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AN EMPIRICAL DETERMINATION OF FOREIGN DIRECT INVESTMENT IN WEST AFRICA COUNTRIES: A PANEL DATA ANALYSIS

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ABSTRACT: *Most countries in Africa have undertaken significant steps to attract FDI by adopted FDI-specific regulatory frameworks to support their investment related objectives. Thus, this study investigates the determinants of FDI in sixteen countries in West African by empirically examining the influence of growth rate of GDP in all the sixteen countries; GDP per capita; government policy in attracting foreign investors; infrastructural development; openness of the economy to trade; inflation rate; natural resources, official exchange rate and labour availability. Panel data were used because of its advantage over OLS and because it is better use in cross-country regressions. An important implication of the empirical result is that FDI in West Africa is mainly affected by natural resources and labour availability, GDP per capita which is used as a proxy for capital-labour endowment, Market size of the countries proxy by GDP growth rate and official exchange rate. The rule of thumb regarding the issue of FDI in West Africa sub-region suggests that the sub-region can be the top receipt in Africa in the next decade if other countries discover resources available in their countries*.

KEYWORDS: FDI inflows, West Africa countries, Eclectic Paradigm, Panel Data

INTRODUCTION

The role of FDI is quite critical in Africa given the fact that poverty levels are generally high while domestic savings and income remain extremely low as income is mainly channeled to consumption expenditure. These factors coupled with the unpredictability of foreign aid flows, the low share of Africa in world trade and the high volatility of short-term capital flow calls for the need to attract different forms of FDI inflows. However, given the importance attached to FDI, West Africa countries must therefore learn how to attract greater volumes of this important potential resource.

Consequently, most countries in Africa have undertaken significant steps to attract FDI by adopted FDI-specific regulatory frameworks to support their investment related objectives. According to UNCTAD 1998, 45 out of 53 countries in Africa had established FDI-specific regulatory framework. The changes included the setting up of investment promotion agencies and facilities, and establishment of specialized schemes to attract investment such as export processing zones (EPZs). Also, some countries also took steps at the international level through signing of international investment agreements (IIAs) such as bilateral investment treaties (BITs) and double taxation treaties (DTTs). For instance, BITs signed in Africa increased from 41 in 1970 to 772 in 2009. Similarly, DTTs signed increased from 68 in 1970 to 516 in 2009.

Apart from improving their investment environment that they hope will attract foreign direct investment to their economies, some incentives called "sweeteners" have also be put in place to ensure that resources are directed to areas and sectors where they are mostly needed to deal with the issues of

employment generation and poverty elimination. Using Nigeria, Egypt and Angola as examples, it has been found that the three countries have been able to attract FDI because of their oil endowments, despite their political insecurity, economic instability, weak global economy and crime in the case of Nigeria. However, FDI flows reflect not only the policy and political environment in host countries, but other factors as well.

According to Kumar (2003) "*FDI usually flows as a bundle of resources including, besides capital, production technology, organizational and managerial skills, marketing know-how, and even market access through the marketing networks of multinational enterprises (MNEs) who undertake FDI*". These skill-resources tend to spill over to domestic enterprises in the host country. Therefore, FDI is expected to contribute more economic growth than domestic investment in the host country.

Agiomirgianakis *et al.* (2003) mentioned that FDI is mostly defined as capital flows resulting from the behaviour of multinational companies (MNCs). Thus, the factors to affect the behaviour of MNCs may also affect the magnitude and the direction of FDI. MNCs expand their activities to a foreign country for a number of reasons including, advantages, often owing to a life-cycle pattern of their products or just because their competitors are engaged in similar activities. On the other hand, governments are also engaged in a policy competition by changing key factors of their economic policies, such as domestic labour market conditions, corporate taxes, tariff barriers, subsides, privatization and regulatory regime polices so as to improve FDI activity in their countries.

The study is significant in that it examines the determinants of FDI in one of the sub-region in Africa, West Africa using macro level data. Most of the earlier studies on FDI have either be in Africa[1], Sub-Sahara[2] Africa or country specific. A few work on Southern Africa, MENA but no work has being done on West Africa. In terms of policy forecast, because of economic and environmental differences it is good to study the environment differently so as to known what is good for such an environment. This is what motivates the research to investigate what factors influences FDI in West Africa. The question is how can West Africa countries attract more FDI?

Thus, applying cross sectional data on sixteen countries in West Africa[3], this paper seeks to contribute to the existing literatures by investigating the determinants of FDI in the sub-region. The rest of this study is divided into four sections. Section 2 look at the trends of FDI in Africa while section 3 discusses distribution of FDI within West Africa countries, section 4 look at the related literature with the aim of providing a theoretical foundation for our empirical research Section 5 is the methodology, estimation techniques, model specification and data source. Section 6 presents the estimation result. Following that is the section 7 which gives the summary, conclusion and policy implication.

[1] Morisset, (2000); Ajayi, (2007); Asiedu, (2002, 2004); Indopu etal, (2010), Anyanwu, (2011, 2012), see reference for others.

[2] Rogoff and Reinhart, (2003); Akinlo, (2003); Lemi and Asefa, (2003), Schoeman et al, (2000), Bennett, R. D (2005).

