Factors Determining FDI in Nigeria: Role of Emerging Economies

Dinda, Soumyananda

Chandragupt Institute of Management Patna, Bihar, India

18 July 2012

Factors Determining FDI in Nigeria: Role of Emerging Economies

Soumyananda Dinda

Chandragupt Institute of Management Patna, Bihar, India

July 18, 2012

Abstract

This paper investigates the determinants of FDI in Nigeria, which is poor in terms of income but rich in natural resources. This study is an extension of our earlier work (Dinda 2012). Incorporating emerging trade partners of Nigeria in VECM this paper re-examine the factors determining FDI inflow to Nigeria in this globalized era. The economic activity of the emerging trade partners may be good proxy for exogenous factors to Nigerian economic activity. Considering per capita income of trading partners as proxy for their economic activities are incorporated as exogenous variables in this study. Findings clearly ensure that FDI inflow to Nigeria is resource-seeking FDI and market size has no role that contradicts our earlier result and also the existing literature. Short run dynamics as well as causal linkage are also completely different from our earlier paper. China is emerging as a strong trade partner of Nigeria and significantly influences its natural resource outflow while South Africa raises its competitiveness.

Key Words: FDI, Natural resource export, exchange rate, openness, inflation rate, VECM.

JEL *Classification Number*: C_{13}, F_{18}, Q_{32}, O_{13}, Q_{43},

1. Introduction

Recent surge of foreign direct investment (FDI) flows to Africa followed from positive business environment in the region[1]. In most of African nations, FDI are resource-seeking which is consistent with the UNCTAD data[2]. The objective of the resource-seeking FDI is to extract natural resources and export to the global market. Recently Dinda (2012) investigates factor determining FDI in Nigeria, which is richly endowed with natural resources – mainly oil and gas, mineral deposits, vegetation etc. Nigeria's natural resource balance is dominated by petroleum. Applying time series technique in closed economic framework model, Dinda (2012) empirically examines long run determinants of FDI inflow to Nigeria and short run dynamics during 1970-2006. In this age of globalization open economic model is more relevant and provide better insights regarding resource-seeking FDI and dynamics in macroeconomic variables in the presence of the rest of the world. This paper re-examines the determinants of FDI inflow to Nigeria in the globalized economy. So, this paper is basically an extension of Dinda (2012).

Now this paper critically analyses the data set used in Dinda (2012) and observes that data availability starts from one global crisis (oil crisis in 1970s) to another global economic crisis (it begins after 2006-07). In between two crisis lot of economic activities emerge through different policy in international and domestic level. Nigeria starts economic reforms from 1980s under international pressure. During 1970 -2006 Nigeria adopts several policies (such as liberalization, privatization, structural adjustment, export processing zone decree and investment promotion etc.) to foster

---

[1] Many African countries have reformed their economic policy, investment laws and also improving financial system. Political instability, internal conflict and poor governance till pose significant problems to many countries in Africa.

[2] Three largest recipients of FDI are South Africa, Nigeria and Angola – all are natural resource rich nations. Actually these FDIs in Sub- Saharan Africa are the resource-seeking. This study focuses on FDI flow to Nigeria, which is poor in terms of income but rich in natural resources.

economic development. In this globalized era these activities will affect foreign exchange as well as price level (or inflation rates) in the domestic market, and after all, the whole economy. Openness or trade liberalization is a crucial policy variable through which all other variables interact and promote economic development.

Openness is the main channel through which the rest of the world economic activities affect domestic economy. In this context the trading partners naturally influence on country's major macroeconomic variables like foreign exchange and inflation rates, FDI inflow and economic activities. Using time series technique on annual data of Nigeria, this paper examines the FDI inflow and effect of the country's natural resource outflow on it in the presence of rest of the world.

The economic activity of the rest of the world could be good proxy for exogenous factors to Nigerian economic activity. Considering per capita income of trading partners as proxy for their economic activities are incorporated as exogenous variables in this study. This paper is basically the extension of the earlier paper (Dinda (2012)) in the presence of the rest of the world.

