TRADE OPENNESS AND FOREIGN DIRECT INVESTMENT IN AFRICA

Tonia Kandiero[1]
Global Development Policy, National Treasury
Margaret Chitiga
Department of Economics, University of Pretoria

Abstract

Africa's share of foreign direct investment (FDI) has lagged behind other regions in the world, despite a sharp increase in FDI inflows to the region in 2001. Factors contributing to this circumstance include perceptions of high corruption, weak governance and poor infrastructure. The motivation of this paper is to investigate the impact of openness to trade on the FDI inflow to Africa. In addition to economy-wide trade openness, we also analyse the impact on FDI of openness in manufactured goods, primary commodities and services. The empirical work uses cross-country data from selected African countries observed over four periods: 1980-1985, 1985-1990, 1990-1995 and 1995-2001. We find that the FDI to GDP ratio responds well to increased openness in the whole economy and in the services sector in particular.

JEL F11, 41

1
Introduction

According to the *World Investment Report 2002* (UNCTAD, 2002), Africa's share of total foreign direct investment (FDI) increased from $9 billion in 2000 to $18.5 billion in 2001. This escalation in FDI flows was primarily due to a rise in FDI in South Africa and Morocco. In the global context, the share of world FDI inflows to Africa rose from 1 per cent in 2000 to 2 per cent in 2001 (UNCTAD, 2002). Factors contributing to this lag in FDI flows to Africa relative to the world include perceptions of high corruption, weak governance and poor infrastructure, among other disadvantages. Nonetheless, resource-rich countries like Algeria, Angola, Egypt, Nigeria and South Africa continue to attract FDI.[2] In addition to resource endowments, economic reform has also contributed to Mozambique, Tanzania, Botswana, Morocco and Uganda's becoming attractive FDI destinations (Basu & Srinivsan, 2002). Economic theory suggests that foreign savings can be beneficial in many ways. For example, FDI inflows stimulate capital accumulation by adding to domestic savings and raising the recipient economy's efficiency through improving resource allocation, provoking competition, improving human capital, deepening domestic financial markets and reducing local capital costs (Todaro, 2002: 582). In the particular case of FDI from South Africa in other parts of Africa, firms play a major role in providing much needed financing resources for infrastructure development and rehabilitation of economies ((Akinboade & Lalthapersad, 2005). All these factors contribute to economic growth[3].

The motivation of this paper is to investigate the impact of openness to trade on the flow of FDI into Africa. In addition to economy-wide trade openness, the study also empirically investigates the impact on FDI of openness in manufactured goods, primary commodities and services. We adhere to the notion that markets that are more open are more likely to create significant economic static welfare gains through more efficient allocation of resources than are less open markets. With efficient use of resources, dynamic gains are

expected in the longer term with enhanced investment, productivity and growth. This economically conducive environment is likely to attract foreign businesses, causing FDI inflows to increase (Kumar, 2002: 33). Several other studies have also looked at the impact of openness on FDI.[4] Our paper is along the lines of the study by Asiedu (2002), where econometric techniques are used to explore whether factors that affect FDI in developing countries affect countries in sub-Saharan Africa differently. The results indicate that: (i) a higher return on investment and better infrastructure have a positive impact on FDI in countries in non sub-Saharan Africa, but have no significant impact on FDI in sub-Saharan Africa; (ii) openness to trade promotes FDI in sub-Saharan Africa and countries in non-sub-Saharan Africa, however, the marginal benefit from increased openness is less for sub-Saharan Africa. Our study differs from this paper in four ways: (i) our paper covers more countries in Africa; (ii) our data covers four periods, 1980-1985, 1985-1990, 1990-1995 and 1995-2001, which is a larger coverage than Asiedu's study; (iii) we control for openness in the primary, manufacturing and services sectors; and (iv) we control for the most common problems in studies across countries, namely individual country effects and endogeneity. In the last step, treating country-individual effects incorrectly, for example, in technology or tastes, may give rise to omitted variable bias. In the case of endogeneity, there is a strong theoretical argument that at least a subset of the explanatory variables should be expected to be endogenous. Therefore our approach applies differencing of variables to deal with individual countries, and instrument the independent variables using lagged variables effects to address the endogeneity problem[5]. Following Asiedu, we do not attempt to provide any novelty in terms of the theoretical analysis of how openness affects FDI. Thus, the importance of this paper lies in its empirical results.

Our paper is divided into 5 sections: section 2 gives a background on FDI and trade openness in Africa; section 3 presents the research methodology and data definition; section 4 discusses results; and section 5 offers conclusions and recommendations for the way forward.

