Foreign direct investment determinants in Sub−Sahara Africa: A co−integration analysis

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Abstract

This study provides an empirical assessment of the factors that significantly influence the long−run transnational corporations' investment decision making process in Sub−Sahara Africa. The empirical evidence based on a co−integration analysis of 19 countries suggests that the most dominant long−run determinants of FDI in Sub−Sahara Africa are market growth, export−orientation policy and FDI liberalisation. These are followed by real exchange rates and market size. Bottom on the list is openness. However, the results for real wage rates and human capital are inconclusive.

1 Introduction

Foreign direct investment (FDI) has become increasingly recognized to provide a package of external resources that can contribute to economic development.[1] Thus, if well managed, it offers either a complementary or alternative channel through which host countries can stimulate and sustain their economic growth rates. Therefore, it is instrumental to identify those factors that have the potential to either impede or induce FDI flows into host countries. Needless to say, it is essential to recognize that in fact, FDI offers a mixture of positive and negative effects. It is then the task of the host country to disentangle these effects, and take measures that maximize the positives but minimize the negatives.[2]

The literature has provided several alternatives of the determinants of FDI.[3] A thorough theoretical and empirical literature review is documented in UNCTC (1992). A view which in a way embraces the concepts of most of the other explanations is that, which suggests that the propensity for a firm to engage in foreign production depends on a combination of ownership-specific advantages, internalization opportunities and locational advantages in the target market. These reasons, which explain why FDI takes place at all, are encapsulated in Dunning's (1981) eclectic paradigm of FDI. It asserts that a firm can only capture a foreign market through FDI if it has the capacity to exploit simultaneously all the three advantages.

Despite the high profitability of the investments undertaken in the sub-continent, and despite offering a number of incentives to foreign investors, many Sub-Sahara Africa (SSA) countries are not even listed for consideration by transnational corporations (TNCs). In fact, they frequently do not make it to the short list when it comes to locational decisions for FDI. Consequently, the level of FDI flows to SSA has increased only modestly in recent years rendering the FDI position of the sub-region comparatively poor, probably suggesting a serious problem with its locational advantages. Thus, as far as SSA is concerned, it is instrumental to understand the factors that are either impeding or that have the potential to stimulate and sustain FDI flows into the region.

In view of the aforementioned factors, this study aims to provide an empirical assessment of the factors that significantly influence the TNCs' investment decision-making process in SSA. The investigation builds on previous research and focuses on the macro locational determinants of FDI. Since as aforementioned, the SSA FDI situation has tended to be 'perpetual', the investigation deviates from the tradition short-term approach and focuses on the long-run factors. The study employs both individual country data and panel data analysis techniques. This approach enables identification of similarities and/or differences between countries, and across the entire sample. The empirical analysis comprises 19 SSA countries namely Botswana, Cameroon, Central African Republic, Congo, Gabon, Ghana, Cote d'Ivoire, Kenya, Madagascar, Malawi, Mauritius, Niger, Nigeria, Rwanda, South Africa, Sierra Leone, Swaziland, Zambia and Zimbabwe. The choice of these countries and that of the sample period (1970-2000) has been influenced by the availability of FDI data.

The paper is therefore organized as follows. Section 2 presents an overview of the time-series trends of FDI in Africa. The theoretical framework, methodology, measurement of variables, and data sources and limitations are discussed in section 3. The empirical results are presented in section 4, and concluding remarks are contained in section 5.

2 FDI trends in Africa

Figure 1

FDI flows into Africa were rather static prior to 1980. The exception was in 1974 and 1979 when heavy investment was made in oil producing countries during and following the oil

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[1] For details see for instance UNCTAD (1999).

[2] Bende-Nabende (2002) has covered this comprehensively.

[3] For instance the product life cycle theory of investment and the follow-the-leader theory of defensive FDI.

crises (Figure 5.1, UNCTAD, 1999). However, as Figure 1 illustrates, in response to investment and trade policy liberalization, FDI surged in the early-1980s and peaked in 1989. However, it slumped in 1990[4] before recovering. Among the reasons attributed to this increase is the degree of investment profitability in Africa. For instance, UNCTAD (1999) reports that: (i) in the case of United States (US) FDI, the rate of return in Africa was above 10 per cent between 1983 and 1997 except in 1986; (ii) since 1990, the rate of return in Africa has averaged 29 per cent; (iii) since 1991 the rate of return in Africa has been higher than any other region, including developed countries as a group, in many years by a factor of two or more; and (iv) in 1995, Japanese affiliates in Africa were more profitable (after taxes) than in the early-1990s, and were even more profitable than Japanese affiliates in any other region except for Latin America and the Caribbean and West Asia.