[3] Benin, Burkina Faso, Cape Verde, Cote D'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal Sierra Leone and Togo

Trends of FDI inflows in Africa

Foreign Direct Investment (FDI) flows to Africa vary across sub regions of Africa. The general picture is depicted in the table below. From the period 1980-84 FDI flows to Africa stood at 30.6 and steadily increased between 1985-89 and 1990-94. It is important to note that from the period 1995-99 the increase in FDI inflows has accelerated. Indeed, it was during the period 1995-99 that the continent's average FDI inflows exceeded the mark of US$170 million. The acceleration of FDI inflows could partly be explained by more political stability, economic integration, flexibility in investment in some of the countries in the region, and better economic performance that Africa experienced from mid-1990s. It's also shown in the table that all the African sub-regions experienced a surge in FDI inflows from mid-1990s. In addition, as the FDI flows to Africa increased steadily, the sub-region flows also increased this is evident in the remaining years, 2000-2012. A detailed analysis at sub-regions level shown that East Africa is the least performing sub-region in attracting FDI, for all the periods. Southern Africa negatively attracted FDI in the period early and late1980s as this was due to the period of apartheid, economic sanction and debt crisis in the sub-region. The data show that until the 1990s, after the lifting of economic sanctions the region FDI to the sub-region gained significant momentum in the periods. This can also be attributed to privatization exercise. Indeed, from the 1980s, Northern Africa became the highest performing African sub-region in attracting FDI until 2010 the region continued to witness economic and political instability in Egypt, Libya and Tunisia. The uprisings in North Africa had a strong impact on investment,

Table1: Annual Average of FDI inflows across African sub-regions (% share, 1980-2012)

	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2012
Africa	30.6	55.4	83.6	171	340	1060	45.7
Africa Sub-regions							
Central Africa	37.8	41.3	31.2	147	647	1670	14.7
East Africa	6.4	12.7	19.3	70.7	106	265	25
North Africa	74.4	224	278	392	807	3420	37.8
South Africa	62.6	-4.4	47.7	369	544	1280	30.4
West Africa	26.9	61.3	115	147	177	613	55.8

Source: Authors computation

The average FDI inflows in Central Africa, was USD41.3 million in the mid 1980s the amount steadily increased until mid 1990s and this was consistent till 2000s. The decline of FDI inflows in Central Africa could partly be explained by political instability and civil wars in the sub-region in the early 1990s. However, from the mid of 1990s, there was recovery of FDI inflows in Central Africa, largely because of the increase in oil exploration and mining extraction in some part of the countries in the region. Eastern Africa is a less resource rich region in Africa except Sudan and South Sudan. Its annual average share of African FDI amounted to USD6.4m and USD12.7 in the early and late 1980s respectively. As investment picked up in Sudan, Ethiopia and Uganda, the share of the region FDI steadily increased from 1990s and was consistent till 2000s.

Northern Africa performance is higher than the continent's average, regardless of the period considered. Especially, during the period 2005-09, the average FDI inflows in Northern Africa was

more than three times the African average of FDI inflows. The recent global crisis and the Arab spring events would negatively impact FDI inflows in Northern Africa. However, given that Northern Africa is geographically the closest African sub-region to Europe, and given she is highly endowed in natural resources, one can expect that the sub-region will continue to attract a significant amount of FDI. In Southern Africa, there were FDI outflows during the period 1985-89, partly because of the apartheid regime, which did not favour the development of FDI in the sub-region. However, from the period 1990-94, with the end of the apartheid regime, there was a steady increase in FDI inflows in Southern Africa sub-region, which accelerated from mid-1990s. Indeed, from the period 1995-99 and 2000s the performance of Southern Africa was higher than the region's average.

Investment in Western Africa sub-region was 26.9 in the early 1980s. FDI inflows steadily increased and reached the amount of USD61.3 million in the mid and late 1980s and this was more than doubled compared to the previous years. In the period 1990s as most countries in the sub-region began to attract foreign investor, there was a surge in the flow to the sub-region. Nigeria accounted for almost 70% of total FDI to the region in the 2000s, followed by Ghana as her new oil industry is attracting an increasing share in the last five year. However, the recent developments in the sub-region suggest that the future performance of Western Africa is certain as far as FDI inflows are concerned. Indeed, while some countries like Nigeria and Ghana with successful government policy on investment are sending a good signal to foreign investors, other governments in the sub-region are exerting more efforts to restore political stability in their countries. In recent years, Nigeria and Ghana are the leading FDI recipient in the sub-region and among the top ten countries in attracting FDI in Africa in 2009, 2011. In sum, in terms of regional distribution, much of FDI in Africa has gone to North Africa, followed by Central Africa, Western Africa and Eastern Africa except in the late 2000s that the North Africa begin to witness political and economic instability.