The paper proceeds as follows: Section 2 describes the data and methodological framework. Section 3 discusses the empirical results and finally Section 4 concludes.

2. Data and Methodology

The major variables are FDI, market size, exchange rate, inflation rate, openness, natural resource and per capita GDP of the US, China, India and South Africa. For this study purpose the data set are taken from four main sources – viz., the Penn World Table, UNCTAD, World Investment Report (2006, 2008), World Bank and the Central Bank of Nigeria (See, their website for detail). Data for FDI, inflation rate and natural resource outflow are obtained from the Central Bank of Nigeria (statistical

2

reports). Real GDP per capita (at 1996 constant international price, dollar), foreign exchange rate and openness are taken from the Penn World Table 6.2, and world total export and total FDI are taken from UNCTAD handbook of statistics 2007. All these Nigerian data covers the period from 1970 to 2006. For detail see Dinda (2012). Traditional approach considers the endogenous macroeconomic variables but ignores the development of the rest of the world. Ideally this paper incorporates it.

This paper follows a systematic time series econometrics approach. Common practice among time series econometricians is to examine the data properties or its nature (stationary or non-stationary), and the long run relation[3] among variables having higher integrating order. Error correction model (ECM) provides the short run dynamics with long run equilibrium relation. In the multivariate framework[4] the Vector Error Correction Model (VECM) is more appropriate and can be used for empirical investigation of the determinants of FDI in long relation with short run dynamics. Considering per capita income of trading partners as proxy for their economic activities are incorporated as exogenous variables in this study. The economic activity of the rest of the world could be good proxy for exogenous factors to Nigerian economic activity.

3. Results

Primary concern of this study is to find the long run relationship between FDI inflow and resource outflow. Following a systematic time series econometrics approach, results confirm a significant co-integrating equation. VECM incorporates the economic activity of the rest of the world and paper also investigates the impact of the

---

[3] Johansen (1988) approach provides the number of co-integration equations among variables.
[4] Engle and Granger (1987) two stage approach, Engle-Granger-Yoo (1991) 3-step approach, Johansen (1988), Johansen and Juselius (1990) maximum likelihood approach, Pesaran and Shin (1995) and Pesaran-Shin-Smith (1996, 2001) bounds testing approach or known as the auto-regressive distributed lag (ARDL) approach. There is clear cut evidence which shows one approach to be consistently superior to the others.

rest of the world on FDI inflow to Nigeria. The interrelation among macroeconomic variables provides the long run co-integrating or equilibrium relation and short run dynamics. Now we discuss long run equilibrium and short run dynamics in details as follows.

3.1 Long run Equilibrium

We study interrelation among major macroeconomic variables and rest of the world representing developed economy like the US and emerging economies like China, India and South Africa. Long run co-integration results suggest that natural resource, inflation and foreign exchange rate are crucial for FDI inflow to Nigeria during 1970-2006 (Table 1).

Table 1: Estimated Co-integrating Vector considering emerging trade partners

Variables	Estimated Coefficients
FDI	1
NRX	-0.88256***
	(-2.61)
GDP	-1.69 x 10^{-05}
	(-0.066)
INFLA	-0.01843***
	(-19.81)
OPEN	0.00337*
	(1.866)
FX	-0.01748***
	(-8.86)
C	0.6376

Note: (i) Figures in parenthesis are t-statistics. (ii) ***, ** and * denote the level of significance at 1%, 5% and 10%, respectively.

