Determinants of Foreign Direct Investment Inflows in Nigeria: An Empirical Investigation

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Abstract: This study set out to investigate empirically the long run determinants of foreign direct investment inflow in Nigeria using Residual-Based Engle-Granger-Dickey-Fuller Co-integration test. The source of the data was mainly CBN statistical Bulletin and Nigerian Development Index. The time series properties of the variable were investigated by conducting a unit root test using annual series data for the period 1970-2009 and found that variables employed were I(1) series with I(0) residual. The result revealed that 1% change in Degree of Openness, market size, ICT, oil sector, tax, tourism and mobile phone penetration component will determine a 15, 67, 11, 79, 48, 38 and 34% change in the mean of inflows of FDI, respectively in the long run. Also, 1% change in infrastructure, CPI, exchange rate and external debt will account for 628, 50, 163 and 309% change in the mean of inflows of FDI, respectively in the long run over the period of study. The implication from above is that the positive role played by natural resource-seeking FDI suggests that Nigerian government should not only increase its budget on the maintenance of these resources but also ensure conducive investment environment through political and social stability as oil sector and tourism alone are statistically significant attracts 79 and 38% of the total FDI inflows, respectively in Nigeria.

Key words: Foreign direct investment, oil sector, degree of openness, ICT, market size, infrastructure, cointegration, Nigeria

INTRODUCTION

The overwhelming importance of Foreign Direct Investment (FDI) inflows to the developing countries has occupied a substantial body of economic literature. This is because FDI creates employment and acts as a vehicle of technology transfer, provides superior skills and management techniques, facilitates local firm’s access to international markets and increase product diversity and over all an engine of economic growth and development in Africa where its need can not be over emphasised (Ngowi, 2001). FDI inflows into Africa have increased from annual average of almost US$1.9 billion in 1983-1987 to US$3.1 billion in 1988-1992 and US$4.6 billion in 1991-1997. Also, annual inflows of FDI to sub-Saharan Africa was averaged of about US$7 billion from 1995-2001 but felt to US$2.9 billion when Angola, Nigeria and South Africa were excluded. Nigeria which is one of the most beneficial of FDI in Africa is poor in terms of income but possess the potentials to become sub-Saharan Africa’s largest economy because of its rich in both natural and human resources. In other to attract handsome FDI inflows, Nigerian authority has put in place various policies like the deregulation of the economy, the new industrial policy of 1989 which welcomes many foreign investors to the manufacturing sector, tax relief and other form of incentives are available to the investors and owners of equity in all industries; establishment of privatisation programme under the umbrella of Structural Adjustment Programme which has been introduced since 1986, adoption of Export Processing Zones Decree in 1991, establishment of Nigeria Investment Promotion Commission (NIPC) through Decree 16 of 1995 and signing of Bilateral Investment Treaties and Double Taxation Agreements in the late 1990 and 2000s. Among others are the formation of the Economic and Financial Crime Commission (EFCC) and the Independent Corrupt Practices Commission (ICPC) purposely to control the rate corruption and the recent proposed bill of a single term of 6 years in office of the presidency and governor all in the
name of political stability. Out of West African countries, Nigeria alone got 70% of the sub regional total and 11% of Africa’s total of FDI inflows (UNCTAD, 2007). Most of the FDI in Nigeria goes into the oil and extractive sectors and the economic structure remains highly undiversified with oil accounting for 55% of exports. While many theoretical and empirical studies have identified several determinants of FDI on the manufacturing industries, research on the extractive industries is scanty. Specifically, not many studies have been reported in the case of Nigerian economy where extractive industries take the lion share of FDI inflows. More importantly, the major limitation of the few reported studies in Nigeria is the non consideration of the role played by natural resources in the determination of FDI inflows in Nigeria, hence this study investigate the effect natural resources (oil sector and tourism), market size, tax, mobile phone, exchange rate, macroeconomic stability, Information and Communication Technology (ICT), external debt, infrastructure and trade intensity on FDI inflows in Nigeria over the period of 1970-2009.

