Factors Determining FDI to Nigeria: An Empirical Investigation

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Abstract

This study empirically investigates the determinants of foreign direct investment (FDI) to Nigeria during 1970-2006. This study suggests that the endowment of natural resources, trade intensity, macroeconomic risk factors like inflation and exchange rates are significant determinants of FDI flow to Nigeria. The findings also suggest that in long run market size is not the significant factor for attracting FDI to Nigeria, it contradicts the existing literature. Our results indicate that FDI flow to Nigeria is resource-seeking FDI. Results also suggest that trading partner like the UK in North-South (N - S) and China in South-South (S - S) trade relation have strong influence on Nigeria's natural resource outflow.

Key Words: FDI, Natural resource export, exchange rate, openness, inflation rate, North-South and South-South trade, VECM.

JEL *Classification Number*: C_{13}, C_{22}, F_{18}, Q_{32}, O_{13}, O_{55},

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1. Introduction

Worldwide Foreign Direct Investment (FDI) is increasing at an extraordinary speed in the 21st century[1], which begins making Africa different (Asiedu 2002). FDI flow to Africa increased from $9.68 billion in 2000 to $1.3 trillion in 2006 (UNCTAD 2007). Recently Africa is gradually coming to the focus of the global business. So, new destination of FDI is, now, Africa. Why is Africa attractive region for foreign direct investments? This study re-examines the determinants of FDI flow to Africa and more specific to a poor African country like Nigeria which is rich in natural resources. This paper attempts to investigate the role of natural resources in the determinants of FDI flow to Nigeria, in addition to the standard factors used in such analysis. This paper tries to find out in long run relation with short run dynamics and interlinking causal mechanism in the multivariate framework. Using a vector error correction model, this paper suggests that natural resource is crucial attracting factor for FDI to Nigeria.

The recent surge of FDI flows to Africa during 2000-2007 followed from positive business environment in the region backed by reform[2] framework for FDI. In most of African nations, FDI flow rose mainly in the primary sector because of the existence of vast natural resources[3]. So, the paper examines this common perception that the FDI is largely driven by natural resources. This perception is also consistent

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[1] The largest FDI flows among developing economies goes to China and most attractive region is South and South-East Asia (UNCTAD 2007).

[2] Many African countries have reformed their economic policy, investment laws and also improving financial system. Market size is also growing in terms of purchasing power in the region with vast population. Political instability, internal conflict and poor governance till pose significant problems to many countries in Africa.

[3] There is no doubt that the demand for Africa's natural resources, particularly oil, is increasing. The United States for instance, has been reducing its dependence on Middle, and increasing its interest in supplies from Africa.

with the UNCTAD data – three largest recipients of FDI are South Africa, Nigeria and Angola – all are natural resource rich nations.

Nigeria is one of the countries in Western Africa richly endowed with natural resources – mainly oil and gas, mineral deposits, vegetation etc. Nigeria's natural resource balance is dominated by petroleum. Known oil reserves could last for another 30 - 40 years. The country has coal reserves but production is substantially lower than potential.

The UNCTAD World Investment Report 2006 shows that FDI flow to West Africa is mainly dominated by Nigeria, who received 70 percent of the sub-regional total and 11 percent of Africa's total. Out of this Nigeria's oil sector alone receive 90 percent of the FDI flow. This recent improved performance in FDI flow to Nigeria calls for need to investigate factors that determine its inflow. This study focuses on FDI flow to Nigeria, which is poor in terms of income but rich in natural resources.

The Nigerian Government adopts several policies to attract FDI[4] in this globalization era. Particularly, the government implemented IMF monitored-liberalization of its economy, welcomes foreign investors in the manufacturing sector, offers incentives for ownership of equity in all industries except key industries like military equipment. The incentives like tax relief are available to investors and concessions for local raw material development. In line with its economic reforms, starting from the 1980s, Nigeria undertook a far reaching privatization programme. This change starts in 1989 and onwards due to several policies (like introduction of Structural Adjustment Programme in 1986, Export Processing Zones Decree in 1991,

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[4] The contribution of FDI is crucial for countries where incomes and hence domestic savings are particularly low, like Nigeria. They need external capital for investment and promote their economic growth and development. After 1990 the crisis facing poor African nations is a rapid depletion of the official sources: official loans (as share of GNP) to Sub-Saharan African countries dropped from 6% in 1990 to 3.8% in 1998; foreign assistance per capita shrunk from US$35 to US$28 from 1989-92 to 1993-97. With limited access to the international capital markets they are forced to rely solely on FDI. Hence, the need for FDI appears to be more urgent than ever before.

Investment Promotion Commission in 1995) adopted by the Nigerian government. FDI flow was low in pre- 1990's but post 1990's it remarkably changes especially in the 21st century.