Long run co-integrating (equilibrium) relation is

$$FDI = -0.6376 + 0.88256*NRX + 0.01843*INFLA + 0.01748*FX + u \qquad (1)$$

Where *u* is the error term. From the equation (1), in long run, the natural resource outflow, inflation rate and foreign exchange rate have significant direct impact on FDI inflow to Nigeria. The rising inflation and foreign exchange rates attract FDI because it creates the possible business environment in favour of FDI inflow to Nigeria. FDI inflow to Nigeria might crowd out the resources from potential domestic investors. Due to inflation the cost of production increases and the foreign currency could be exchanged at higher level in terms of Nigerian currency. It simply means Nigerian currency is devalued and foreign currencies appreciate. Hence, foreign direct investment becomes cheaper than Nigerian domestic investment. So, one unit of foreign currency could buy the same amount of resources at higher price for given rising inflation and foreign exchange rates. Unit foreign currency gains the purchasing power for higher amount of resources at existing price. Both rising foreign exchange and inflation rates influence significantly on FDI inflow to Nigeria.

In the long run, openness and domestic market size become statistically insignificant in the presence of the USA, China, India and South Africa. Market size has no significant role for attracting FDI to Nigeria which contradict existing literature.

3.2 Short run Dynamics

Table 2 presents the VECM results in the presence of the economy of the US, China, India and South Africa. Short run results change significantly. In short run, natural resource outflow and domestic economic activities (GDP) significantly affect the FDI inflow to Nigeria. Natural resource outflow strongly boost up GDP in short run. Foreign exchange and inflation rates significantly affect natural resource outflow in short run. The coefficient of error correction term for FDI is significantly negative

which indicates that FDI flow returns to its long run equilibrium path, if any departure in the economy, while reverse situation occurs in case of natural resource.

Table 2: Estimated VECM incorporating emerging trade partners

Variables	D(FDIFL)	D(NRX)	D(FX)	D(GDP)	D(INFLA)	D(OPEN)
Error Correction	**-0.99925**** (-2.49)	**0.10119**** (2.75)	18.26402 (1.26)	75.70486 (0.82)	24.35759 (0.92)	-25.76761 (-1.43)
Endogenous variables						
D(FDIFL(-1))	-0.036292 (-0.102)	-0.043018 (-1.32)	**-28.2448**** (-2.21)	-70.45235 (-0.86)	-10.36299 (-0.44)	33.25** (2.087)
D(FDIFL(-2))	0.206031 (0.9)	-0.005126 (-0.24)	-18.614** (-2.26)	-29.32989 (-0.56)	6.430539 (0.43)	23.67** (2.31)
D(NRX(-1))	-1.435754 (-0.53)	**-0.51098**** (-2.066)	-6.146876 (-0.06)	-733.4546 (-1.18)	-26.16297 (-0.15)	148.935 (1.23)
D(NRX(-2))	**3.8626**** (2.016)	0.170075 (0.97)	-55.00882 (-0.797)	**945.37**** (2.15)	26.73563 (0.21)	-98.237 (-1.14)
D(FX(-1))	-0.008990 (-1.1)	**0.0019**** (2.52)	-0.012525 (-0.04)	1.458402 (0.78)	0.604236 (1.12)	-0.3265 (-0.89)
D(FX(-2))	-0.011392 (-1. 9)	0.000875 (1.59)	0.117207 (0.54)	-0.40039 (-0.29)	0.560996 (1.42)	-0.1234 (-0.46)
D(GDP(-1))	0.002146** (2.03)	-1.02E-05 (-0.1)	-0.001020 (-0.03)	0.175506 (0.72)	0.056307 (0.81)	-0.0553 (-1.17)
D(GDP(-2))	-0.001079 (-0.81)	-0.000194 (-1.587)	0.022012 (0.46)	-0.432361 (-1.41)	-0.066668 (-0.76)	-0.05823 (-0.97)
D(INFLA(-1))	0.004073 (0.57)	**0.002**** (3.07)	0.263805 (1.02)	1.408046 (0.85)	0.487242 (1.03)	-0.35386 (-1.1)
D(INFLA(-2))	-0.003979 (-0.6)	0.000431 (0.71)	0.257403 (1.08)	1.743648 (1.15)`	-0.37078 (-0.85)	**-0.629**** (-2.12)
D(OPEN(-1))	0.006163 (1.12)	0.00036 (0.71)	-0.24254 (-1.22)	**2.4893*** (1.97)	-0.484299 (-1.33)	**-0.525**** (-2.12)
D(OPEN(-2))	0.009295 (1.47)	0.00051 (0.88)	-0.04696 (-0.206)	-0.29627 (-0.2)	-0.16856 (-0.4)	0.23155 (0.82)
C	-0.58139 (-1.28)	0.04596 (1.1)	13.72186 (0.84)	-27.64467 (-0.27)	6.127504 (0.2)	35.6988* (1.76)
Exogenous variables						
USGDP	0.00022 (1.79)	-2.11E-05 (-1.86)	**-0.01066**** (-2.399)	-0.042969 (-1.52)	-0.00927 (-1.14)	0.004707 (0.85)
CHNGDP	-0.00071 (-1.54)	**8.53E-05**** (2.006)	-0.023698 (-1.42)	-0.043087 (-0.40)	-0.004578 (-0.15)	-0.037147 (-1.79)
INDGDP	7.85E-06 (0.005)	-7.68E-05 (-0.52)	**0.172***** (2.95)	0.48737 (1.31)	0.074502 (0. 7)	0.107377 (1.48)
SAGDP	-0.00046 (-1.20)	6.01E-05 (1.71)	0.000423 (0.03)	0.04613 (0.52)	0.014007 (0.55)	**-0.038**** (-2.23)