**Literature review**

**Motive of foreign direct investment:** Regardless of whether FDI increase in the future or not countries are going to intensify effort to attract FDI and will compete, fiercely for it (UNCTAD, 2007). According to the Investment Promotion Agencies (IPA), Africa is the main attractive location for FDI in the short term for many MNCs as well as investors in the world today. African countries have thus recognized the need for FDI and thus gearing effort to ensure that they make maximum use of it. Over the decades, efforts of these African countries are therefore directed toward the improvement of their investment climate, deregulating the economy and offering incentives to investors. All these are done with the primary motive of encouraging more FDI inflows. Motives behind FDI inflows are as follow:

**Resource seeking:** Multi-National Corporations (MNC) involve themselves in FDI with the motive of acquiring resources from the host country. Such resources could be in form of natural resources of labour which is relatively abundant in the host economy than in other economies of the world.

**Efficiency seeking:** MNCs also views FDI as a means of achieving efficiency by exploiting economies of large scale production and scope.

**Strategic-assets seeking:** This explains the motive of FDI which occurs when MNCs invest with the motive of preventing gains of resources to other competitors. That is MNCs sometimes engage in FDI so as to restrict the dominance of a particular economy by their competitors.

**Empirical evidences from developed and developing countries:** Despite the large increase in FDI flow to Africa in recent years, these flows represent only a few proportions of the total flows to developing nations. Average annual FDI flows increased from $2.2 billion in 1980 to $15 billion during the period 2000-2004. In contrast, Africa’s share of the global flows fell from 2.3% in 1980 to about 1.5% during 2000-2004. As a percentage of the total flows to developing countries, Africa’s share fell from 10% in 1980 to 7% during 2000-2004. The same declining pattern is revealed in the continent’s flow per capita.

UNCTAD attributed the poor FDI performance in Sub-Saharan Africa (SSA) to the negative image the region holds among the foreign investors. For instance, the sub-continent tends to be associated with the political turmoil, economic instability, diseases and natural disasters, internal and external armed conflicts. Military coup are also common. Moreover, spillover effects from neighbouring countries instability often in some way affect those countries that experience internal stability. Within the continent, the distribution of FDI flows is also uneven. For example in the early 2000’s, the major recipients of flows in the region were South Africa, Morocco, Nigeria, Angola and Algeria. They invariably accounted for more than half of the total flows to the region. The sources of the FDI are also changing, shifting to emerging the economies of China, South Africa and India. Emerging economies like China, India, Taiwan and Malaysia have emerged as members of the top ten sources of FDI-flows into Africa. However, France, Netherlands, South Africa, UK and US still dominate FDI flows into Africa and accounting for >50%.

The primary sector remain the most important destination for FDI flows into the region, accounting for >50% of inflows from major investors to Africa over the late 1990s and early 2000 period. Within the primary sector, oil and gas are the most important industries. Since 2000, there has been an increase in inflows into the tertiary service sector and sometimes attracted more inflows than the primary sectors. There is a growing body of evidence which indicate that in recent years, the composition of flows is shifting away from countries with large oil and mineral reserves towards the industrial and service sectors such as textiles, telecommunications and banking. This in itself means that the factors that determine FDI in SSA are also changing, away from resource seeking to a more efficiency seeking type. The
growth of interest in FDI in many African countries can only be matched by the high expectations of what FDI can achieve in terms of its contribution to economic and social development. The effect of FDI and its quality depend significantly on domestic policies, especially measures to develop human capital and social, physical and institutional infrastructure.

Anderson and Hainaut (1998) investigated the linkage between FDI and employment in the industrialized countries. The research was focused on the real FDI outflow and inflow for the OEC countries. It was motivated to look for the evidence regarding the precise relationship between FDI outflows and employment in the source countries. The empirical evidence mainly relied on the estimated relationship between FDI and various components of demand but was derived from the time series analysis for individual countries as well as from the panel regression. There was a limited FDI outflows leading to job losses in the source countries. However, the study identified the principal determinants of FDI flows as prior track pattern, IT-related investment and the scope for the cross border mergers and acquisitions.