This paper empirically examines the hypothesis that natural resource is an important determinant of FDI flow to Nigeria during 1970-2006. The main objective of the resource-seeking FDI is to extract natural resources and sale in the international market through exporting them. Automatically these activities generally affect foreign exchange as well as price level (or inflation rates) in the domestic market which again stimulate to FDI flow through raising resource exports. All these affect the whole economy, viz. GDP. How important are the market size, macroeconomic instability, endowment of natural resources and macroeconomic policy like openness in the determination of FDI flow to poor Nigeria? So far, literatures consider only endogenous variables. In their consideration trade intensity or openness might be crucial policy variable through which all other variables may be affected. In this context we also consider the influence of major trading partners on foreign exchange and inflation rates, as well as FDI flow and economic activities (GDP). This study provides an additional avenue through which exogenous factors may affect one economy. This paper examines the impact of exogenous factors considering the major trading partners from North like the US, UK, Germany, and France; and from South like China, India and South Africa.

Results of this study suggest that natural resource is one of the crucial determinants of FDI flow to Nigeria in long run. The major contribution of this paper is to identify the resource-seeking FDI and points out interlinks among FDI determinants in the multivariate framework. This paper also traces out the impacts of exogenous factors specific to major trade partners. Significant long run equilibrium

relationship between FDI flow to Nigeria and resource outflow exists in both North-South and South-South trade relation. These findings indicate that resource-seeking FDI are significant for the UK in North-South and China in South-South trade relation. Results also suggest that so called market size is not the significant determinant of FDI which contradicts the existing literature.

The paper proceeds as follows: Next Section briefly reviews the literature. Section 3 describes the data and methodological framework. Section 4 discusses the empirical results and finally Section 5 concludes.

2. Literature

Role of Foreign Direct Investment (FDI) in economic development has been discussed in several times and still debate is going on. Most of the studies are focusing either on the impact of FDI on domestic economy or determinants of FDI. Literature discusses the major determinants of FDI that are domestic market size, economic growth, technological capability, infrastructure, government policy, institutions, and other factors. FDI plays an important role in promoting economic development and growth, raising a country's technological level and creating employment. FDI works as a means of integrating under developed countries into the global market and rising capital availability for investment. In brief, FDI serves as an important engine for growth in developing countries through two modes of action: (i) expanding capital stocks in host countries and (ii) bringing employment, managerial skills, and technology. Several frameworks have evolved for analyzing the determinants and effects of FDI. Gastanga et al. (1998) examines the effects of various policies on FDI flows from the perspective of the eclectic theory of international investment and hence the advantages of foreign ownership, host country

location, and internationalization. Wheeler and Mody (1992) and Hines (1995) incorporate institutional factors like host country's risk and corruption in the determination of FDI. Tsai (1994) notes the importance of qualitative policies but fails to do so. Asiedu (2002, 2006) explore the impact of natural resources, market size, host country's investment policy, corruption and political instability on FDI flow. Asiedu (2006) examines the determinants of FDI to Africa. She suggests that low inflation and efficient legal system promote FDI but corruption and political instability have opposite effect.

Using least squares technique on annual data for 1962 – 1974 Obadan (1982) supports the market size hypothesis confirming the role of protectionist policies (tariff barriers). Study suggests taking the cognisance factors such as market size, growth and tariff policy when dealing with policy issues relating to foreign investment to the country. Anyanwu's (1998) study of the economic determinants of FDI in Nigeria also confirmed the positive role of domestic market size in determining FDI flow to the country. This study noted that the abrogation of the indigenization policy in 1995 significantly encouraged the flow of FDI into the country and that more effort is required in raising the nation's economic growth so as to attract more FDI. Iyoha (2001) examined the effects of macroeconomic instability and uncertainty, economic size and external debt on foreign private investment inflows. He shows that market size attracts FDI to Nigeria whereas inflation discourages it. This study also confirms that unsuitable macroeconomic policy acts to discourage foreign investment. Anyanwu (1998) and Iyoha (2001) have studied on the determinants of FDI in Nigeria. Major limitations of these studies are the traditional econometric technique and non-consideration of natural resource in determination of FDI flow. Using time series econometric technique on annual data of Nigeria, this paper examines the effect

of the country's natural resource export, along with openness, market size and macroeconomic risk variables like inflation and foreign exchange rate on FDI flow during 1970-2006.

3. Methodology and Data

3.1 Variables:

Existing literature provides the major determinants of FDI such as domestic market demand, macroeconomic factors like inflation and foreign exchange rate, external debt, infrastructure, corruption or rule of law, efficient government and policy variables like openness and other factors. Ideally all these data are required for analysis but due to limited available data over time this study is confined with few of them. The major variables – FDI, market size, exchange rate, inflation rate, openness, natural resource - are described below.