Figure 1

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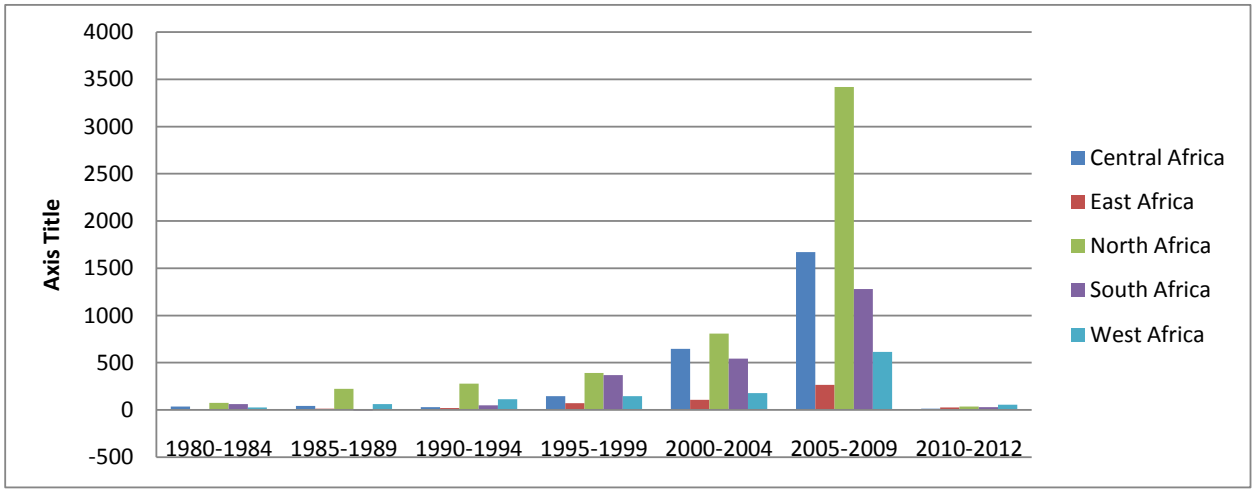

A Stylized Fact Regarding Distribution of FDI inflow Within West Africa Countries:
The figure below provides the annual FDI inflows in West Africa countries over the period 1990-2012 The figure revealed that Nigeria as the giant of Africa has the highest FDI inflows throughout the period. The first noticeable reason could be the availability of low labour cost, market size and natural resources endowment in Nigeria. Nigeria is one of the top recipients of FDI over the years. One of the characteristics of all the data on FDI in West Countries is that most countries in the region could not attract more FDI as a result of lack of natural resources. One thing that is surprises about Nigeria is that despite the level of corruption and insurgency in the country, the country's oil industry and large consumer market made it the continent's top investment recipient, taking over from Angola and other African countries, with a total of $7.36 billion. This shows that the investors in West Africa are resources and efficient seekers – as they look for the best market for their product. Next to Nigeria is Ghana, Ghana's new oil industry is attracting an increasing share of FDI rising from $860 million in 2007 to $1.67 billion in 2011.

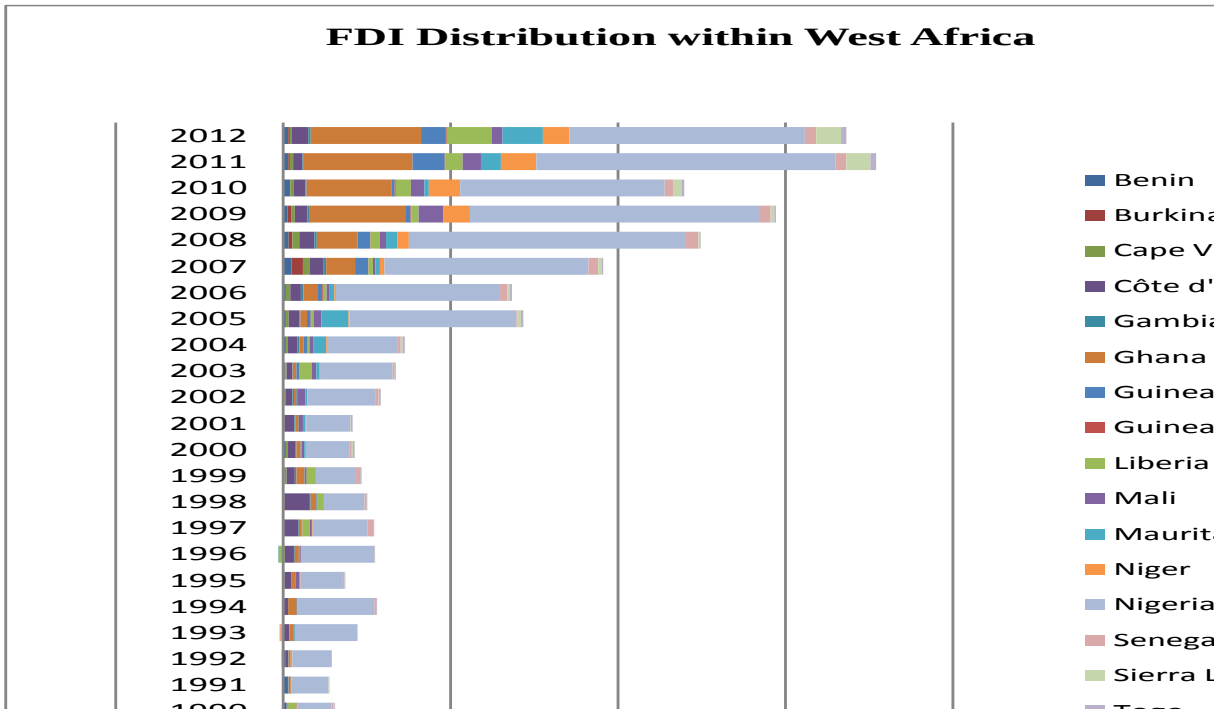

Figure 2: FDI inflows within West African sub-regions (1990-2012)

LITERATURE REVIEW

Over time a number of studies have been carried out to examine the various determinants of FDI in Africa specifically. In one or two cases, Africa is shown to be different from the rest of the world in terms of the various factors affecting foreign direct investment (Ibi Ajayi, 2003). However, there is a dearth of empirical work that is solely concentrated on the determinants of FDI in West African sub-region. Except Marong, A (1997) who analyzed Economic Integration and Foreign Direct Investment in West Africa. The author only focused on how to attract FDI and not what can influence FDI to the region. Beside, he used descriptive statistics. Most of the studies carried out concentrated on Africa while few of them are on Sub-Sahara Africa[4] in which not all the West Africa countries are represented and a little number of literatures on ECOWAS[5]. However, the existing literature focuses on the empirical determinants of FDI to the region, with very little discussion of concrete actions or strategies that could be adopted to promote FDI flows to the region. For example, Gustanaga et al. (1998) consider a total of 49 countries, only 6 of which are in sub-Saharan Africa (SSA), while Schneider and Frey (1985) consider 51 countries, of which 13 are in SSA. About half of the 51 countries in Edwards (1990) are in SSA.