Figure 2

However, an assessment of the trends from a comparative perspective (Figure 2) reveals that Africa's FDI position has been far below the average of developing countries since the mid-1980s[5]. In fact, Figure 3 demonstrates that Africa's share of FDI to developing countries has indeed been declining. UNCTAD (1999) observes that while inflows into developing countries (as a group) almost quadrupled, from less than $20 billion between 1981 and 1985 to an average $75 billion between 1991 and 1995, inflows into Africa only doubled during that period. Consequently, Africa's share in total inflows to developing countries dropped significantly.

Figure 3

Obviously, aggregate FDI flows conceal country-specific information. For example, although the share is gradually declining, owing to their oil reserves, Nigeria and Egypt have accounted for a substantial share of FDI flows to Africa ranging. For instance, they were responsible for 67 per cent share between 1983 and 1987, 54 per cent share between 1988 and 1992 and 38 per cent share between 1993 and 1997 (UNCTAD, 1999). Furthermore, in growth terms, UNCTAD (1999) reports that more recently a group of African countries including Botswana, Equatorial Guinea, Ghana, Mozambique, Namibia, Tunisia and Uganda have attracted rapidly increasing FDI. However, there are countries, which received FDI divestments (i.e. Swaziland) and countries where FDI had declined in the recent past but has now been reversed (i.e. Mozambique and United Republic of Tanzania).[6] Bennell (1994) reports that British Corporate investment fell drastically since mid-1994 following the TNCs' divestments in English Speaking Africa.

Table I

Traditionally, most of the FDI in Africa originated from a few countries of Western Europe and the US[7]. This later extended to the Organization for Economic Co-operation and Development (OECD) countries and, hence, the Triad.[8] Nonetheless, it is evident from Table I that since the mid-1980s although volatile in nature, Africa started to attract significant FDI from non-Triad countries including the developing countries of Southeast Asia. Evidently, if it were not for these other non-traditional sources, the position of Africa's share of FDI would be worse.

Table II

FDI in Africa is no longer concentrated in the primary sector[9] so much that services and manufacturing sectors are becoming key sectors even in oil-exporting countries.[10] Table II

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[4] Resulting from a global recession in response to the Japanese stock market slump.

[5] When the realignment of the major currencies induced global liberalisation of FDI policies followed by an FDI boom.

[6] FDI figures for individual countries are reported in the various issues of UNCTAD's World Investment Reports.

[7] Mostly 'colonial masters'.

[8] The European Union, Japan and US.

[9] For instance, among the countries under investigation, investment in the primary factor was undertaken because of the following natural resources: *oil* is found in Cameroon, Central African Republic, Congo, Gabon,

illustrates that although the primary sector still dominates the FDI stock in Africa, the services and manufacturing sectors surpassed it *vis-à-vis* annual flows between 1988 and 1999. UNCTAD (1999) reports that in 1996, FDI from the US was almost as important in the manufacturing sector[11] as the traditionally most important sector, petroleum.

3   The theoretical framework and empirical methodology
3.1   The theoretical framework

This study draws on the existing literature and for simplicity starts from the notion that FDI from the locational advantage point of view is influenced by four broad categories of factors. These are, the cost-related factors, the investment environment improving factors, other macro-economic factors, and the development strategy of the host country.

Under the first category, the presence of a significant cost factor disparity between a home country and a host country may considerably influence the choice of an investment location. Such a disparity might be particularly prevalent in the labor-intensive export-oriented, and sourcing and assembly type of industries in which major market imperfections arise from the disproportionate cost of given unit inputs between the developed countries and the developing countries. Key cost-related locational factors will be the host country's real wage rate, foreign exchange rates, land and property rents/rates, fuel costs, local input costs (where applicable), level of taxation, transport costs, and cost of capital (i.e. lending interest rate) in relation to those of the home country. Schreiber (1970) found low cost labor to be the leading factor influencing the choice of Taipei, China as an offshore production site; and Hill and Lindsey (1987) found it to be a vital influence for export-oriented subsidiaries in the Philippines. Likewise, Hollander (1984) found transport costs to be significant in determining US firms' sourcing, while Goldberg and Klein (1998) identified a relationship between real exchange rates and FDI from Japan and the US into the Southeast Asian countries.