The components of *FDI* are equity capital, reinvested earnings and other capital (mainly intra-company loans). As countries do not always collect data for each of those components, reported data on FDI are not fully comparable across countries. In particular, data on reinvested earnings, the collection of which depends on company surveys, are often unreported by many countries (UNCTAD Handbook of Statistics). The *market demand* is one of the important determinants that have been used in empirical studies to explain the inflow of FDI to a host country. This is because investment opportunities in countries with large markets tend to be more profitable for the foreign firms. The variable that has been widely used to proxy market size is per capita income of a country. The GDP per capita reflects the income level of the whole economy (Chakrabarti 2001). A country with relatively *weak currency* attracts more FDI than one with strong currency. The *inflation rate* is used

as a measure of overall macroeconomic stability of a country (Asiedu 2002). High inflation rate can serve as disincentive on FDI to a country as it increases the user cost of capital. *Openness* is measured as the ratio of export and import to GDP. It is also termed as trade intensity which refers to the ease with which capital can be moved in or out of a country by investors (Chakrabarti 2001). The availability of *natural resources* might be a major determinant of FDI to host country. FDI takes place when a country richly endowed with natural resources lack the amount of capital or technical skill needed to extract or/and sale to the world market. Foreign firms embark on vertical FDI in the host country to produce raw materials or/and inputs for their production processes at home. This means that certain FDI may be less related to profitability or market size of host country than natural resources which are unavailable to domestic economy of the foreign firms.

3.2 Data

For this study the data are taken from four main sources – viz., the Penn World Table, UNCTAD, World Investment Report (2006, 2008) and the central bank of Nigeria. Data for FDI, inflation rate and natural resource (mainly oil export) are obtained from the Central Bank of Nigeria (statistical 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 (see the website for details: http://stats.unctad.org/Handbook). All these Nigerian data covers the period from 1970 to 2006.

In literature, generally, *FDI flow* is defined as the ratio of FDI to GDP and *resource flow* as ratio of natural resource export to total export of a country. Traditional approach considers that everything is endogenous but ignores the

development of the rest of the world. Ideally this paper incorporates it and accordingly FDI flow is redefined as the ratio of FDI to Nigeria (FDI_N) to total FDI in the world (FDI_W), i.e., FDI flow = FDI_N/FDI_W. So, it is basically a share of the World FDI goes to Nigeria. Similar way natural resource flow is also redefined as the ratio of Nigeria's natural resource export (NRX_N) to the world resource export (NRX_W), i.e., NRX = NRX_N/NRX_W. NRX is a share of the world resource exports going out from Nigeria. Inflation and foreign exchange rate represent the macroeconomic risk factors.

3.3 Methodology

Primary concern of this study is to find the long run relationship between FDI flow and resource flow. Fig 1 shows the long run relation of FDI and resource flow over time. From Fig 1 it is clear that there is a co-movement between natural resource outflow and FDI flow to Nigeria during 1970-2006. So, co-integration technique may be appropriate for this study. This paper follows a systematic time series econometrics approach.

Common practice among econometricians is to test whether nature of time series data are stationary or non-stationary in order not to obtain spurious results before using any econometric technique[5]. Considering all the variables are non-stationary and integration of order one or I(1), we apply co-integration technique. Johansen (1988) approach provides the number of co-integration equations among variables. Here, error correction model (ECM) is useful for short run dynamics with long run equilibrium relationship. There are several techniques for ECM in the

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[5] One major feature of earlier studies on Nigeria is that they employed least square econometric technique in investigating the existing relationships between the time-series data of FDI and its determinants. It may mislead the policy conclusion.

existing literature[6]. In this study we apply sophisticated econometrics technique like Vector Error Correction Model (VECM), which is used for empirical investigation of the determinants of FDI in short and long run. The VECM[7] is more useful in multivariate framework. The paper also examines the misspecification, if any. We are introducing a set of exogenous variables to capture the effect of economic activity in other countries (i.e., major trading partners).

4. Results

This paper follows a systematic time series econometrics approach to investigate the determinants of FDI flow to Nigeria during 1970-2006. The results of unit root test and co-integration test are presented in Table 1. In this study the unit root tests confirm that all the variables are non-stationary at level (Table 1). Augmented Dickey Fuller (ADF) and Phillips Perron (PP) Tests also confirm that all the variables are difference stationary (see panel A of Table 1). Hence Unit Root Test results strongly suggest that all the variable are integration of order one or I(1). Since all the variables are in same order of integration we should apply co-integration technique. Fig 1 also confirms the co-integration among natural resource outflow and FDI flow to Nigeria during 1970 -2006. Applying Johansen (1988) approach we find the number of co-integration equations among the variables. Co-integration test results are presented in the Panel B of Table 1. At 5 percent level of significance, results suggest only one co-integrating equation and confirm significant long run relationship among the variables. Here error correction model (ECM) is useful for short run dynamics with

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[6] Engle and Granger (1987) 2 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.

[7] It is widely used as the extension of Engle-Granger (1987) approach. The order of VAR and the optimal number of lags are used in the model (Pesaran and Smith 1998 and Li et al. 2006).

long run relationship. There are several techniques for ECM in the existing literature[8]. The VECM is more useful in multivariate framework. We present the estimated results of VECM with and without exogenous factors separately.