Note: (i) Figures in parenthesis are t-values. (ii) ***, ** and * denote the level of significance at 1%, 5% and 10%, respectively.

Bottom part of Table 2 also shows that China's economy has strong influence on natural resource outflow whereas the presence of the US and India have strong influence on foreign exchange rate. The presence of South Africa marginally reduces

only trade intensity through competitiveness. Long run and short run results have changed dramatically in the presence of the US, China, India and South Africa.

$$\Delta FDI_t = -0.99924EC_{t-1} + 3.8626\Delta NRX_{t-2} + 0.002146\Delta GDP_{t-1} + \varepsilon_{1t} \qquad (1.1)$$

$$\Delta NRX_t = 0.10119EC_{t-1} - 0.51098\Delta NRX_{t-1} + 0.0019\Delta FX_{t-1} + 0.002\Delta INFLA_{t-1}$$
$$+ 0.000085CHNGDP + \varepsilon_{2t} \qquad (1.2)$$

$$\Delta FX_t = -28.2448\Delta FDI_{t-1} - 0.010657USGDP + 0.172INDGDP + \varepsilon_{3t} \qquad (1.3)$$

$$\Delta GDP_t = 945.37\Delta NRX_{t-2} - 2.4893\Delta OPEN_{t-1} + \varepsilon_{4t} \qquad (1.4)$$

$$\Delta INFLA_t = \varepsilon_{5t} \qquad (1.5)$$

$$\Delta OPEN_t = 33.25\Delta FDI_{t-1} + 23.67\Delta FDI_{t-2} - 0.629\Delta INFLA_{t-2} - 0.525\Delta OPEN_{t-1} - 0.038SAGDP$$
$$+ \varepsilon_{6t} \qquad (1.6)$$

Where ε_ts are white noise.

Equations (1.1) – (1.6) display the short run dynamics among the variables in VECM. Equation (1.1) shows that current change in FDI directly depends on that of GDP in last year and that of natural resource outflow two years back. The coefficient of error correction (EC) term is negative and statistically significant. It suggests that there is a convergence tendency, which means if any departure from long run equilibrium path in last year then it will correct the last year's error and moves towards equilibrium path. Equation (1.2) indicates that current change in natural resource outflow is auto regressive and depends on change in foreign exchange rate and that of inflation. Coefficient of error correction term is positive which suggests that if any departure from long run path it diverges or move further away from equilibrium path in consecutive years. It is noted that China's GDP is the proxy of China's economic activity, which has significant impact on Nigerian natural resource outflow/export.