The investment environment improving factors not only make it possible for the investment to take place, but also smoothen the entire process of investment and of eventual production. The central factors here are seen to be the openness of the economy, the liberalization of the investment and the trade regimes, and the prevailing political risk. The FDI policy liberalization package may include ownership policies, taxes/subsidies, convertibility of currency, price controls, and performance requirements. Trade policy liberalization involves the reductions of restrictions and tariffs on traded merchandise regarding the countries in question making them more open and acceptable to trade.[12] These factors may play that crucial role of influencing the investors' preference when making a choice between two locations that have similar cost-related advantages. Kravis and Lipsey (1982) found that a high propensity to trade was an important factor in the decision to locate US transnational affiliates in foreign countries. Furthermore, investment benefits that are conditioned by liberalization of the trade and FDI regimes may emanate from their facilitation of freer trade and investment in conjunction with the repatriation of dividends and profits to home countries. Bende-Nabende et al (2001) found liberalization to be a major determinant of FDI into the ASEAN-5 economies. Furthermore, the political risk rating of the country cannot be ignored. An unstable political environment makes investments risky

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and Nigeria; *diamonds* are available in Botswana and Central African Republic; *gold* is in Ghana and copper in Zambia; *timber* in found in the tropical countries of Central African Republic, Gabon, Ghana, and Sierra Leone; and *agriculture* is prominent in almost all the countries.

[10] For example, the primary sector accounted for 30 per cent FDI stock in Nigeria in 1992, while manufacturing accounted for almost 50 per cent and services close to 20 per cent. In 1995 almost half of the FDI flows to Egypt (48 per cent) went into services, 47 per cent into manufacturing, and a mere 4 per cent into the primary sector (UNCTAD, 1999).

[11] Mostly in food and kindred products, primary and fabricated materials, and other manufactured products.

[12] For details on this see for instance, UNCTAD (1997).

and therefore erodes the investors' confidence.[13]

Under the macro-economic factors, consideration is made on factors that can in their own right influence foreign firms to consider direct investment in the host country as opposed to continuing to service it either through exports or through other means[14]. Here there are two market familiar factors, i.e. current market size and the potential market size. While a large domestic market size generates scale economies, a growing market improves the prospects of market potential. In addition, there are country-specific created assets that take the form of the quality of the available infrastructure, technology and manpower, that facilitate the production and distribution processes of goods and services. Bhattacharya et al (1996) identified gross domestic product (GDP) growth as a major factor for sub-Saharan Africa as a whole, while Mbekeani (1997) found market size and growth rates to be the most important determinants of FDI in East Asia and Pacific, and Latin America and the Caribbean.

The political ideology and hence development strategy of the host country also plays a critical role, particularly, with respect to the type of investment to be undertaken. For instance, it may be a restrictive import-substitution strategy, which draws investment (defensive) geared for the domestic market. Alternatively, it may be a less restrictive export-orientation strategy, which promotes investment for exports. Singh and Jun's (1995) study revealed that exports, particularly manufacturing exports, are a significant determinant of FDI and that there is strong evidence that exports precede FDI flows.

Data constraints make it impracticable to test all of these potential determinants of FDI. Consequently, a limited number of variables have been selected to represent each of the categories in the analysis. The variables and their expected directions of response are presented in Table III where the following notation has been adopted: *RWR* = real wage rates, *IR* = interest rates, *XR* = foreign exchange rates, *OPEN* = openness, *LIB* = liberalization, *GDP* = current market size, *Gr* = market growth (future market potential), *HC* = human capital and *X* = export-orientation development strategy.[15]

Table III

This relationship can now be represent in very simple terms as:

$$FDI = f([RWR, IR, XR], [OPEN, LIB], [GDP, Gr, HC], [X]) \qquad (1)$$

3.2   The methodology

The literature on FDI has obviously considered the links between FDI and macroeconomic performance of host countries, but it has tended, indeed, to do so on the basis of one-way causality, in either direction. The exploration of two-way causation is only just beginning. There are two main avenues for exploring that interdependency in a simultaneous fashion (rather than just establishing 'causality' à la Granger). One is the construction of some form of a structural simultaneous equation, dynamic, macro-model. The other is to employ a vector auto-regression (VAR) in orthodox format, or in the form of a vector error correction (VEC); which is a Johansen (1995) VAR incorporating (potential) error correction terms, consequent upon potential co-integrating vectors. The latter avenue is employed in this analysis and assesses co-integration or rather long-run relationships between FDI and its determinants. Consider a VAR(k) given by:

$$y_t = B_1 y_{t-1} + B_2 y_{t-2} + \ldots + B_k y_{t-k} + \Psi D_t + \varepsilon_t \qquad (2)$$

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[13] For theoretical details see for instance UNCTAD (1997 and 1999).

[14] Such as licensing.