However, the literature review is based on all the articles published in journals. All the reviewed papers analyse factors influencing or promoting FDI in Africa and/or in Sub-Saharan Africa (SSA).

Sichei, M. S and Kinyondo, G (2012) in their study provides panel data evidence on the determinants of foreign direct investment (FDI) for a sample of 45 African countries over the period 1980 to 2009. Using dynamic panel data estimation techniques, they identifies a number of factors that affect FDI flows in Africa, including, agglomeration economies, natural resources, real GDP growth, and international investment agreements. The study also shows that the Africa-wide environment has become more conducive to FDI since the year 2000.

Anyanwu, J. C (2011) there is a positive relationship between market size and FDI inflows; openness to trade has a positive impact on FDI flows; higher financial development has negative effect on FDI inflows; high government consumption expenditure attracts FDI inflows to Africa; higher FDI goes where international remittances also goes in Africa; agglomeration has a strong positive impact on FDI inflows to Africa; natural resource endowment and exploitation (especially for oil) attracts huge FDI into Africa; East and Southern African sub-regions appear positively disposed to obtain higher levels of inward FDI.

Naude, W. A. and Krugell, W. F. (2007) used cross-country econometric approach investigate whether geography and institution determine the FDI in Africa with some other variables which include, government consumption, inflation rate, investment, governance (political stability, accountability,

[4] Rogoff and Reinhart, (2003); Akinlo, (2003); Lemi and Asefa, (2003), Schoeman et al, (2000), Bennett, R. D (2005).

[5] Raheem, I.A (I_raheem @ymail.com. +2347032659866), Ibrahim and Usman (2012)

regulatory burden, rule of law) and initial literacy. The authors concluded that geography does not seem to have a direct influence on FDI flows to Africa. Neither market-seeking nor re-exporting influence the flow of FDI in Africa, with different policy instruments being significant in the different specifications. This does not discount the importance of good policies, but probably indicates the importance of good policies made by good institutions. Institutions, in the form of political stability showed up as a significant determinant of FDI.

Asiedu (2006) analyses the relative influence of natural resources and market size, government policy, host country's institutions and political instability in attracting FDI to SSA. The results show that countries that are endowed with natural resources or have large markets attract more FDI. Also, good infrastructure, an educated labour force, macroeconomic stability, openness to FDI, an efficient legal system, less corruption and political stability promote FDI. Accordingly, the author suggested that small countries and/or countries that lack natural resources in the region can attract FDI by improving their institutions and policy environment. In another work, Asiedu (2002) seeks to determine if FDI differs in SSA and non-SSA countries exploring this by using both an intercept dummy for 71 developing countries, which includes 32 Sub-Saharan countries, Africa and interaction terms with the dummy variable and other economic variables-openness, infrastructure, and return on investment. Employing FDI as a percentage of GDP as the dependent variable, she finds that average SSA countries receive a lower level of FDI than other regions. Also, higher return to capital has no significant effect on FDI flows and that the marginal effect of trade openness is less for SSA countries, and infrastructure development is insignificant on FDI flows to SSA countries. These results indicate the heterogeneity of FDI determinants especially for Africa.

Dupasquier, C and Osakwe, P. N (2005) examines the performance, promotion, and prospects for foreign direct investment (FDI) in Africa. The authors found that political and macroeconomic instability, low growth, weak infrastructure, poor governance, inhospitable regulatory environments, and ill-conceived investment promotion strategies, are identified as responsible for the poor FDI record of the region.

Bende-Nabende (2002) provides an empirical assessment of the factors that significantly influence the long-run FDI inflows in SSA. The empirical evidence based on a co-integration analysis of 19 African countries suggests that the most dominant long-run determinants of FDI in SSA are market growth, export-orientation policy and FDI liberalisation. These are followed by real exchange rates, market size and openness. The analysis covers the period 1970-2000.

Onyeiwu, S (2010) using fixed effects panel regressions investigates whether the determinants of FDI affect MENA countries differently. The results indicate that some of the variables that influence FDI flows to developing countries are not important for flows to MENA countries. These include the rate of return on investment, infrastructures, economic growth, and inflation. While trade openness increases FDI flows to MENA countries, corruption/bureaucratic red tape were found to reduce flows to the region. Thus, trade liberalization and privatization are important preconditions for FDI flows to the region.

In their econometric analysis of the determinants of FDI using panel data, Elbadawi and Mwega (1997) argue that market size is relatively unimportant in explaining FDI flows to Africa, economic

growth is an important determinant. The authors found that depreciation of the real effective exchange rate, an increase in a country's openness to trade and the expansionary effects of fiscal balance have positive impacts in influencing FDI flow in the region. It is also shown that removal of trade restrictions and good conditions for private initiative have important bearings on FDI inflows, while the number of political upheavals has a negative bearing. Terms of trade shocks and the level of schooling are found to have little impact on FDI into Africa. Incidents of war and African regional integration arrangements are found to have limited impacts on FDI flows.