Equation (1.3) identifies that current change in Foreign Exchange rate (FX) depends on that of FDI. There are some exogenous variables which also influence the current change in FX. Equation (1.4) suggests that last year's change in openness/trade intensity affects indirectly on current change in GDP while change in natural resource outflow in two years back affects directly on current GDP change. Equation (1.5) shows that inflation rate change is purely random variable. VECM result, especially equation (1.6), clearly shows that openness/trade intensity is autoregressive in nature and depends directly on series of past FDI inflows while indirectly on inflation rate change. South Africa's economic activity (SAGDP) significantly influences Nigeria's trade intensity/openness.

Change in openness in last year directly influences the current change in GDP. Last year's change in GDP also directly influences the change in foreign direct investment in current year. It should be noted that there is a triangular unidirectional causal linkage among Openness, GDP and FDI. Openness is the crucial policy variable through which GDP growth and FDI inflow operates. Another triangular unidirectional causal linkage is observed among FDI, foreign exchange and natural resource outflow. In this triangle FDI inflow influences foreign exchange rate which affects natural resource outflow that again attract FDI in Nigeria. Here, FDI inflow to Nigeria is acting as a pivotal variable to affect major macroeconomic activities.

Inflation rate or change in price level in domestic market is purely independent but it affects directly natural resource outflow and indirectly trade intensity/openness. So, inflation rate in domestic market provides signal to the global investors for FDI in the channel of natural resource outflow and trade intensity/openness. In this context, global players also play an important role regarding FDI. In this study we observe that

China influences on natural resource outflow, the US and India affect foreign exchange rate while South Africa influences the trade intensity/openness.

Equations (1.1) – (1.6) also provide the short run dynamics and a causality direction. The following is in brief of the causal linkage among macroeconomic variables and emerging trade partners:
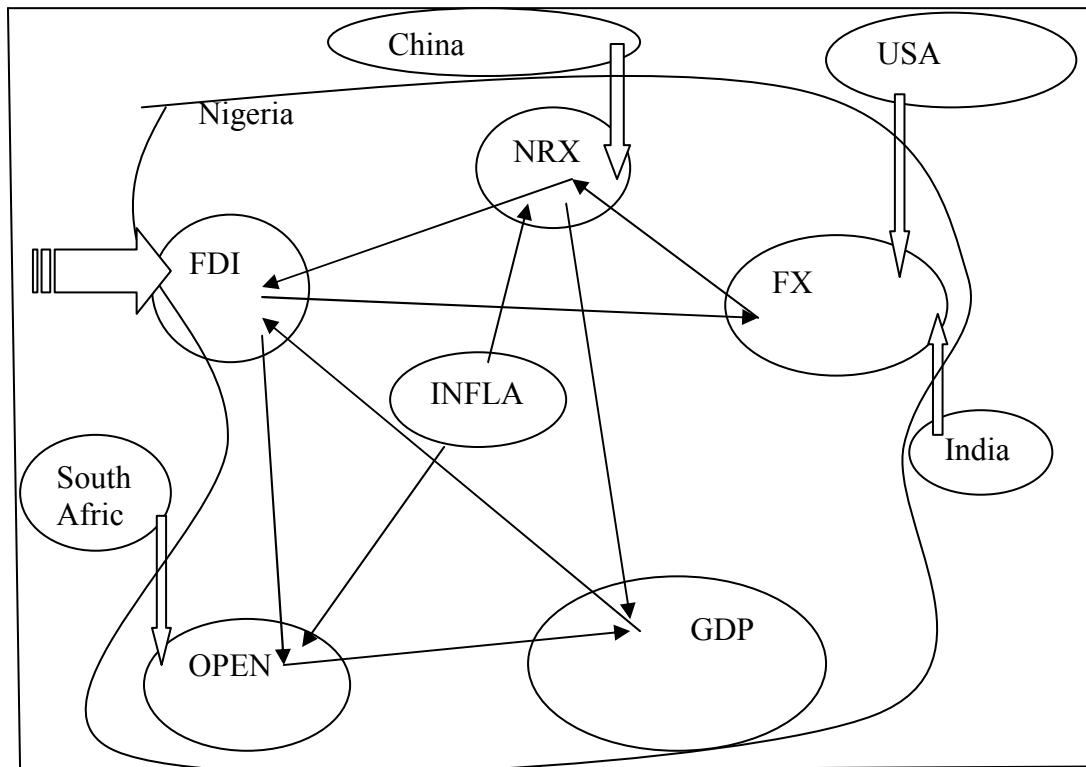