[15] It has not been possible to compute the cost related variables as 'host country in relation to home country' because the FDI data used is aggregated in nature (i.e. it originates from several countries).

where y_t is a column vector of n I(1) and/or I(0) variables; B_i are n by n matrices of coefficients; and D_t is a vector of deterministic terms. The Johansen (1995) co-integration test re-parameterizes equation (2) into an error correction form:

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + ... + \Gamma_{k-1} \Delta y_{t-k+1} + \Psi D_t + \varepsilon_t \tag{3}$$

Accordingly,

$$\Pi = (I - B_1 - B_2 - ..... - B_k) \tag{4}$$

Each row of Π is (potentially) a co-integrating vector of y_t; and the rank (r) of the stochastic matrix determines the actual number of such vectors. Obviously, should the rank turn out to be zero then equation (2) becomes a VAR in differences; and should the matrix be of full rank, the vector process itself is stationary, so that a standard VAR in levels (equation (3)) is the appropriate specification of the relationship between the variables. In the intermediate case r ($0 < r < n$) co-integrating vectors exist. In this case, the stochastic matrix is:

$$\Pi = \alpha\beta'; \text{ where } \alpha \text{ and } \beta \text{ are } n \text{ x } r \tag{5}$$

where $\beta'y_t$ are the co-integrating vectors; and α is a matrix of speed adjustment, which gives the response of y_t to the error correction terms. This is now a VEC model. This methodology is now so familiar that there is no need to say much about it.[16]

3.3   Measurement and properties of variables, data sources and limitations

The measurement of variables and data sources are reported in the Appendix. The limitations of the World Penn Tables have been pointed out by Summers and Heston (1991). They include the low reliability of data obtained from the less developed countries, which means that biases as well as measurement errors may vary. Consequently, the reliability of the analysis based upon the data may be compromised.

Tests for *unit roots,* the order of integration and the roots of the companion matrices were carried out. The results indicated that the variables' order of integration is 1 or could be so. The results also indicated that the VARs and the VECs are stable, there is Normality, and there is no evidence of Heteroscedasticity.

4   The empirical results

It is worthwhile noting that empirical results on some of the FDI determinant factors have sometimes deviated from theoretical expectations, leading to inconclusive inference. For instance, Schmitz and Beiri (1972) found the European Community's share of total US FDI to be negatively (sometimes significantly) related to the European Community growth rate during 1952 to 1958. Likewise, Lunn (1980) found the growth rate lagged one year (Y_{t-1} - Y_{t-2}) to be significantly negatively related to US FDI in the European Community. In similar manner, Caves (1996) found in some cases the wage rate to have a positive sign. Similarly, Bende-Nabende (1999) found growth to be statistically significant and negatively related to FDI in Indonesia, the Philippines and Singapore. In addition, he found output (as a proxy for market size) for Malaysia and Singapore to be statistically insignificant and negatively related to FDI. Therefore, there is an indication that the composition of the equation may influence both the significance and the direction of the relationship between FDI and some of its determinant variables. This could probably be partly attributed to the instrumental variables used whose choice is rather subjective, and partly to the fact that because of data limitations most models are incomplete. In this investigation, upon running the co-integration test for the equation comprising the entire set of the aforementioned determinant variables,

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[16] See for instance Hamilton (1994).

the direction of the normalized coefficients for some of the variables contradicted the theoretical expectations. Consequently, they did not make economic sense and were eliminated from the respective country equations. Therefore, they are referred to as eliminated variables hereafter. After experimenting, the best lags turned out to be 3 for Zambia; 2 for Central African Republic, Ghana, Madagascar, Malawi, Nigeria, Rwanda, South Africa, Swaziland and Zimbabwe; 1 for the remaining countries; and 6 for the Pool.

Table IV

The Osterwald-Lenum (1992) critical values for the trace statistic were used to test for co-integration. Those for the country specific estimates have been adjusted for small sample size.[17] The trace statistics reported in Table IV illustrate co-integration (at the 5 per cent level) for all the countries. For instance, $r = 5$ for Mauritius; $r = 4$ for Kenya, Niger and Nigeria; $r = 3$ for Malawi, Zimbabwe and the Pool; $r = 1$ for Rwanda, Sierra Leon, South Africa, Swaziland and Zambia; and $r = 2$ for the remaining countries. Evidently, there is indeed a long-run relationship between FDI and its determinants in SSA.

Table V

The standardized co-integration vectors are reported in Table V. It is evident that the most consistent long-run determinant of FDI in SSA is market growth, followed by liberalization and export-orientation policy. Unfortunately, some countries did not have sufficient time-series data for human capital stock and real wage rates. Therefore, no general conclusion can be drawn about them.