Summarily, all the above reviewed papers contributed to the literature. However, these papers have some limitations. First, most of the papers on Africa did not cover all the West Africa countries and of course policy differs from country to country so also the conclusion generated from the one region may not be applicable for other region. However, the findings of the studies can be sensitive to the period of analysis and may change if the period of analysis covers a larger number of years. Also, the existing papers are not comprehensive in the sense that they cover few African countries and with this not all West Africa countries are included (except Marong, 1997). This paper contributes to the existing literature by analysing factors that drive FDI flows in West Africa.

THEORETICAL FRAMEWORK

The theoretical framework of this work is anchored on a modified internalization Theory propounded by Dunning. The concept of the Eclectic Paradigm of international production was pioneered by Ohlin in 1976: "*The intention was to offer a holistic framework by which it was possible to identify and evaluate the significance of the factors influencing both the initial act of foreign production by enterprises and the growth of such production*" (Dunning, 1988). Dunning, 1993 explained the emergence of MNCs using an eclectic paradigm for FDI, the Ownership-Location-Internalisation (OLI) framework. He affirmed that Multinationals need to have some firm specific asset that differentiates them from domestic firms in order to compensate for the extra costs in terms of local knowledge that a foreign firm must incur to operate in foreign markets. The firm specific asset is called an ownership (O) advantage. Multinationals should also have an internalisation (I) advantage to internalise business contacts, and not to outsource. The reason why a multinational invests in one country but not in another depends on the country's locational advantage (L). Hence, the OLI framework explains FDI on the basis of ownership-specific advantages of the firm, internationalisation incentives and locational advantages. Dunning then defines four types of MNCs:

- market-seeking (MNCs that serve market through investment rather than through exports)
- efficiency-seeking (e.g. MNCs using low labour costs)
- natural resources-seeking
- strategic asset seeking (seeking technology, skills or take over brand names).

Using the classification above, West African investors are more likely to invest in order to seek markets or for strategic reasons. However, this study explores the determinants of FDI inflow into West Africa. From the theory reviewed, the major determinants of FDI are the domestic market demand; natural resources; macroeconomic factors like inflation and official exchange rate; efficient government policy on

investment; infrastructure development; policy variable like openness of the economy, and other factors. The study covers a period of 32years i.e. 1980 – 2012

METHODOLOGY

Estimation Procedure

The paper employs panel data estimation procedure. Panel data have been proposed as a better econometric technique for use in cross-country regressions because it allows for the inclusion of country-specific and because it exploits the time series dimension of the data thereby giving greater degrees of freedom. Other advantages of panel data over pure cross section estimation include its ability to provide richer data quality; and by allowing for greater flexibility, panel data reduces misspecification problems which might be present in pure cross-section regressions. Panel data also makes it possible to observe the dynamics of adjustment[6]. Panel data has been the technique of choice in recent years in estimating cross-country regressions (Islam, 1995; Caselli et al.). Thus, panel data generate more accurate predictions for individual outcome than time-series alone.
Model of panel data is given by:

$$Y_{it} = X'_{it}\beta + \varepsilon_{it} \qquad \text{i = 1,2……...14, t = 1980, 1981……..2012} \qquad \textbf{(5.1)}$$

Where Y is the regressand and X' is a vector of K regressors and β is the vector of coefficients to be estimated. i is the number of cross sectional series in the model and t is a particular time period. ε is the stochastic disturbance.

When dealing with panel data model as in 5.1 above, the existence of heteroscedasticity and autocorrelation are inevitable. Heteroscedasticity exists when disturbances have difference variances. This can occur when studying cross-section data where the scale of the dependent variables and the explanatory power of the model tend to vary across observations. Autocorrelation on the other hand is usually found in time-series data. Economic time-series often display a 'memory' in that variation and the regression function is not independent from one period to the next. As a result of the heteroscedasticity and autocorrelation in panel data model, Ordinary Least Square (OLS) estimator that assumes the exclusion of these two disturbances is not appropriate in estimating the true value of β and to make inference from the estimated model. In other words, based on the seemingly presence of autocorrelation and heteroscedasticity in panel data model, the least square, nonlinear least square and instrumental variables remain unbiased, consistent and asymptotically normally distributed but no longer efficient estimator and hence the usual inference procedures are no longer appropriate.
However, in order to retain the efficiency property of least square in a panel data, we transformed the model. When a model is transformed, ordinary least square is no longer the estimator, but generalized least square. The transformation of equation (5.1) means that autocorrelation and heteroscedasticity have been dealt with. The transformation is achieved when 5.1 is pre-multiplied by the projection matrix P where

$$P = X(X'X)^{-1}X'$$

[6] Baltagi (2001) and Hsiao (2003) provide comprehensive surveys of panel data econometrics.