Diagram 1: Integrated causal linkage among major macroeconomic variables in Nigeria in presences of emerging trade partners especially with the US, China, India and South Africa.

From empirical findings it is clear that inflation is random and independent variable in this model. In above diagram the arrow headed lines indicate the causal direction. Diagram 1 exhibits two strong triangular linkages among major macroeconomic variables - one is Openness, GDP and FDI; other one is FDI, FX and NRX. For example, initially, inflation rate influences to open up the economy, then openness directly affects GDP which attracts FDI that influences openness again. In brief, INFLA => OPEN => GDP => FDI => OPEN. FDI inflow to Nigeria affects openness

and foreign exchange rate (FX) which directly influences natural resource outflow that directly affects FDI inflows which again hits foreign exchange rate. In brief, INFLA => NRX => FDI => FX => NRX. Inflation also directly influences natural resource outflow which has direct impact on FDI inflow and GDP. In this context FDI inflow to Nigeria is acts as a pivotal role controlling above two triangular linkages in the domestic market. Inflation is randomly generated and stimulates overall economic development through Nigerian macroeconomics variables.

It is clear from the above diagram and equations (1.2), (1.3) and (1.6) that there are external factors measured in terms of economic activity of emerging trade partners that also influence natural resource outflow, foreign exchange rate and trade intensity or openness, respectively. Emerging China has direct impact on natural resource outflow. Emerging India has direct impact on foreign exchange rate while emerging South Africa and the US influence indirectly on trade intensity or openness and foreign exchange rate, respectively. Considering trade intensity as the proxy of competitiveness, certainly South Africa raises Nigeria's competitiveness in trade and is a close competitor of Nigeria among four trade partners as mentioned above. So, the role of emerging trade partners is very important in this globalized era. Results should mislead if we ignore the external factors in determining FDI inflow.

4. Conclusion

Incorporating emerging trade partners in VECM this study empirically investigates long run determinants of FDI inflow to Nigeria and their shirt run dynamics during 1970-2006. The findings suggest that the endowment of natural resources, macroeconomic risk factors and policy variable like openness are significant determinants of FDI inflow to Nigeria. This study supports existing literature except market size. This paper observes that market size is insignificant in case of Nigeria

that contradicts the earlier literature. The findings also suggest that FDI inflows to Nigeria are resource-seeking FDI which has strong impact on Nigeria's natural resource export to the global market. China influences strongly on resource outflow, the US and India affects foreign exchange rate while South Africa raises competitiveness with Nigeria. So, the roles of emerging trade partners are crucial for overall economic development in Nigeria.

The positive role of natural resource-seeking FDI suggests for creating more conducive investment environment through socio-political and economic stability in the country. The government should intensify the trade liberalisation policy that attracts FDI to country.

This study has several limitations. The results may change if sufficient data on bilateral FDI flow are available and incorporate in the model. The north – south and south - south trade framework model can also provide possibly new insights in FDI inflow to Nigeria. Future study will focus on these.

Refernces

Asiedu, E. 2006. "Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability." *United Nations University*.

Asiedu, E. 2002. "On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different?" *World Development*, Vol.-30(1): 107-119.

Banerjee, A., J. W. Galbraith, and D. F. Hendry. 1993. *Co-integration, Error correction and the econometric analysis of non-stationary data*, New York, Oxford University Press.

Chakrabarti, A. 2001. "The determinants of foreign direct investment: Sensitivity analyses of cross-country regressions." *Kyklos* 54: 89-112.