In the panel co-integration, the results for the Pool are consistent with those for the majority of the countries. For instance, concomitant with most of the country results, only the co-integration vector for openness is inconsistent with economic theory. Otherwise, all the other variables are rightly signed.

5   Conclusion and policy considerations

The empirical evidence suggests that the most dominant long-run determinants of FDI in SSA are market growth, export-orientation policy and FDI liberalization. These are followed by real exchange rates and market size. Bottom on the list is openness. However, because of data limitations no definite conclusion can be drawn from the results for real wage rates and human capital. Specifically then, the long-run implication is that SSA countries can improve their FDI positions by improving their macroeconomic management, liberalizing their FDI regimes and broadening their export bases.

Of course because of data problems, some factors were not included in the empirical analysis. Therefore, it is instructive to address some of these factors here. UNCTAD (1999) attributed the poor FDI performance in SSA to the negative image the region holds among many foreign investors. For instance, the sub-continent tends to be associated with political turmoil, economic instability, diseases and natural disasters. Internal and external armed conflicts are its key characteristics. Military coup d'états are also not uncommon. Moreover, spillover effects from neighboring countries' instability often in some way affect those countries that experience internal stability. Four decades ago, per capita incomes of SSA were almost similar to those of some of the economies of Southeast Asia. However, the post-independence (political) mismanagement of SSA economies has not only led to economic decline, but has also led to comparatively less investment in infrastructure (including human capital) than their counter parts in Asia. As a consequence, SSA has lagged behind in terms of economic growth in general, and infrastructural development in particular. Infrastructure facilitates the production and distribution process of goods and services. Under-investment in infrastructure therefore deters FDI. The quality of infrastructure together with the available human capital may dictate the type of investment to be undertaken. It is no wonder then that

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[17] This effectively involved correcting for degrees of freedom using the formula (t-nk)/t*lr; where t = actual sample size used in the estimation, n = number of variables in the system, k = number of lags used, and lr = log likelihood ratio.

apart from South Africa, the manufacturing sectors of SSA countries comprise mostly processing and a few light manufacturing industries concomitant with the available level and quality of infrastructure. Man cannot control natural disasters. However, as exemplified by the developed countries, good economic management provides opportunities to have buffer resources capable of alleviating the after effects of any such disasters.

The FDI trends demonstrate that until recently, most FDI in SSA was undertaken in natural resources exploration, extraction and processing, and/or agricultural products processing concomitant with the host countries' factor endowments. In addition, FDI mostly originated from the OECD countries. However, this is changing. The high profitability of the investment undertaken in Africa, its recent diversification into manufacturing and services, and its diversification to non-traditional sources imply that Africa indeed has the *potential* to attract FDI. However, in order to achieve this a lot has to be done to change the current image the region holds.

First and foremost, individual countries must sort out their country-specific problems and focus on factors that can enhance economic, social and political stability. For instance, it is more productive for conflicting countries to resolve their problems via round table discussions rather than through the unnecessarily expensive armed conflicts. This helps reduce the characteristically heavy defense budgets, and enables the allocation of funds to better causes. The developed countries also have a role to play here since they often act as suppliers (directly or indirectly) of the expensive and destructive heavy artillery employed in these conflicts. The role of the corruption culture, which requires total eradication, need not be over emphasized.

Although low-cost labor remains a source of competitive advantage particularly for developing countries, its importance is diminishing. Likewise, the importance of natural resources is diminishing as their substitutes are developed. Instead, TNCs are increasingly seeking world-class infrastructure, skilled and productive labor, innovatory capacities and an agglomeration of efficient suppliers, competitors, support institutions and services. In addition, large domestic markets remain a powerful magnet for investors. In fact, low-cost labor does not provide a base for sustainable development since rising incomes erode the comparative edge it provides. Thus, low-cost labor is only a beginning point for luring FDI and consequently generating static economic benefits. Therefore, developing Africa can attain sustained economic growth, through the exploitation of TNCs' dynamic competitive advantages. Consequently, African countries have to set-up resource bases that can facilitate their progressive shifts up the levels of technological complexity. This involves instituting plans for deepening the content of export activity and building the human capital and macroeconomic capacity to sustain such a shift across a range of tradable activities in response to changing world demand and technologies. This is made more challenging by the current unprecedented and accelerating pace of technological change, whose developments they have to keep pace with. These steps will not only generate sustained growth prospects and hence market potential, but will also provide a conducive environment for FDI.

Appendix   Measurement of variables and data sources

FDI = FDI (millions U.S $) - from the Balance of Payments Statistical Yearbook and UNCTAD.

Market size = GDP (billions international prices) - from the Penn World Tables.