Mariotti et al. (2003) provided insight into the relationship between country employment and foreign direct investment in Italy within the decade 1985-1995 using the unit of analysis as each (assemble) firms operating in the same industrial sector and localized in the same geographical region, the study examined national firms in Italy. By this, direct and indirect effects of foreign production on the parents’ environment which arise through the generation of linkages and externalities were captured. Empirical evidence based on co-integration and error correction methodology showed that impact of outward FDI on the labour intensity of domestic production is negative. In the case of vertical investment undertaken, especially by smaller firms in LDCs and positive for horizontal market seeking investment in advanced countries.

Li and Park (2005) identified three groups of factors that may affect the location of choice by foreign firms: agglomeration economies, infrastructure and institutional changes resulting from economic reforms 40 industries in China were examined based on the 2 digit Chinese industrial codes between 1999 and 2002. The researchers conducted multiple regression analysis with all independent variables in the model to examine the variance factors. The finding was that agglomeration economies, particular the clustering of foreign firms and domestic forms, exert the strongest effects on FDI. Higher FDI concentration tends to attract more foreign firms. The clustering of domestic firms exert a negative effect on FDI location, privatization. Better infrastructure (electricity, telecommunication and road) and greater institutional changes (open policies, privatization and legislation) shows positive effect on FDI location. Dunning (2002) engaged in traditional of production which he identified three sets of influence on forcing direct investment. These are:

Cost factors: Such as the availability of labour, low labour costs and inflation.

Market factors: Size of the market and growth measured by the GNP of the recipient country.

The investment climate: Measured by degree of foreign indebtedness and state of balance of payments. Elaborating on the above, he developed an elective theory of international direct investment based on the theory of industrial organization of location and of the firm. The general proposition is that the ability of a country to engage in international production depends on the incentives offered by the firm to internalize ownership specific advantage possessed 9 relative to enterprises of other nationalities. He adopted a step-wise multiple regression in order to determine the most important organization, internalization and location variables for inward and outward investment flows. The study sampled 67 countries divided into 3 groups by cluster analysis for the period between, 1967 and 1978. The result showed that the different statistical significance in influencing foreign direct investment depending on the country cluster and the direction of investment flow.

Agarwal (1980) classified foreign direct investment into its political and economic determinants; he identified two political factors such as investment incentive, the seize and the growth of the recipients market, its degree of economic development (e.g., infrastructures, market distance and economic stability in terms of inflation, growth and balance of payments. In respect of political instability, his survey showed mixed evidence. Accent reviewed the effect of exchange rate instability of macroeconomic performance with specific reference to the effect on the trade and investment. The study explained the impact that the macroeconomic environment constitutes one of the major impediments to FDI in many LDCs. One influential study which gave greater attention to economic factors was by Root and Ahmed (1979) selected 70 developing countries between the period of 1966 and 1970. Using discriminate analysis, they tested whether sixteen economic variables (income, degree of education, seize of middle class, strength of labour force movement, degree of modernization of outlook and extent of urbanization) and seven political
variables or factors (per capital foreign aid, frequency of government change, degree of administrative efficiency, degree of nationalism, number of internal armed attacks, colonial affiliation and role of government in an economy have any significant analysis suggested indeed that among the statistical analysis suggestive indeed that among six variable which were selected as essential discrimination at 5% of significant.

Four were economic (per capital GDP, GDP growth rate, importance of commerce, transport and communication economic integration) one social (degree of urbanization) and only one political (the number of constitutional changes in government leadership).

Market seeking investment is undertaken to sustain existing markets or to exploit new market. For example, due to tariff and other forms of barriers, the firm has to relocate production to the host country where it had previously served by exporting. Campos and Kinoshita (2002) use panel data to analyse 25 transition economies between 1990 and 1998. They reached the conclusion that for set of countries is influenced by the economy clusters, market size and the low cost of labour and abundant natural resources. Besides all these factors, the following variables presented insignificant result, sound institutions, trade openness and lower restriction to FDI flows.

Nummennkamp and Spatzt studying a sample of 28 developing countries between 1987-2000 period. They find significant spearman correlation between FDI flows and per capita GNP, year of schooling, cost factors, population, GNP growth and administrative bottleneck technology regulation all proved to be non-significant. However, when regression were performed separately for the non-traditional factors in which traditional factors in which traditional factors were control (population and per capital GNP only factor cost produced significant result and only for the 1997-2000 period.