4.1: VECM Results without Exogenous Factors

Table 2 presents the results of the VECM without exogenous factors. Table 2a shows the co-integrating vector or long run relationship. FDI flow to Nigeria is co-integrated with natural resource outflow, GDP per capita, openness, inflation and foreign exchange rate. This finding asserts and supports the existing literature. Asiedu (2002) finds that natural resource, openness, market size, foreign exchange and inflation rate explain the FDI flow for whole Africa while we observe it for Nigeria only. Table 2b shows the results of VECM. First row of the Table 2b presents the error correction terms and rest of the table presents the VAR estimates. It should be noted that the coefficients of error correction of FDI flow and foreign exchange rate are significantly negative whereas that of natural resource outflow and GDP are significantly positive. It suggests that in short run if any disturbance in the economy, FDI and foreign exchange rate returns to the long run equilibrium path whereas resource outflow and GDP do not come back to its long run path. From the VAR or rest of Table 2b, it should be noted that inflation rate affects FDI flow to Nigeria in short run. FDI flow increases directly with rising inflation in Nigeria. GDP and FDI and openness have significant impact on resource outflow. Inflation rate significantly reduces real GDP which is obvious. Natural resource outflow significantly affect inflation rate, which follows autoregressive structure. Here, natural resource outflow plays a crucial role to

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[8] Engle and Granger (1987) 2 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.

curve down inflation in Nigeria during 1970-2006. FDI flow, resource outflow directly influence foreign exchange rate whereas openness affect it inversely. Foreign exchange appreciates with FDI inflow and resource outflow. Apart from all these, constant term is statistically significant which suggest that other policy variables also significantly affect Nigerian foreign exchange rate in short run. It is clear from VECM that openness is exogenous and independent in short run (Table 2b). Openness is very much policy related variable.

There is a strong interconnection among variables. In brief, resource outflow curves down inflation rate that discourages FDI flow. Having auto regressive structure, through spiralling process inflation rate also comes down that reduces FDI flows which further stimulate to increase resource outflow that helps to appreciate foreign exchange rate. Few results of Table 2 are not our expectation in terms of signs and therefore we suspect on it. We confirm it after the diagnostic tests specifically model fitting criteria[9], which suggested that model might be mis-specified.

Considering only endogenous variables the earlier model may be mis-specified due to non-incorporation of exogenous variables. Now, this study introduces a set of exogenous variables to capture the effect of economic activity in the rest of the world. The economic activity of major trading partners could be good proxy for exogenous factors to Nigerian economic activity. This study considers economic activities of the US and emerging economies (like China, India and South Africa) as proxy of exogenous variable for the rest of the world. Later, we also consider the

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[9] Considering Log likelihood function, AIC and SBIC criteria. Alternatively, converting all the variables into logarithm form and re-examine the long run relation in terms of elasticity. Here, the results are interesting and suggest that FDI flow is highly elastic with respect to natural resource outflow, foreign exchange rate, and openness in long run. It should be noted that growth rate of resource outflow directly influence that of FDI flow to Nigeria. Thus, natural resource outflow is the crucial factor that determines the FDI flow to natural resource-rich Nigeria. In this context, one point should be mentioned that GDP turns to insignificant in long run relation with FDI flow. The result also suggests that growth of market size (captured by growth of income per capita) has no effect on that of FDI flow to Nigeria.

major trading partner of Nigeria from developed world like the US, UK, France and Germany and from emerging economies like China, India and South Africa. In general, trade relation with partners may vary over time. This paper considers the trade partners only for the short run dynamics. It is interesting that these variables are significantly important. This indicates that the earlier model is mis-specified. Here, exogenous variables play a crucial role. Now we examine the impact of the rest of the world on Nigerian economy.

4.2: VECM Results with Exogenous Factors

VECM models allow us to study the interrelation among the variables in the presence of exogenous variables. In this context we study interconnection among variables and also with the US and emerging economies like China, India and South Africa. Considering per capita income of trading partners as proxy for their economic activities are incorporated as exogenous variables in this study (VECM). Long run co-integration results suggest that natural resource, inflation and foreign exchange rate are crucial determining factors of FDI flow to Nigeria during 1970-2006 (See Table 3a). It should be mentioned that in the long run GDP and openness become statistically insignificant in the presence of exogenous factors. Market size has no significant role for attracting FDI to Nigeria during 1970-2006. So, market size is not the determining factor of FDI especially in Nigeria which contradict existing literature. This striking result provokes me to study more in details.

Table 3b presents the VECM results in the presence of exogenous factors like the US economy and other emerging economies like China, India and South Africa. It should be mentioned that short run results are changed significantly. In short run, natural resource outflow and GDP significantly affect the FDI flow to Nigeria.

Natural resource outflow and openness strongly boost up GDP in short run. Foreign exchange and inflation rates significantly affect natural resource outflow in short run. Since the coefficient of ECM for FDI is significantly negative, FDI flow returns to its long run equilibrium path, if any departure in the economy but reverse situation for natural resource.

Table 3b shows the results of exogenous factors especially to the US economy and emerging economies like China, India and South Africa. It should be noted that China has strong influence on natural resource outflow whereas the US and India have strong influence on foreign exchange rate. South Africa affects trade intensity only. The long run results as well as short run results vary dramatically in the presence of exogenous factors.

For more detail and analytical purpose we also divide trade partners into two major groups – considering the US, UK, German and France as developed country group (North trade partners) and China, India and South Africa as developing country group (South trade partners). Nigeria itself belongs to South. So, finally, we repeat the exercise for North-South (N-S) and South-South (S-S) trade relation.