Market growth = growth rate of GDP, i.e. Gr_t = log GDP_{t-1} - log GDP_t (international prices) - computed.

Openness = total imports and exports (billions international prices) - from the Penn World Tables.

Export orientation development policy = exports (billions international prices) - computed from the Penn World Tables.

Liberalization = dummy variable with 0 representing the pre-liberalization (FDI) period (i.e up to 1985) and 1 the post liberalization period (from 1986 onwards). Therefore, it relates to only the liberalization of the FDI regimes.

Real wage rates = hourly wage rates (U.S $) - from the International Labor Statistics.

Foreign exchange rates = real effective exchange rates - from World Bank web site.

Human capital = mean years of education - from Nehru and Dhareshhwa (1965-87) at the World Bank web site. 1988 -1998 estimated by author.

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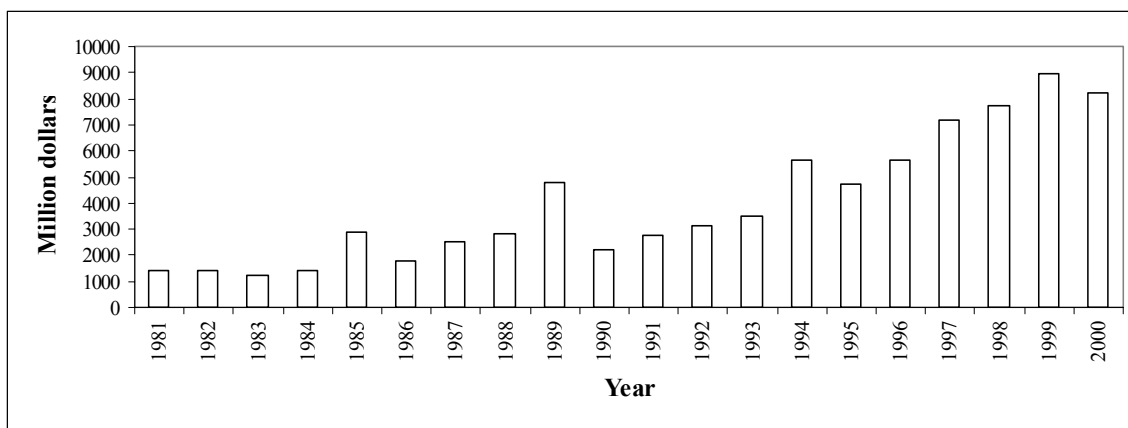
Figure 1:   **Trends of FDI flows into Africa.**
Sources: Various issues of UNCTAD's World Investment Reports.
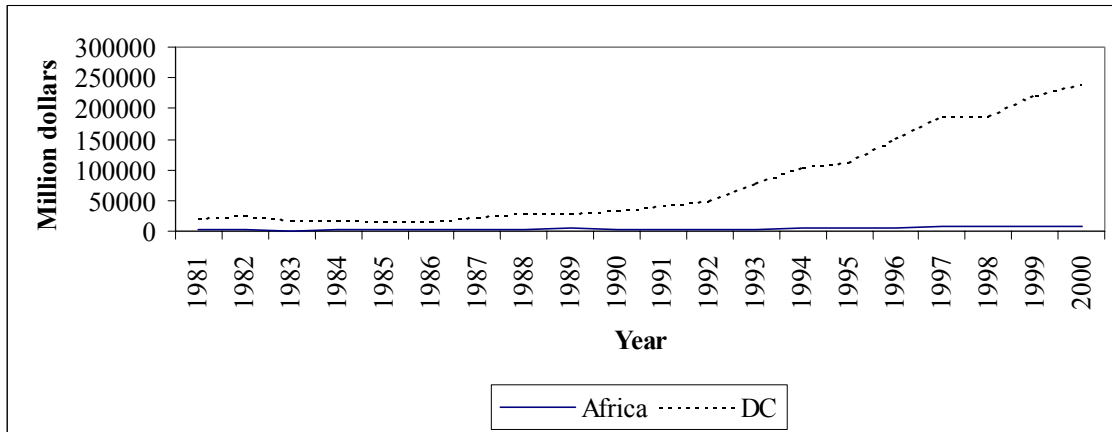
Figure 2   **Trends of FDI flows to Africa and to the developing countries.**