Hence, 6.1 becomes $PY_{it} = PX'_{it}\beta + P\varepsilon_{it}$ **(5.2)**

So 5.1 has been transformed in 5.2 and can be written as

$$Y^{*}_{it} = (X'\beta)^{*} + \varepsilon_{it} \quad \textbf{(5.3)}$$

The variance of ε^{*}_{it} becomes $E(\varepsilon^{*}\varepsilon^{*\prime}) = P\sigma^2\Omega P' = \sigma^2 1$ where $\sigma^2\Omega$ is the variance covariance matrix of the error term. In equation 5.2 Y and X* are the observed data which has been transformed. To restore the coefficient property of β then:

$$\begin{aligned} b &= (X^{*\prime}X^{*})^{-1}X^{*\prime}Y \\ &= (X'P'PX)^{-1}X'P'PY \\ &= (X'\Omega^{-1})X'\Omega^{-1}Y \end{aligned} \quad \textbf{(5.4)}$$

Clearly 5.4 being the efficient least square of β is in contrast to the estimator of β in ordinary least square which is just

$$b = (X'X)^{-1}X'Y \quad \textbf{(5.5)}$$

The GLS estimator of β in 5.5 is the minimum (or efficient) variance linear unbiased estimator in the generalized regression model. With this estimator, prediction about the value of b is reliable and inference can be made from the model. One important reason of choosing GLS as the appropriate estimation techniques is that if a good or bad fit is obtained in the model, it is of no interest, because the dependent variable Y* in 5.5 is different from the one in 5.3. The usual R-squared often suggest that the fit of the model is improved by a correction from heteroscedasticity, but also degraded by a correction of autocorrelation, (Greene, 2000)

Random Effects

Therefore, panel data estimator comprise of random and fixed effect model. Random effect model allows for random deviation of individual intercept from the mean value. It also considers the individual cross-country effect as latent of the random variables and to formally incorporate them into the residual term of a linear model. This method or approach allows for non-observable heterogeneity of error term.

The random estimator is written as

$$y_{it} = \alpha + \beta_{it}\chi_{it} + \mu_{it} \quad \textbf{(5.6)}$$

In this case, y_{it} is the dependent variable, β_{it} is the parameter of interest to be estimated χ_{it} is the explanatory variables which include the policy and non-policy determinants of saving. The Random

effect assumes that the term $\alpha_{\iota\tau}$ is the sum of a common constant α and time-invariant variable μ_τ that is correlated with the residual $\varepsilon_{\iota\tau}$. Therefore, instead of treating β_{it} as fixed we assume that it is a random variable (consisting the cross-country effect with a mean value of β_1 (no subscript i) and the intercept value for an individual country can be expressed as

$$\beta_{1\iota} = \beta_1 + \varepsilon_i \qquad \iota = 1, 2\ldots.N \qquad \textbf{(5.7)}$$

Where, ε_i is a random error term with a mean value of zero and variance of σ^2_ε.

In essence, the whole West Africa countries drawing as a sample have a common mean value for the intercept (i.e. β_1) and the individual country differences in the intercept values of each country are reflected in the error term ε_i. However, we consider one way error component model as indicated below

$$\mu_{\iota\tau} = \eta_\iota + \nu_{it} \qquad \textbf{(5.8)}$$

In the one way error component model, error term $\mu_{\iota\tau}$ is decomposed into η_ι and ν_{it} where η_ι is the individual specific effect (that captures the individual heterogeneity) and ν_{it} is the disturbance (combined cross-section)

Substituting equation (6.6) into (6.7), we obtain

$$y_{it} = \alpha + \beta_\tau \chi_{\iota\tau} + \varepsilon_\tau + \boldsymbol{e_{it}} \qquad = \alpha + \beta_\tau \chi_{\iota\tau} + \omega_{\iota\tau} \qquad \textbf{(5.9)}$$

Where,

$$\omega_{\iota\tau} = \varepsilon_i + e \qquad \textbf{(5.10)}$$

However, a panel data is suitable to analyse data observed for a relatively small number of cross sectional unit is adopted. The estimator is the generalized least square method. It allows for group-wise heteroscedasticity, cross-group correlation and within group autocorrelation.

The Fixed Effects Model

One of the (two) most important potential sources of bias in cross-sectional econometrics is the so called heterogeneity bias arising from unobserved heterogeneity related to both *y* and *x*. If we assume that the unobservable element correlated with *x* does not change over time, we can get rid of this source of bias by running the fixed effect model (FEM). The fixed effects model is useful in a wide variety of situations, and it can be applied to panel data with any number of individual, cross sectional observation. Unbalanced panels, where *T* differs over individuals, are no problem for the FE-estimator. Also, time-constant unobserved heterogeneity is no problem for the FE-estimator. FE as

well allow for serial autocorrelation (AR (1)), individual specific constant, which will capture all time-constant (unobserved) characteristics. The base specification of fixed effect is of the form:

$$Y_{it} = ß_0 + \sum_{i=2}^{N} \gamma_i W_{it} + \sum_{k=1}^{K} ß_k X_{kit} + \in_{it} \qquad \textbf{(5.11)}$$

Where the subscript *i* refers to countries, *t* refers to time, and *k* refers to independent variables. Y_{it} is the vector of saving rates, W_{it} is the vector of country dummy variables, X_{kit} is the matrix of independent variables, and $\in_{it}$ is the vector or errors, which are assumed to satisfy the assumption of the normal linear model. This basic model incorporates fixed country-specific effects in the intercept term. However, the assumption that will be made for this study will be that, the intercept and slope co-efficient are constant across time and space and the cross term captures differences over time and individual. This approach is to disregard the space and tine dimension of the pooled data and just estimate the usual OLS regression. Therefore, given the small number of countries included here and the differences in their economic features, the fixed effect estimator seems to be suitable for the analysis of this study as it allows for serial autoregressive of order 1, AR (1).