Long run results in North-South trade relation suggest that natural resource, inflation and openness are important determining factors of FDI flow to Nigeria during 1970-2006 (See Table 4a). It should be mentioned that in the long run GDP and foreign exchange rate become statistically insignificant in the presence of exogenous factors considering developed country group. Market size has still no significant role for attracting FDI to Nigeria and foreign exchange rate has no role in long run. The coefficient of the error correction term of natural resource outflow is negative and statistically significant (Table 4b). Among the developed country group only the UK has significant impact on natural resource outflow (Table 4b). Similar

long run relationship also holds in case of South-South trade relation (Table 5a). It should be noted that signs of coefficients differ from that of N-S trade. Among developing country group only China has significant effect on natural resource outflow (Table 5b). These findings suggest that natural resource attracts FDI irrespective of N-S or S-S trade relation with Nigeria. So, FDI flow to Nigeria is resource seeking. Perhaps it is true for other African resource-rich poor-nations.

5. Conclusion

Applying vector error correction model, this study empirically investigate the determinants of foreign direct investment flow to Nigeria during 1970-2006. This paper suggests that the endowment of natural resources, macroeconomic risk factors and policy variable like openness are significant determinants of FDI flow to Nigeria. This study supports earlier literature except market size. Generally, the market size is considered as the major determining factor for FDI. This paper observes that market size is insignificant and contradict the existing literature. It might be true for other resource-rich poor-country. The findings also suggest that FDI flow to Nigeria can be explained by resource-seeking FDI irrespective of any specific trade relation (i.e., either North-South or South-South). Trading partners like the UK in N-S and China in S-S trade relation have strong influence on Nigeria's natural resource outflow. Their basic target is to extract resource from the resource-rich country like Nigeria. The findings definitely help to formulate appropriate policies for resource-rich poor-countries.

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

attract FDI to country and should be cautious about political crises and social unrest that discourage foreign investment.

This study has several limitations due to inadequate data. The results may change if sufficient data on employment in foreign companies and foreign debts are available and incorporate in the model. Future study will focus on these and also focus on the technology spill over effect. This is our next research agenda.

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Table 1: Results of Unit root and Co-integration test

A: Unit Root Test				
List of Variables	Level		1st Difference	
	ADF	Phillips-Perron	ADF	Phillips-Perron
FDI	-2.16(4)	-2.18	-9.86***(3)	-16.06***
Natural Resource	-3.27(3)	-2.53	-4.76***(2)	-5.52***
Inflation rate	-3.0001(5)	-2.89	-5.74***(2)	-10.72***
Foreign Exchange rate	1.3 (4)	-0.64	-5.88***(1)	-5.89***
GDP	-0.95 (3)	-1.05	-5.49***(2)	-5.487***
Open	-1.73 (2)	-3.44	-10.7***(1)	-10.703***
B: Co-integration Test				
Hypothesizes Co-int. equations	Eigen value	Trace statistics	Critical value	Probability
None***	0.718177	111.1014	95.75	0.003
At most 1	0.63152	66.77	69.82	0.085
At most 2	0.36924	31.83189	47.856	0.6214
At most 3	0.229338	15.70283	29.797	0.733
At most 4	0.17049	6.585138	15.4947	0.6263
At most 5	0.00122	0.042753	3.84147	0.8362

Note: *** and ** denote the level of significance at 1% and 5%, respectively. Figures in parenthesis are Lag numbers.

Fig 1. FDI inflow to Nigeria and Natural resource export during 1970-2006
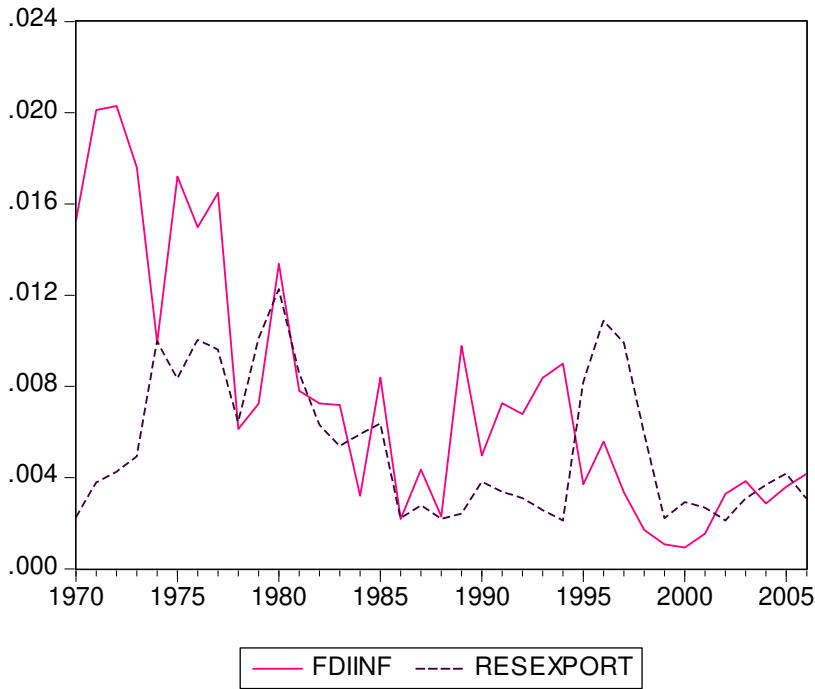
Table 2a: Estimated Co-integrating Vector