Note: DC - Developing countries.
Sources: Data from various issues of UNCTAD's World Investment Reports.
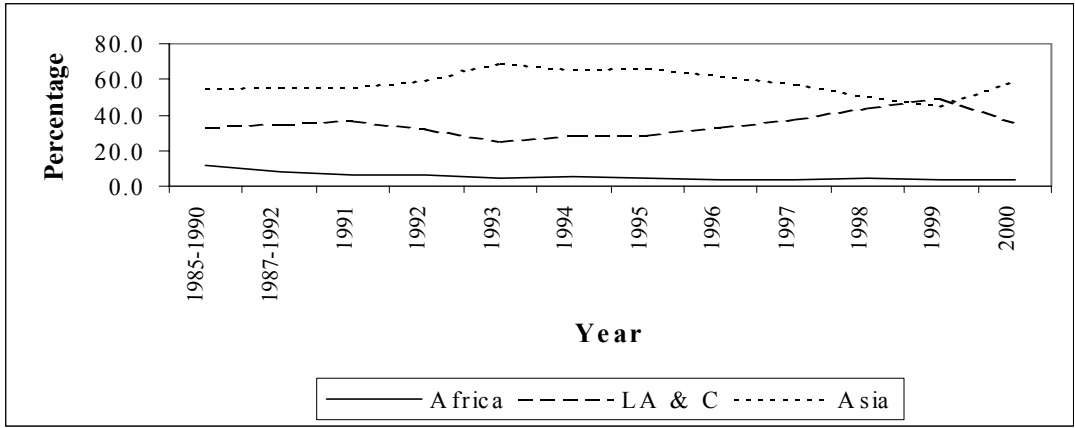
Figure 3   Percentage share of FDI flows to developing countries.
Note: LA & C - Latin America and Caribbean.
Sources: Data from various issues of UNCTAD's World Investment Reports.

Table I   **Trends of FDI sources**

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
					Million dollars						
EU[a]	142	308.1	1663.6	537.9	1862.2	1221.6	1523.1	824.3	1928.6	3282.6	4339
US	155	-607	-554	-451	75	-84	837	762	352	737	3790
Japan	165.5	492.5	457.2	488.9	568.7	121.1	207	152.5	166.6	101.4	160.3
Triad	462.4	193.6	1566.8	575.8	2506	1258.9	2567.1	1738.7	2447.3	4121	8289.3
Others	2037.5	2606.4	3245.2	1631.2	246.1	1892.3	901.9	3574.2	1697.8	1786	-632.3
					Percentage share						
EU[a]	5.7	11.0	34.6	24.4	67.7	38.8	43.9	15.5	46.5	55.6	56.7
US	6.2	-21.7	-11.5	-20.4	2.7	-2.7	24.1	14.3	8.5	12.5	49.5
Japan	6.6	17.6	9.5	22.2	20.7	3.8	6.0	2.9	4.0	1.7	2.1
Triad	18.5	6.9	32.6	26.1	91.1	40.0	74.0	32.7	59.0	69.8	108.3
Others	81.5	93.1	67.4	73.9	8.9	60.1	26.0	67.3	41.0	30.2	-8.3

Note: a - Excludes Austria, Finland, Greece, Ireland, the Netherlands and Sweden.
Source: FDI flows from Annex table 1, UNCTAD (1999).

Table II   **Sectoral distribution of FDI in Africa (million dollars)**

Sectors	FDI inflows				FDI stock			
	1988		1997		1988		1997	
	value	% share	value	% share	value	% share	value	% share
Primary	65	10.1	89	15.3	2338	51.8	17.16	53.4
Manufacturing	183	28.7	187	32.1	940	20.8	862	26.8
Services	254	39.7	243	41.8	1235	27.4	635	19.8
Unspecified	137	21.5	62.5	10.8	n.a.	n.a.	n.a.	n.a.

Source: UNCTAD (1999, pp. 418-425).
Note: n.a. - data not available or negligible.

Table III   **The variables and their expected directions of influence**

Cost-related			Investment environment improving		Other macro-economic			Policy
RWR	IR	XR	OPEN	LIB	GDP	Gr	HC	X
-	-	-	+	+	+	+	+	+