According to Dunning (2002), the strategic assets seeking investment takes place in which FDI is used in mergers and acquisition, seeking horizontal efficiency also investment are characterized by the search for markets and resources, thus being of vertical efficiency.

**Empirical evidences from Nigerian economy**: Ademiluyi investigated the determinants of FDI in Nigeria between 1970 and 2001. The motive for the study is to examine empirically the fundamental economic determinants of foreign direct investment in Nigeria. The OLS was employed for the economic regression analysis it revealed that the domestic inflation rate, domestic exchange rate are some of the fundamental determinants of FDI in Nigeria. The study showed that FDI is very sensitive to exchange rate and interest rate prevailing in the economy while domestic inflation rate was shown to be statistically insignificant. Chetty (1998) examined the various theoretical determinants of foreign direct investment. This study was inspired by the observation that empirical exploration of the determinants of foreign direct investment had not been on the major factors. In particular, he noticed that it was largely unclear what role the economic factors play relative to political factors. Using the error correction methodology, he found out that the growth of the economy proxied by the GDP growth rates exerts positive influence on foreign direct investment. He also concluded that public investment have tended to crowd out private investment (Domestic or Foreign). A plausible reason for this, he says is that such heavy spending for public sector capital project could lead to high interest rates, severe credit rationing and huge that require some degree of local equity participations.

Ekpo (1995) reports that political regime, real income per capital, rate of inflation, world interest rate credit rating and debt service explain the variance of FDI in Nigerian. Also, Alaba made emphasis on exchange rate uncertainty and its effect on foreign investment in Nigeria. The study attempted to estimate the relationship between the behaviour of exchange rate as one of the most important anchors of the global economic process and Foreign Direct Investment (FDI) with respect to Nigeria. He employed the dynamic error correlation methodology to analyse the model. He found out that parallel exchange rate, seemed to be more important driver of activities in the Nigerian economy. Proper management of exchange rate, forestall costly distortions, constituent and important factor in determining flow of FDI in Nigeria. Anyanwu (1998) investigated econometric determinant of FDI in Nigeria.


The study was carried out as a result of the need to ascertain whether financial liberation was a seemingly unrelated model, it was discovered that there is a negative FDI growth supplement consumption, substitute for saving and devoted to the importation of consumer goods and service at the expense of investment and export. Lycha (2001) examined the effects of macroeconomic instability and uncertainty, economic size and external debt on foreign private investments, the result showed that market size attracts FDI to Nigeria while inflation discourages it.
MATERIALS AND METHODS

Model specification and estimation techniques: Following the previous studies, the appropriate model as the interest of this study lies in the long run determinants of foreign direct investments inflows in Nigeria is specified:

\[
\log(\text{fdi}_t / \text{gdp}_t) = b_0 \log(\text{gdpk}_t) + b_1 \log(\text{cpi}_t) + b_2 \log(\text{oil sec},_t) + b_3 \log(\text{inr},_t) + b_4 \log(\text{tax},_t) + b_5 \log(\text{tourism},_t) + b_6 \log(\text{exchange},_t) + b_7 \log(\text{extdebt},_t) + b_8 \log(\text{infra structure},_t) + b_9 \log(\text{lopeness},_t) + b_{10} \log(\text{teline},_t) + u_t
\]

(1)