Variables	Estimated Cointegrating Vector
FDI	1
NRX	-0.2443***
	(-3.2)
GDP	-2.02×10^{-05}***
	(-12.66)
INFLA	0.00013***
	(10.18)
OPEN	-9.11×10^{-05}***
	(-6.62)
FX	0.00011***
	(18.88)
C	0.0153

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

Table 2b: Estimated Error Correction terms in VECM

Variables	D(FDI)	D(NRX)	D(GDP)	D(INFLA)	D(OPEN)	D(FX)
Error Correction	**-0.76354****	**0.61945*****	**14236.04****	1168.599	1944.876	**-1880.8*****
	(-2.32)	(3.55)	(2.04)	(0.63)	(1.28)	(-2.14)
D(FDI(-1))	-0.19174	**-0.52047*****	1545.89	1057.76	-586.394	**2247.02*****
	(-0.6)	(-3.09)	(0.23)	(0.59)	(-0.4)	(2.65)
D(FDI(-2))	-0.0576	-0.187	7958.75	351.27	-692.37	802.03
	(-0.18)	(-1.1)	(1.17)	(0.19)	(-0.47)	(0.93)
D(FDI(-3))	-0.1706	-0.033	1072.94	-488.81	-1385.78	510.52
	(-0.73)	(-0.27)	(0.22)	(-0.37)	(-1.29)	(0.82)
D(NRX(-1))	0.675	-0.14	1056.4	2065.5	-90.62	-183.98
	(1.24)	(-0.49)	(0.09)	(0.67)	(-0.04)	(-0.13)
D(NRX(-2))	-0.249	-0.3	2360.8	**-5584.15****	-2123.46	693.55
	(-0.534)	(-1.22)	(0.24)	(-2.13)	(-0.99)	(0.56)
D(NRX(-3))	0.292	-0.05	-4906.25	-779.99	88.49	**2767.49****
	(0.62)	(-0.2)	(-0.49)	(-0.29)	(0.04)	(2.2)
D(GDP(-1))	-0.000007	**-0.00001****	-0.09	0.06	0.027	0.00065
	(-0.63)	(-2.37)	(-0.4)	(0.94)	(0.53)	(0.02)
D(GDP(-2))	0.000002	0.000004	-0.09	0.038	0.02	0.02
	(0.17)	(0.5)	(-0.32)	(0.5)	(0.3)	(0.5)
D(GDP(-3))	-0.000001	0.000005	0.14	-0.03	-0.009	0.049
	(-0.08)	(0.74)	(0.53)	(-0.42)	(-0.16)	(1.47)
D(INFL(-1))	**0.00017****	-0.000025	-2.2774	-0.09	-0.178	0.275
	(2.39)	(-0.67)	(-1.52)	(-0.23)	(-0.55)	(1.46)
D(INFL(-2))	0.0001	-0.00002	-1.168	**-0.7724****	-0.31	-0.154
	(1.93)	(-0.68)	(-1.0)	(-2.49)	(-1.22)	(-1.05)
D(INFL(-3))	0.00006	0.00002	**-2.9882****	-0.2526	0.071	0.0077
	(0.84)	(0.57)	(-2.07)	(-0.66)	(0.23)	(0.04)
D(OPEN(-1))	-0.00007	0.00003	3.1443	-0.5723	-0.364	-0.06
	(-0.8)	(0.72)	(1.75)	(-1.2)	(-0.93)	(-0.26)
D(OPEN(-2))	0.000074	**0.00012****	2.1	0.409	0.41	-0.24

	(0.79)	(2.47)	(1.06)	(0.78)	(0.95)	(-0.96)
D(OPEN(-3))	0.000042	0.00008	1.75	0.387	0.09	**-0.92352*****
	(0.49)	(1.73)	(0.97)	(0.8)	(0.23)	(-4.05)
D(FX(-1))	0.000047	-0.000015	-0.57	-0.404	-0.107	0.39294
	(0.62)	(-0.38)	(-0.36)	(-0.95)	(-0.3)	(1.96)
D(FX(-2))	0.00002	-8.8×10^{-7}	0.045	-0.134	-0.032	0.176
	(0.4)	(-0.03)	(0.04)	(-0.43)	(-0.125)	(1.2)
D(FX(-3))	0.000055	-0.000013	-0.475	-0.072	0.02	0.14
	(1.11)	(-0.48)	(-0.45)	(-0.26)	(0.09)	(1.04)
C	-0.00123	-0.00073	3.14	2.54	0.884	**5.25649****
	(-1.48)	(-1.65)	(0.18)	(0.54)	(0.23)	(2.37)

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

Table 3a: Estimated co-integrating vector

in the presence of exogenous factors.