Table IV   Trace statistics

	Ho: r = p	Eigenvalue	Trace statistic	5 Per cent critical value	1 percent critical value
Botswana	p = 0	0.823	112.12**	82.49	90.45
	p < = 1	0.798	74.02**	59.46	66.52
Cameroon	p = 0	0.88	125.4**	76.07	84.45
	p < = 1	0.723	68.05**	53.12	60.16
Central Africa	p = 0	0.826	94.07**	68.52	76.07
	p < = 1	0.699	48.68*	47.21	54.46
Congo	p = 0	0.886	145.46**	114.9	124.75
	p < = 1	0.76	89.06*	87.31	96.58
Gabon	p = 0	0.792	102.48**	76.07	84.45
	p < = 1	0.686	61.69**	53.12	60.16
Ghana	p = 0	0.811	111.77**	77.74	85.78
	p < = 1	0.756	68.48**	54.64	61.24
Cote d'Ivoire	p = 0	0.726	77.52**	59.46	66.52
	p < = 1	0.694	49.0**	39.89	45.58
Kenya	p = 0	0.978	295.37**	146.76	158.49
	p < = 1	0.944	191.96**	114.9	124.75
	p < = 2	0.834	114.3**	87.31	96.58
	p < = 3	0.632	65.76*	62.99	70.05
Madagascar	p = 0	0.931	133.04**	59.46	66.52
	p < = 1	0.819	63.51**	39.89	45.58
Malawi	p = 0	0.752	103.6**	59.46	66.52
	p < = 1	0.732	67.32**	39.89	45.58
	p < = 2	0.557	33.06**	24.31	29.75
Mauritius	p = 0	0.897	193.32**	114.9	124.75
	p < = 1	0.813	131.97**	87.31	96.58
	p < = 2	0.689	86.63**	62.99	70.05
	p < = 3	0.602	55.13**	42.44	48.45
	p < = 4	0.509	30.24*	25.32	30.45
Niger	p = 0	0.988	225.48**	102.14	111.01
	p < = 1	0.745	104.94**	76.07	84.45
	p < = 2	0.648	68.05**	53.12	60.16
	p < = 3	0.524	39.82*	34.91	41.07
Nigeria	p = 0	0.993	266.74**	87.31	96.58
	p < = 1	0.966	142.5**	62.99	70.05
	p < = 2	0.704	58.07**	42.44	48.45
	p < = 3	0.496	27.64*	25.32	30.45
Rwanda	p = 0	0.846	104.73**	76.07	84.45
Sierra Leone	p = 0	0.676	68.7**	59.46	66.52
South Africa	p = 0	0.741	61.67**	53.12	60.16
Swaziland	p = 0	0.797	60.68**	53.12	60.16
Zambia	p = 0	0.84	74.81**	47.21	54.46
Zimbabwe	p = 0	0.917	117.47**	62.99	70.05
	p < = 1	0.865	70.09**	42.44	48.45
	p < = 2	0.709	32.06**	25.32	30.45
Pool	p = 0	0.232	173.39**	109.99	119.8
	p < = 1	0.198	114.03**	82.49	90.45
	p < = 2	0.119	64.49*	59.46	66.52

Note: ** - 1 % and * - 5 % levels of significance.

Table V   Normalised co-integration vectors

	OPEN	LIB	Gr	GDP	HC	RXR	RWR	X
Botswana	19.6	1.1	290.0	e.v	n.a	-0.36	-0.09	e.v
Cameroon	e.v	e.v	60.5	e.v	6.8	-0.32	n.a	0.06
Central Africa	e.v	0.01	58.7	2.6	n.a	n.a	n.a	8.8
Congo	1.3	6.4	250.3	4.6	n.a	e.v	n.a	4.4
Gabon	e.v	5.9	7.6	e.v	n.a	-0.01	n.a	3.7
Ghana	e.v	0.05	804.5	12.5	62.6	e.v	n.a	e.v
Cote d'Ivoire	4.4	30.4	e.v	e.v	41.5	-0.02	n.a	e.v
Kenya	0.8	18.5	275.5	3.4	21.3	e.v	e.v	2.2
Madagascar	e.v	e.v	1.8	0.7	0.1	-0.01	n.a	e.v
Malawi	e.v	1.2	0.1	e.v	e.v	n.a	-0.1	0.9
Mauritius	e.v	e.v	e.v	7.6	21.7	-0.2	-7.8	0.9
Niger	10.7	225.9	11269	1.7	n.a	-.8	n.a	e.v
Nigeria	e.v	e.v	276.5	0.3	4.7	e.v	n.a	0.2
Rwanda	e.v	0.2	3.1	e.v	0.5	e.v	n.a	4.4
Sierra Leone	e.v	e.v	31.7	e.v	6.0	-0.01	n.a	4.5
South Africa	e.v	54.3	2538	e.v	n.a	e.v	n.a	4.0
Swaziland	0.02	6.0	95.5	e.v	n.a	n.a	e.v	e.v
Zambia	e.v	10.6	169.2	e.v	e.v	n.a	n.a	0.3
Zimbabwe	23.9	273.5	e.v	136.8	e.v	e.v	e.v	e.v
Pool	e.v	2.03	21.5	1.1	1.2	-0.02	e.v	0.1

Note: e.v - eliminated variable, n.a - data not available, and the co-integrating vector for FDI standardized as -1.