where, \(\text{gdpk}\) which is gross domestic product per capita is the proxy for market size/demand as it reflects the level of income of the economy (Chakrabarti, 2001). \(\text{cpi}\) is the consumer price index captured inflation which is used as a proxy for the measure of macroeconomic stability (Asiedu, 2002). \(\text{Openness}\) represents trade intensity, it is the ease by which capital capital moved in and out of the country by investors (Chakrabarti, 2001). \(\text{Exchange}\) is the exchange rate and it is considered as one of determinants since a country with relatively weak currency attracts more FDI than the country with strong currency and ditto for the \(\text{extdebt}\) which is external debt. ICT is proxied by the government expenditure on telecommunication which also influence the direction of FDI flows. Oil sector and tourism are used as the proxy for natural resources, since the availability of natural resources may be a major determinant of FDI inflows to the host country. Tax is proxied by company income tax which may likely to be distortionary and hence its level determined amount of FDI inflows. Since data employed are time series, researchers therefore used an Ordinary Least Square (OLS) method of estimation. In other to avoid spurious result, the first test for the order of integration of the individual series by conducting unit root test for stationarity. According to Engle and Granger (1987), a non-stationary series is said to be integrated of order \(d\) if it can be made stationary by differencing it \(d\) times; expressed as \(X_t - I(d)\). After confirming firstly that the series are generated by first order autoregressive process, i.e., AR(1) of the form:

\[
y_t = y_{t-1} + \epsilon_t
\]

(2)

Because of the possible autocorrelation, Eq. 2 is extended to allow for AR(\(m\)) process yielding Augmented Dickey Fuller (ADF) test of the term:

\[
\Delta y_t = \beta y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \epsilon_t
\]

(3)

Where:

- \(y_t\) = Particular variable
- \(\beta\) = Parameter
- \(\epsilon_t\) = Error terms assumed to be white noise, i.e., \(\epsilon_t\) IID \((0, \sigma^2)\)

Philips-Perron Test would be employed along with ADF test as Pesaran and Pesaran (1997) argued that the ADF unit root testing procedure is not very powerful in finite samples hence, the Philips-Perron (PP) (Philips and Perron, 1988) unit root test is used as one alternative. The interest of the study is to establish the various determinants of foreign direct investment in Nigeria, therefore the study adopts Engle-Granger-Dickey-Fuller (EGDF) Cointegration test. This cointegration test was developed by Engle and Granger (1987) and they show that if after using either Dickey-Fuller (DF) or Augmented Dickey-Fuller (ADF) unit root test, the variables in the regression model are \(I(1)\) and the residual component obtained from the regression is \(I(0)\) there is a linear combination (long-run relationship or equilibrium) among the variables in the model.

Specifically, for FDI, to be cointegrated with its various determinants, \(u_t\) must be \(I(0)\) otherwise the regression is spurious. Thus, the basic idea behind the Engle-Granger Cointegration Test is to test whether \(u_t\) is \(I(0)\) or \(I(1)\). After the application of ADF and PP unit root tests on the variables in Eq. 1, researchers then perform OLS on the equation and obtain the residuals as shown:

\[
\hat{u}_t = y_t - \beta \cdot \epsilon_t
\]

(4)

Where:

- \(y_t = \text{fdi}_t\)
- \(\epsilon_t = \text{log(cpi}_t) + \text{log(tax}_t) + \text{log(tourism}_t) + \text{log(exchange}_t) + \text{log(extdebt}_t) + \text{log(infra structure}_t) + \text{log(lopeness}_t) + \text{log(teline}_t)\)

and then apply ADF and PP unit root test to \(\hat{u}\) which assumes AR(1) and is of the form:

\[
\Delta \hat{u}_i = \delta \hat{u}_{i-1} + \sum_{i=1}^{p} \gamma_i \Delta \hat{u}_{i-1} + \epsilon_i
\]

(5)

The null hypothesis expressed in (Eq. 5) test for no cointegration. Thus, if \(\delta\) is statistically different from zero, researchers may reject the null hypothesis suggesting that there is cointegration between the two variables, otherwise researchers may not reject it. If the null
hypothesis is rejected, the regression is regarded as a cointegrating regression $\beta$ is known as the cointegrating parameter. If the variables are cointegrated, the regression is no longer spurious despite the fact that the variables are I(1). However, if these series are not cointegrated the resulting regression will be spurious.

RESULTS AND DISCUSSION

Unit root tests and regression analysis: Taking into consideration the steps suggested before, researchers start by testing for the order property of the variables of the interest, Augmented Dickey-Fuller and Philips-Perron were employed. All variables are regarded as non-stationary at their levels since each reported absolute t-value is not $>$5% critical values of ADF and PP with a sample size of 40.