Variables	Estimated Coefficients
FDI	1
NRX	-0.88256***
	(-2.61)
GDP	-1.69×10^{-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-values. (ii) ***, ** and * denote
the level of significance at 1%, 5% and 10%, respectively.

Table 3b: VECM using exogenous Factors: USA, China, India and South Africa

Error Correction:	D(FDIFL)	D(NRX)	D(FX)	D(GDP)	D(INFLA)	D(OPEN)
CointEq1	**-0.999247****	**0.10119****	18.26402	75.70486	24.35759	-25.76761
	[-2.48785]	[2.74506]	[1.26219]	[0.82010]	[0.91962]	[-1.43045]
D(FDIFL(-1))	-0.036292	-0.043018	**-28.2448****	-70.45235	-10.36299	**33.25****
	[-0.10216]	[-1.31941]	[-2.20697]	[-0.86292]	[-0.44237]	[2.08712]
D(FDIFL(-2))	0.206031	-0.005126	**-18.614****	-29.32989	6.430539	**23.67****
	[0.90145]	[-0.24435]	[-2.26063]	[-0.55836]	[0.42666]	[2.30787]
D(NRX(-1))	-1.435754	**-0.51098****	-6.146876	-733.4546	-26.16297	148.9353
	[-0.53286]	[-2.06623]	[-0.06332]	[-1.18440]	[-0.14725]	[1.23246]
D(NRX(-2))	**3.8626****	0.170075	-55.00882	**945.37****	26.73563	-98.23706
	[2.01577]	[0.96705]	[-0.79684]	[2.14665]	[0.21158]	[-1.14310]
D(FX(-1))	-0.008990	**0.0019****	-0.012525	1.458402	0.604236	-0.326512
	[-1.10098]	[2.52165]	[-0.04258]	[0.77712]	[1.12214]	[-0.89159]
D(FX(-2))	-0.011392	0.000875	0.117207	-0.400386	0.560996	-0.123394
	[-1.89996]	[1.59072]	[0.54262]	[-0.29056]	[1.41889]	[-0.45889]
D(GDP(-1))	**0.002146****	-1.02E-05	-0.001020	0.175506	0.056307	-0.055308
	[2.02894]	[-0.10472]	[-0.02677]	[0.72208]	[0.80739]	[-1.16610]
D(GDP(-2))	-0.001079	-0.000194	0.022012	-0.432361	-0.066668	-0.058229
	[-0.80967]	[-1.58731]	[0.45835]	[-1.41124]	[-0.75841]	[-0.97396]
D(INFLA(-1))	0.004073	**0.002*****	0.263805	1.408046	0.487242	-0.353861
	[0.56754]	[3.07314]	[1.02032]	[0.85366]	[1.02954]	[-1.09939]
D(INFLA(-2))	-0.003979	0.000431	0.257403	1.743648	-0.370781	**-0.629****
	[-0.60114]	[0.70891]	[1.07949]	[1.14625]	[-0.84951]	[-2.11808]
D(OPEN(-1))	0.006163	0.000358	-0.242542	**2.4893***	-0.484299	**-0.525****
	[1.11819]	[0.70818]	[-1.22155]	[1.96528]	[-1.33254]	[-2.12567]
D(OPEN(-2))	0.009295	0.000512	-0.046955	-0.296265	-0.168562	0.231545
	[1.46819]	[0.88047]	[-0.20587]	[-0.20362]	[-0.40376]	[0.81549]
C	-0.581385	0.045958	13.72186	-27.64467	6.127504	35.69876
	[-1.28370]	[1.10562]	[0.84099]	[-0.26559]	[0.20517]	[1.75752]
USGDP	0.000220	-2.11E-05	**-0.010657****	-0.042969	-0.009272	0.004707
	[1.78715]	[-1.86145]	[-2.39932]	[-1.51646]	[-1.14050]	[0.85120]
CHNGDP	-0.000713	**8.53E-05****	-0.023698	-0.043087	-0.004578	-0.037147
	[-1.53920]	[2.00592]	[-1.42054]	[-0.40486]	[-0.14993]	[-1.78869]
INDGDP	7.85E-06	-7.68E-05	**0.172*****	0.487370	0.074502	0.107377
	[0.00485]	[-0.51687]	[2.95234]	[1.30975]	[0.69780]	[1.47875]
SAGDP	-0.000462	6.01E-05	0.000423	0.046131	0.014007	**-0.038****
	[-1.20585]	[1.70911]	[0.03063]	[0.52427]	[0.55479]	[-2.23304]

Table 4a: Estimated co-integrating vector considering N-S trade relation

Variables	Estimated Coefficients
FDI	1
NRX	**1.5406*****
	(7.175)
GDP	-4.51×10^{-07}
	(-0.097)
INFLA	**-0.00017*****
	(-6.4)
OPEN	**-0.00036*****
	(-7.5)
FX	2.52×10^{-05}
	(0.816)
C	0.0074

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

Table 4b: Estimated Error Correction and Exogenous factors under N-S trade relation