Model Specification

Eclectic Paradigm is used to investigate the factors influencing FDI in West Africa. The FDI dynamism of adjustment process is postulated based on equation 5.1 and 5.6 below

$$Y_{it} = X'_{it}\beta + \varepsilon_{it}$$

$$y_{it} = \alpha + \beta_{it}\chi_{it} + \mu_{it}$$

However, to investigate the effects of MNCs in terms of marketing and investment in a country and motivations (either efficiency-seeking or market-seeking) of FDI (Dunning et al., 2007) following the Eclectic Paradigm Theory, GDP Growth Rate are employed in the model, the factors to be included as FDI determinants in West Africa include: openness of the economy, government policy in attracting foreign investment, inflation and others. Thus, the specified FDI model with the variables to be tested is given as:

$$FDI = f(GRGDP, GDPPC, INFL, OFEXCR, GOVTPOL, OPENNESS, INFRAS, LABOUR, NATURAL)$$

For estimation purposes, the equation for FDI inflows into West Africa is expressed in log-linear form as follows:

$$FDI_{it} = a_0 + a_1 grgdp_t + a_2 \inf l_t + a_3 gdppc_t + a_4 ofexcr_t + a_5 govtpol_t + a_6 \inf ras_t + a_7 openness_t + a_8 labour + a_9 natural_t$$

Where,

FDI denotes the net FDI inflows as % of GDP, to the countries

GRGDP is growth rate of gross domestic product (US$) in each of the countries in West Africa

GDPPC is the GDP per capita in each of country.

OPENNESS is openness index - total trade (% of GDP) in each of the countries

INFL is the annual inflation rate in each of the countries used to capture macroeconomics instability

OFEXCR is the official exchange rate is the US$ (annual average) in each of the countries

INFRAS is the telephone lines (per 1000 people) in each of the countries

LABOUR is the total labour force in each of the countries

GOVTPOL is government policy proxy by country's ranking in CIPA business environment in each of the countries. It measures the government effectiveness and stability

NATURAL is the total natural resources rent in West Africa.

Data Source

This study examines macroeconomics determinants of FDI in West Africa. The data set is limited by the amount of information available for each country involved. The data are obtained from the *"UN's World Investment Directory country profile", UNCTAD World Investment Report, African Economic Outlook, Central Bank of Nigeria, World Development Indicators*

DISCUSSION OF RESULTS

The regression result in below shows that the R^2 values for the fixed and random effect regressions are 0.637 and 0.576 respectively, while the pooled least square is 0.452. Apart from taking account of time and country specific effect, the fixed effect panel regression has a better fit than the OLS and random effect. The result of R^2 shows that it is statistically significant at 64% meaning that 64% of the total variance in FDI inflows in West Africa is explained by the model. Thus, the single- cross-country regression result can be misleading when unobserved country-specific effects and the problem of endogeneity are ignored. However, the author used the result obtained from fixed effect regression as the basis for the discussion.

GDP growth rate

From the table, the growth rate of GDP is positive and statistically significant. GDP growth rate is the national income indicator of the size of economies, which is related to total of production, consumption, and distribution of goods and services of a country and its also measures the level of the country's economic development and domestic market opportunities for investors especially market-seeking FDI for. Thus, the result shows that there is a strong relationship between FDI and market size in the estimation. This implies that investors in West Africa are attracted by the size of the market in the sub-region.

GDP per capita

GDPPC is used in the estimation as a proxy for the host countries capital-labour endowment. GDPPC can either be positive or negative as the case may be depending on the host countries economy. The estimation result shows a negative coefficient and statistically significant implying that West Africa

countries are labour intensive. Edwards (1990) also found that a negative relationship between GDP per capita and FDI. This is consistent with the eclectic paradigm theory of Dunning (1988) that the investors are efficiency seeker – as they look for cheap labour cost in the host countries.

Inflation rate (consumer price index)

Inflation rate measured the quality of macroeconomics instability in the sub-region – measured by the consumer price index. The result shows a negative sign though significant. This indicates that macroeconomics instability in the region hamper FDI inflows. It can be argued that if foreign investors are risk-averse (or even risk-neutral), a higher inflation rate may lead to a reduction in FDI in the host country, because investors will not risk profits expected from investment. As long as there is uncertainty, foreign investors will demand a high price to cover their exposure to inflation risks, and this, in turn, will decrease the volume of investment. Thus, to encourage investment, the stability of the inflation rate is important.

Natural resources endowment

The coefficient of natural resources is positive and highly significant. This means that natural resources endowment attracts FDI inflows in West Africa. Countries with natural resources tend to attract resources seeking FDI than those without. For instance, Nigeria has been the highest FDI recipient in the region, followed by Ghana in the 2000s. The explanation of this result is that the significant relationship between FDI inflow and natural resources abundance shows that if a country is abundant in natural resources, it may still be able to attract more FDI inflows despite the level of its macroeconomics instability.

Openness to trade

Openness to trade is negative though statistically significant. This result contradicts the author's expected sign as most researcher[7] found openness to trade to FDI to be positive and highly significant though these work were done in Africa region. However, the estimation result sows that openness in insignificant in attracting investors to West Africa.

Government policy

Government policy is negative but also statistically significant. The result is not consistent with the expected sign. A good government policy on business and investment is a signal to foreign investors. Thus, the result shows that government policy though necessary for FDI but not the main determinants of FDI inflows in West Africa.

