant for infrastructural development in the country are either siphoned or diverted into unproductive use such that its influence is not felt on real growth.

Table 1. Augmented Dickey-Fuller Unit Root Test Results for all variables

Variable	Stage	Critical Value	1%	5%	10%
RGDP	Level	-3.171479*	-2.641672	-1.952066	-1.610400
LINV	Level with Intercept	-4.214001*	-3.670170	-2.963972	-2.621007
FDI	Level with Intercept	-4.048045*	-3.661661	-2.960411	-2.619160
LXPT	First Difference	-5.156270*	-2.647120	-1.952910	-1.610011
LIMP	First Difference	-5.884540*	-2.644302	-1.952473	-1.610211
LODA	First Difference	-5.354091*	-2.647120	-1.952910	-1.610011

Note: * Indicates significance @ 1% level.

Reference

Aghion, P. and Howitt, P. (1992) A model of growth through creative destruction. *Econometric Society* 60(2): 323–351.

Agosin, M. and Machado, R. (2005) Foreign investment in developing countries: Does it crowd in domestic investment? *Oxford Development Studies* 33(2): 149–162.

Aitken, B.J. and Harrison, A.E. (1999) Do domestic firms benefit from direct foreign investment? Evidence from Venezuela? *American Economic Review* 89(3): 605–618.

Ajide, B. and Adeniyi, O. (2010). FDI and the Environment in Developing Economies: Evidence from Nigeria. *Environmental Research Journal* 4(4), 291-297.

Alesina, A. and Weder, B. (2002) Do corrupt governments receive less foreign aid? *American Economic Review*92(4): 1126–1137.

Ayadi, F.S. (2009). Foreign Direct Investment and Economic Growth in Nigeria. In Repositioning African Business and Development for the 21st Century Simon Sigué (Ed.). *Proceedings of the 10th Annual Conference IAABD.*

Bakare, A.S. (2011). The Macroeconomic Impact of Foreign Aid in Sub-saharan Africa: The Case of Nigeria. *Business and Management Review* Vol. 1(5) pp. 24 – 32.

Bauer, P.T. (1972) *Dissent on Development*. Cambridge, MA: Harvard University Press.

Bauer, P. T. (1991). The Development Frontier: Essays in Applied Economics. Cambridge, MA: Harvard University Press.

Bender, D. and Löwenstein, W. (2005). Two-Gap Models: Post-Keynesian Death and Neoclassical Rebirth. Institute of Development Research and Development Policy. *IEE Working Papers*, vol. 180.

Brautigam, D. and Knack, S. (2004) Foreign aid, institutions, and governance in Sub-Saharan Africa. *Economic Development and Cultural Change* 52(2): 255–285.

Burnside, C. and Dollar, D. (2000) Aid, policies, and growth. *American Economic Review* 90(4): 847–868.

Chaehery, H. and Strout, A. (1956). Foreign Assistance and Economic Development. *American Economic Review*, vol. 56.

Chenery, H. and Adelman, I. (1966). Foreign Aid and Economic Development. *RES*, vol. 48.

Chenery, H. and M. Bruno (1962). Development Alternatives in an Open Economy. *Economic Literature*, vol. 72.

Dickey, D.A and Fuller, W.A. (1979). Distribution of the Estimators for Autoregressive Time Series with a U nit R oot, *Journal of the American Statistical Association*. 74: 427- 431.

Driffield, N. and Jones, N. (2013). Impact of FDI, ODA and Migrant Remittances on Economic Growth in Developing Countries: A Systems Approach. *European Journal of Development Research*. 25: 173-196.

Easterly, W., Levine, R. and Roodman, D. (2004) Aid, policies, and growth: Comment. *American Economic Review*94(3): 774–780.

Edoumiekumo, S. (2009). Foreign Direct Investment and Economic Growth in Nigeria: A Granger Causality Test. *Journal of Research in National Development*. Vol 7, No 2.

Ekperiware, M.C. and Adepoju, A.O. (2013). Empirical Analysis of the Relationship between FDI, Technology Transfer and Economic Growth in Nigeria. *British Journal of Economics, Management & Trade* 3(3).

Eregha, P.B. (2009). Foreign Aid, Growth and Determinants in Nigeria: An Autoregressive Framework. *Pakistan Journal of Social Sciences* 6(5), pp. 309-312.

Fasanya, I.O. and Onakoya, A.B. (2012). Does Foreign Aid Accelerate Economic Growth? An Empirical Analysis for Nigeria. *International Journal of Economics and Financial Issues* Vol. 2, No. 4, pp.423-431.

Görg, H. and Greenaway, D. (2004). Much ado about nothing? Do domestic firms really benefit from foreign direct investment? *World Bank Research Observer* 19(2): 171– 197.

Granger, C. W. J. (1969). "Investigating Causal Relations by Econometric Models and Cross-spectral Methods". *Econometrica* 37 (3): 424–438

Granger, C.W.J (1988). Some Recent Development in a Concept of causality, *Journal of Econometrics*.39: 199-211.

Griffin, K.B. and Enos, J.L. (1970). Foreign Assistance: Objectives and Consequences. *Economic Development and Cultural Change.*

Grossman, G.M. and Helpman, E. (1991) Trade, knowledge spillovers, and growth. *European Economic Review*35(2–3): 517–526.

Haddad, M. and Harrison, A. (1993) Are there positive spillovers from foreign investment? Evidence from panel data for Morocco. *Journal of Development Economics* 42(1): 51–74.