Variables	D(FDI)	D(FX)	D(GDP)	D(INFLA)	D(NRX)	D(OPEN)
Error Correction	-0.09533	**5346.063*****	684.67	-670.743	**-0.72101*****	-941.094
	(-0.18)	(5.13)	(0.07)	(-0.3)	(-2.37)	(-0.53)
Exogenous factors	D(FDI)	D(FX)	D(GDP)	D(INFLA)	D(NRX)	D(OPEN)
US	-8.2×10^{-7}	0.003	0.008	0.0018	-1.02×10^{-6}	**-0.0087****
	(-0.7)	(1.16)	(0.39)	(0.38)	(-1.6)	(-2.307)
UK	-6.4×10^{-7}	-0.005	0.0124	-0.003	**2.8×10^{-6}****	**0.0134****
	(-0.33)	(-1.33)	(0.34)	(-0.36)	(2.53)	(2.05)
GERMANY	-1.44×10^{-6}	**0.0188*****	-0.034	-0.0017	-1.12×10^{-6}	0.0014
		(4.77)	(-0.9)	(-0.2)	(-0.97)	(0.21)
FRANCE	4.7×10^{-6}	-0.0009	0.0004	-0.004	-1.6×10^{-6}	0.0063
	(1.43)	(-0.13)	(0.006)	(-0.3)	(-0.86)	(0.57)

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

Table 5a: Estimated co-integrating vector considering S-S trade relation

Variables	Estimated Coefficients
FDI	1
NRX	**-14.13379*****
	(-5.51)
GDP	-4.13 x 10^{-05}
	(-0.52)
INFLA	**0.00273*****
	(5.18)
OPEN	**0.0028*****
	(4.206)
FX	-0.00016
	(-0.24)
C	-0.08934

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

Table 5b: Estimated Error Correction and Exogenous factors under S-S trade relation

Variables	D(FDI)	D(FX)	D(GDP)	D(INFLA)	D(NRX)	D(OPEN)
Error Correction	**-0.04334*****	-50.476	-521.54	-26.7676	**0.0334*****	-23.2717
	(-2.46)	(-1.137)	(-1.43)	(-0.32)	(3.03)	(-0.308)
Exogenous factors	D(FDI)	D(FX)	D(GDP)	D(INFLA)	D(NRX)	D(OPEN)
CHINA	-5.3x10^{-6}	**-0.01802****	-0.06	-0.007	**4.32x10^{-6}****	-0.0127
	(-1.65)	(-2.24)	(-0.91)	(-0.46)	(2.17)	(-0.93)
INDIA	1.24x10^{-5}	**0.0985*****	0.307	0.019	-1.3x10^{-5}	0.044
	(1.2)	(3.77)	(1.43)	(0.38)	(-1.96)	(0.99)
SOUTH AFRICA	6.2x10^{-7}	**-0.0227*****	-0.058	-0.004	8.8x10^{-7}	-0.0077
	(0.32)	(-4.6)	(-1.44)	(-0.38)	(0.72)	(-0.91)

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

Appendix

Let

$$Y = \hat{D}Z + \hat{\delta} \tag{1}$$

Where

$$Y = (y_1, y_2, ..., y_T) \qquad \text{(n x T) matrix}$$

$$D = (\hat{A}_0, \hat{A}_1, ..\hat{A}_p, ..\hat{A}_{p+d}) \qquad \text{(n x (1+n(p+d)) matrix (} \hat{A} \text{ is the estimated parameters matrix)}$$

$$Z = (Z_0, Z_1, ..., Z_{T-1}) \qquad \text{((1+n(p+d) x T) matrix}$$

$$Z_t = \begin{bmatrix} 1 \\ y_t \\ y_{t-1} \\ . \\ . \\ y_{t-p+1} \end{bmatrix}$$

And

$$\hat{\delta} = (\hat{\varepsilon}_1, ..., \hat{\varepsilon}_T) \qquad \text{(n x T)}$$

$\hat{\varepsilon}_t$ is defined as the estimated error term.

VECM (P)

Without loss of generality, assume the existence of an autoregressive vector of p order (VAR (p)) (see Quintos 1998).

$$y_t^* = J(L)y_{t-1}^* + \varepsilon_t \tag{2}$$

$$J(L) = \sum_{i=1}^{k} JL^{i-1} \tag{3}$$

Where y_t^* is integrated of order one (I(1)). The corresponding VEC vector is

$$\Delta y_t^* = J_k^*(L)\Delta y_{t-1}^* + \Pi y_{t-1}^* + \varepsilon_t \tag{4}$$

$$J_k^*(L) = \sum_{i=1}^{k-1} J_i^* L^{i-1} \tag{5}$$

$$J_i^* = -\sum_{l=i+1}^{k} J_l \tag{6}$$

With

$$\Pi = (J(1) - I) \tag{7}$$

If there are q cointegration relationships, the matrix Π can be written as

$$\Pi = \alpha\beta' \tag{8}$$

Where $\beta = vec(D)$, *vec* means the column-staking operator.

From equation (8), it can be established that short and long-run significance of the parameters can be studied, β_{ij} *and* α_{ij}, respectively. Weak exogeneity can be studied by using zero constraints on α_{ij}.