Official Exchange Rate

The official exchange rate is positive and highly statistically significant. The coefficient of exchange rate is expected to be positive as most investors take advantage of the depreciation in the host countries. However, a depreciation of a country's exchange rate will increase the relative income/wealth of foreign firms and lead to an increase in foreign purchases of domestic assets. Also, a depreciation of a country's foreign exchange will lead to capital inflows as foreign countries try to take advantage of relatively cheaper domestic labor.

[7] See Asiedu (2002), Anyanwu (2011)

Infrastructure development

The number of telephone lines subscribers (per 1000 people) is used to proxy the availability of infrastructures and communications facilities in West African countries sub-region. The estimation result is positive and significant. This shows that with level of development in the infrastructure especially telephone lines, investors still found it interesting to invest in West Africa.

In sum, the econometrics result as discussed above reveals that natural resources and labour availability, GDP per capita which is used as a proxy for capital-labour endowment, GDP growth rate and official exchange rate promote FDI in West Africa. However, macroeconomics instability, openness to trade, infrastructure development, and government policy do not significant impact on FDI in the sub-region. Importantly one can conclude that investors in West Africa are market, natural resources and efficient seekers are propounded by Eclectic Paradigm of Dunning

Table2: Panel Data Estimation Result

Explanatory Variables	**Pooled least square estimation**		**Fixed effect (corrected for autocorrelation)**		**Random**	
	Coefficient estimate	ρ- value	Coefficient estimate	ρ-value	Coefficient estimate	ρ-value
GDPPC	0.006596	0.000	-0.045757	0.000	-0.050087	0.000
GRGDP	-0.078261	0.0001	0.016674	0.3479	0.018249	0.3513
INFL	-0.029650	0.0005	-0.121430	0.000	-0.080878	0.000
OFEXCR	-0.003069	0.000	0.001213	0.0178	0.000	0.1484
GOVTPOL	-0.674531	0.000	-0.571599	0.000	-0.531821	0.000
OPENNESS	-0.060524	0.000	-0.0912332	0.000	-0.067993	0.000
LABOUR	1.62000	0.000	2.10000	0.000	1.65000	0.000
NATURAL	0.399776	0.000	0.712326	0.000	0.523185	0.000
INFRAS	-2.124671	0.000	0.523093	0.1912	1.541570	0.0018
R.Squared	0.45		0.64		0.58	
Adj. R.Squared	0.44		0.62		0.57	
No of cross section	16		16		16	
Observation	528		512		528	

Source: Authors compilation from the pool result

SUMMARY, CONCLUSION AND POLICY IMPLICATION

This paper had looked at the determinants of FDI in sixteen West Africa countries and it shows that a country who is endowed with low labour cost, large markets and natural resource endowments promote FDI. This showed that investors in West Africa countries are there because of low labour cost and natural resources endowments. Also, despite the under-developed nature of infrastructure in the sub-region, the FDI inflows in some of the countries like Nigeria, Cote D'Ivoire and Ghana are still

increasing. This suggests that West Africa will attract more FDI in the next decade if they are to develop infrastructure couple with the availability of labour and natural resources.

This empirical result has shown that West Africa countries are different from other developing countries with regard to FDI flows. Three significant factors explain why West African countries were able to attract FDI than other countries except North and South in this 21st century – natural resource endowment, large markets size as shown by positive sign of gross domestic product per capita and low labour cost. Some of the determinants of FDI flows to developing countries are not significant for FDI flows to the sub-region countries. These include the openness to trade, government policy and infrastructure development. Also, macroeconomic instability does not have any impact on FDI in West Africa. One thing that is sure on the FDI inflows determinants in West Africa is that, if the determinants of FDI flows were the same for all developing countries, West African countries is more likely to receive substantially less FDI. The main conclusion that emerged from this analysis was that cross country variation in both the FDI inflows and the responsiveness of FDI to those variables could be systematically explained by the country's level of natural resources endowment, size of market and labour availability and that most of FDI in West Africa has been concentrated to extractive[8] industry – oil and natural resources in those countries that are blessed with them - Nigeria. This left the non-oil endowed countries in the sub-region to attract less FDI.

POLICY IMPLICATION

The empirical results have some policy implications on efforts to attract FDI in West Africa. First, the results show that FDI to West Africa is not solely driven by natural resource endowment and labour availability but that there is a role for the conscious efforts by national and international institutions in promoting investments to West Africa. Consequently, the regression result shows that government policy is statistically significant. This implies that West Africa countries need to implement policy measures that will attract investors into the countries. First, they must reduce the size of the government by implementing far-reaching privatization programs. By shrinking the scope of the government, privatization reduces corruption and bureaucratic red tape. It also opens up to foreign investors, sectors of the economy that have been dominated by the state. A second critical policy measure is the liberalization of trade in West Africa countries. The regressions results also show that trade openness has a significant and though negative impact on FDI flows to the sub-region region countries.

Additionally, improvement in macroeconomic performance is essential for economic growth and stability, it should not be the sole pre-occupation of West Africa countries with regard to attracting FDI. Some researchers tend to assume that improvement in macroeconomic performance is a necessary and sufficient condition for attracting FDI. However, this paper has shown that economic fundamentals are not significant for FDI flows to the region especially in country like Nigeria where there is insecurity, the country still found to be among the top recipient of FDI in developing countries. This suggests that West Africa countries should sequence their policy measures, beginning with a focus on trade liberalization, and subsequently shift to improvement in economic fundamentals,

[8] Ayanwale, 2007 and Akinlo, 2004

labour availability by improving on their educational system, tap and discover the resource endowment in the countries and development the domestic market to attract the foreign investors.

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