Chakraborty, C. and P. Basu. 2002. "Foreign Direct Investment and Growth in India: A Co-integration Approach, Applied Economics." 34(9): 1061-1073.

Dinda, S. 2012. "Factors Determining FDI to Nigeria: An Empirical Investigation". *MPRA* Paper 400172, University Library of Munich, Germany.

Enders, W. 2004. *Applied Econometric Time Series*, 2nd ed. New Jersey; John Wiley and Sons.

Engle, R. F. and C. W. J. Granger. 1987. "Cointegration and Error Correction, Representation, Estimation and Testing" *Econometrica:* 251-276.

Engle, R. F. and B. S. Yoo. 1991. "Cointegrated Economic Time Series: An Overview with New Results." in Engle, R.F. and Granger, C. W. J. (eds) *Long-Run Economic Relationships*. Oxford, Oxford University Press.

Gastanaga, V. M. and J.B. Nugent, B. Pashamova. 1998. "Host Country Reforms and FDI Inflows: How Much Difference do they Make?" *World Development*, Vol.-26 (7): 1299-1314.

Harris, R. and R. Sollis. 2003. *Applied Time Series Modelling and Forecasting*, West Sussex, Wiley.

Hines, J. R. Jr. 1997. "Altered states : Taxes and the location of foreign direct investment in America." *American Economic Review,* 86(5): 1076 – 1094.

Iyoha, M. A. 2001. "An econometric study of the main determinants of foreign investment in Nigeria." *The Nigerian Economic and Financial Review,* 6(2): December.

Johansen, S. and K. Juselius. 1990. "Maximum Likelihood estimation and inference on cointegration – with applications to the demand for money." *Oxford Bulletin of Economics and Statistics,* 52 (2): 169-210.

Johansen, S. 1988. "Statistical analysis of cointegrating vectors." *Journal of Economic Dynamics and Control,* 12: 231-254.

Ngowi, H. P. 2001. "Can Africa increase its Global share of foreign direct investment (FDI)?" *West Africa Review,* 2(2).

Obadan, M.I. 1982. "Direct Foreign Investment in Nigeria: An Empirical Analysis." *African Studies Review,* XXV (1): March.

Pesaran, H. M. and Y. Shin. 1995. "Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis." *DAE working paper series* 9514. Department of Applied Economics, University of Cambridge.

Pesaran, H. M., Y. Shin, and R. Smith. 1996. "Testing the existence of a long-run relationship." *DAE working paper series* 9622. Department of Applied Economics, University of Cambridge.

Pesaran, H. M. and R. Smith. 1998. "Structural Analysis of Cointegration VARS." *Journal of Economic Surveys,* 12 (5): 471-505.

Pesaran, H. M., Y. Shin, and R. Smith. 2001. "Bounds Testing Approaches to the analysis of level relationships." *Journal of Applied Econometrics*, vol.-16: 289-326.

Phillips, P.C.B. and P. Perron. 1988. "Testing for a Unit in Time Series Regression." *Biometrika*, 75: 335-346.

Quintos, Carmela, E. 1998. "Stability Tests in Error Correction Models." *Journal of Econometrics*, vol-82(2): 289-315.

Toda, H. Y. and Y. Taku. 1995. "Statistical inference in Vector Autoregressions with possibility integrated process." *Journal of Econometrics*, vol.-66 (1-2): 225 - 250.

Tsai, P. 1994. "Determinants of Foreign Direct Investment and its Impact on Economic Growth." *Journal of Economic Development*, 19: 137-163.

UNCTAD. 2007. *World Investment Report*. United Nations, New York.

UNCTAD. 2007. *Handbook of Statistics.* on-line (http://www.unctad.org).

Wheeler, D. and A. Mody. 1992. "International investment location decisions: The case of U.S. firms." *Journal of International Economics,* v33: 57-76.

World Bank. 2008. *World Development Report*. Oxford University Press.