Herzer, D., Klasen, S. and Nowak-Lehmann, F. (2007) In search of FDI-Led growth in developing countries.*Economic Modelling* 25(5): 793–810.

Nkoro, E. and Furo, A.O. (2012). Foreign Capital Inflows and Economic Growth in Nigeria: An Empirical Approach. *Academic Journal of Interdisciplinary Studies*, Vol 1, No. 2.

Oyatoye, E.O., Arogundade, K.K., Adebisi, S.O., and Oluwakayode, E.F. (2011). Foreign Direct Investment, Export and Economic Growth in Nigeria. *European Journal of Humanities and Social Sciences* Vol. 2, No.1.

Papanek, G. F. (1973). "Aid, Foreign Private Investment, Savings and Growth in Less Developed Countries". *Journal of Political Economy*, 81 (1): 120-30.

Papanek, G. F. (1972). The Effects of Aid and Other Resource Transfers on Savings and Growth in Less Developed Countries. *Economic Journal.*

Rivera-Batiz, L.A. and Romer, P.M. (1991) International trade with endogenous technological change. *European Economic Review* 35(4): 971–1001.

Romer, P.M. (1990) Endogenous technological change. *Journal of Political Economy* 98(5): 71–102.

Saibu, M.O., Nwosa, I.P. and Agbeluyi, A.M. (2011). Financial Development, Foreign Direct Investment and Economic Growth in Nigeria. *Journal of Emerging Trends in Economics and Management Sciences (JETEM S)* 2 (2): 146-154.

Stern, N.H. (1974) Professor Bauer on development. *Journal of Development Economics* 1(3): 191–211.

Umoh, O.J., Jacob, A.O. and Chuku, C.A. (2012). Foreign Direct Investment and Economic Growth in Nigeria: An Analysis of the Endogenous Effects. *Current Research Journal of Economic Theory* 4(3): 53-66.

Appendix (i): Lag Length Selection Criteria Table

VAR Lag Order Selection Criteria
Endogenous variables: RGDP INV FDI XPT IMP ODA
Exogenous variables: C
Date: 10/03/13 Time: 10:08
Sample: 1980 2011
Included observations: 30

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1121.662	NA	1.80e+25	75.17744	75.45768*	75.26709*
1	-1080.148	63.65413*	1.31e+25*	74.80987*	76.77155	75.43743
2	-1053.765	29.90087	3.41e+25	75.45099	79.09411	76.61646

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Appendix (ii): Pairwise Granger Causality Test on all the variables

Null Hypothesis:	Lag	F-Statistic	Decision
LINV does not Granger Cause RGDP	2	0.43164	Accept
RGDP does not Granger Cause LINV		0.67828	Accept
FDI does not Granger Cause RGDP	2	0.95800	Accept
RGDP does not Granger Cause FDI		1.47457	Accept
L XPT does not Granger Cause RGDP	2	2.51500	Accept
RGDP does not Granger Cause LXPT		0.06849	Accept
LIMP does not Granger Cause RGDP	2	0.92318	Accept
RGDP does not Granger Cause LIMP		0.60440	Accept
LODA does not Granger Cause RGDP	2	0.31556	Accept
RGDP does not Granger Cause LODA		0.82183	Accept
FDI does not Granger Cause LINV	2	0.55716	Accept

LINV does not Granger Cause FDI		0.41384	Accept
LXPT does not Granger Cause LINV	2	1.16656	Accept
LINV does not Granger Cause LXPT		1.90048	Accept
LIMP does not Granger Cause LINV	2	0.61962	Accept
LINV does not Granger Cause LIMP		1.46174	Accept
LODA does not Granger Cause LINV	2	0.23291	Accept
LINV does not Granger Cause LODA		0.34037	Accept
LXPT does not Granger Cause FDI	2	1.38061	Accept
FDI does not Granger Cause LXPT		1.50329	Accept
LIMP does not Granger Cause FDI	2	1.72306	Accept
FDI does not Granger Cause LIMP		0.44071	Accept
LODA does not Granger Cause FDI	2	0.06424	Accept
FDI does not Granger Cause LODA		0.16807	Accept
LIMP does not Granger Cause LXPT	2	2.12819	Accept
LXPT does not Granger Cause LIMP		2.42977	Accept
LODA does not Granger Cause LXPT	2	0.05149	Accept
LXPT does not Granger Cause LODA		0.64916	Accept
LODA does not Granger Cause LIMP	2	0.41854	Accept
LIMP does not Granger Cause LODA		0.32850	Accept

Appendix (iii): The Parsimonious Result

Dependent Variable: D(RGDP)
Method: Least Squares
Date: 10/03/13 Time: 10:39
Sample (adjusted): 1982 2011
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.524269	0.984899	-0.532307	0.5996
D(RGDP(-1))	0.257606	0.158423	1.626063	0.1176
D(INV)	0.718765	0.341335	2.105748	0.0463
D(FDI)	-0.836338	0.505667	-1.653931	0.1117
D(XPT)	0.237922	0.179516	1.325352	0.1981
D(IMP)	-0.432925	0.188173	-2.300678	0.0308
ECT(-1)	-1.085872	0.201307	-5.394106	0.0000

R-squared	0.645035	Mean dependent var	-0.447933
S.E. of regression	5.348887	Akaike info criterion	6.392618
Sum squared resid	658.0436	Schwarz criterion	6.719564
Log likelihood	-88.88926	Hannan-Quinn criter.	6.497210
F-statistic	6.965838	Durbin-Watson stat	1.724526
Prob(F-statistic)	0.000257		