The null hypothesis of non-stationary is not rejected for all the series investigated in level. Summarily, the results of these tests are shown in Table 1, these suggest that there is the presence of a unit root in each of the variable investigated but the residual generated is stationary at level.

The main focus of this study was to investigate various determinants of FDI inflows on long run in an opened economy, Nigeria. The study made used of secondary data which were obtained from Statistical Bulletin published by Central Bank of Nigeria and Nigerian Development Index from 1970-2008. In the empirical analysis, the Residual-Based Engle-Granger-Dickey-Fuller test procedure was employed to show that there is a long-run relationship between FDI and its inflows determinants.

Given the non-stationary of the series, the study found that the residual is stationary at level. This suggests that the null hypothesis; no linear combination between FDI and its determinant components in Nigeria is not accepted.

The study therefore, proceeded by regressing FDI component, the result showed a positive relationship between FDI and its various determinants like Degree of Openness (DOP), market demand size (gdpk), oil sector, tax and the level of mobile phone penetration while on the other hand negative relationship exist between FDI and infrastructure, CPI, ICT, exchange rate and external debt in Nigeria over the period of study.

As shown in Table 2, 1% change in DOP, gdpk, ICT, oil sector, tax, tourism and mobile phone penetration component will determine a 15, 67, 11, 79, 48, 38 and 34% change in the mean of inflows of FDI, respectively in the long run. Also, 1% change in infrastructure, CPI, exchange rate and external debt will account for 628, 50, 163 and 309% change in the mean of outflows of FDI, respectively in the long run. The adjusted $R^2$ which gives the adjusted proportion or percentage of the total variation in the dependent variable FDI inflows explained by its regressors. Thus, the close is adjusted $R^2$ to one, the better the fit of the model as shown in Table 2 which is 99.6%. Durbin-Watson is approximately 2 which suggest absence of 1st-order serial correlation. The implication from above is that the positive role played by natural resource-seeking FDI suggests that Nigerian government should not only increase its budget on the maintenance of these resources but also ensure conducive investment environment through political and social stability.

Oil sector and tourism alone statistical significantly attracts 79 and 38% of the total FDI inflows, respectively in the country while the size of the market account for 67% but not statistical significant.

CONCLUSION

This study shows that within the time and data constraint, the study provides a platform for further empirical research in determining the FDI inflows by allowing for broader variable that will include social and political stability index and corruption.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t-statistical</th>
<th>Probability</th>
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</thead>
<tbody>
<tr>
<td>Log(infra)</td>
<td>-6.280807</td>
<td>-6.416400</td>
<td>0.0234</td>
</tr>
<tr>
<td>Log(dop)</td>
<td>0.149021</td>
<td>3.993750</td>
<td>0.0574</td>
</tr>
<tr>
<td>Log(gdpk)</td>
<td>0.674045</td>
<td>2.581730</td>
<td>0.1230</td>
</tr>
<tr>
<td>Log(qpi)</td>
<td>-0.508292</td>
<td>7.564140</td>
<td>0.0170</td>
</tr>
<tr>
<td>Log(tax)</td>
<td>0.105985</td>
<td>5.145770</td>
<td>0.0938</td>
</tr>
<tr>
<td>Log(imports)</td>
<td>0.792352</td>
<td>8.528350</td>
<td>0.0135</td>
</tr>
<tr>
<td>Log(tax)</td>
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<td>7.347667</td>
<td>0.0180</td>
</tr>
<tr>
<td>Log(tourist)</td>
<td>0.382623</td>
<td>8.504508</td>
<td>0.0128</td>
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<tr>
<td>Log(exchrate)</td>
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<td>-5.014870</td>
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<tr>
<td>Log(external)</td>
<td>-5.097051</td>
<td>5.423245</td>
<td>0.0324</td>
</tr>
<tr>
<td>Log(phone)</td>
<td>0.347624</td>
<td>8.504508</td>
<td>0.0135</td>
</tr>
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</table>

Adjusted $R^2$: 0.9452; SE of regression: 0.341502; Sum square residual: 0.2538, Durbin-Watson stat: 2.397311
REFERENCES