2
Background

2.1 Foreign direct investment

There are several reasons why foreign firms choose to invest away from their home countries. Dunning (1993) points to rent-seeking, market-seeking, efficiency-seeking and strategic-asset seeking as factors motivating FDI from most industrialised countries. The rent-seeking accumulation motive involves foreign firms seeking cheaper factors and inputs of production such as primary products. Market-seeking FDI ideally involves foreign firms exporting or opening new markets in host countries in order to boost their sales. This is also another way for firms to get around trade restrictions such as high transport costs and rules of origin. Efficiency-seeking firms aim at using a few countries to serve a larger market. The key motives for efficiency-seeking FDI are location, resource endowment and government regulations. The last motive, strategic-asset seeking, is more concerned with maintaining the foreign firms' international position and competitiveness. In most low-income African countries, FDI is likely to fall in the non-market-seeking category[6]. This is because most non-market FDI goods are produced in the country and exported abroad while in the market-seeking case, goods are produced and sold domestically. Market-seeking FDI thrives in large markets and high-income economies (Asiedu, 2002).

FDI inflows in our sample of sub-Saharan and North African countries increased from $9 billion in 2000 to $18.5 billion in 2001 (see Table 2 in the appendix). These figures are still considered marginal, given that total FDI inflow to the world amounted to $735 billion in 2001. The net FDI inflows to Africa are concentrated in South Africa, Morocco, Angola and Nigeria, with South Africa having the largest share (39 per cent) of total FDI inflow in the region (see Figure 1 in the appendix). Traditionally, most of the FDI in Africa has been in the primary sectors, particularly oil and mineral extraction business, but FDI inflows in this sector declined from $5,056 million in 1998 to $2,029 in 2000. In recent years the services sector has also

become important in terms of attracting FDI flows (Markusen, Rutherford & Tarr, 2000). FDI inflows through the services channel are mainly in telecommunications, banking and finance, transport, wholesale and retail trade and business and legal services. FDI to the tertiary sector rose from $52 million to $1,931 million between 1998 and 2000 (see Figure 2 in the appendix). Although the manufacturing sector is also important in terms of attracting FDI, manufacturing FDI rose by only $64 million between 1998 and 2000.

2.2 Openness to trade

Measurement issues are potentially a problem for all analytical work, although more acute for openness variables. Since it still appears to be difficult to find reliable systematic data on trade policies across countries, many papers, including Dollar and Kraay (2001), have instead simply included trade volumes (exports plus imports as a share of GDP) as a measure of openness. For our particular purpose of looking at the impact of openness in different sectors on FDI, we also adhere to this useful but imperfect measure. Kandiero and Wadhawan (2003) provide a detailed discussion on openness to trade and measurement problems associated with this variable. We use the economy-wide international trade taxes data to test if our economy-wide openness variable is robust. In this paper we use the terms 'openness' and 'liberalisation' interchangeably in the context of trade.

Turning to data on openness in Africa, mineral-rich countries such as the Congo Republic, Equatorial Guinea and Sao Tome, and smaller economies such as Lesotho, Mauritius, Seychelles and Swaziland are ranked as the most open economies in Africa using our measure of openness (see Table 1 in the appendix). The two most popular FDI destinations, South Africa and Morocco, are ranked 27 and 22 respectively out of the 50 countries. Since the 1980s, most African countries have liberalised unilaterally through structural adjustment programmes, as well as through regional arrangements and multilateral systems such as the World Trade Organization (WTO). It is important to note that in Africa in the last 10 years, trade in

services has increased substantially, despite the fact that trade in Africa has been marginalised in the last two decades[7]. Currently, trade in services makes up a quarter of all cross-border trade and a significant portion of all sales by multinational firms (Hoekman & Mattoo, 2000). Although the increase in trade in the services sector is a positive development, barriers to trade in the services sector remain an obstacle in the promotion of FDI. Therefore, effective liberalisation in the services sector is expected to yield substantial gains (Hodge, 2002: 221). As a precondition, liberalisation in the services sector should be accompanied by effective regulation to ascertain that market failures and infrastructures are addressed.

As mentioned in the previous section, FDI to the manufacturing sector seems to have tapered off. However, barriers such as transportation costs and rules of origin could encourage firms to set up their plants in Africa motivated by "protection jumping". As a caveat, this motivation may adversely affect the depth of their production activities in the host country, although it has the potential to increase domestic sales (Kumar, 2002: 33).

3
Research methodology and data definition

3.1 Model specification

This study adopts the econometric methodology followed by many cross-country studies such as Barro (1991). The empirical work is applied to a panel of 50 African countries observed over four periods: 1980-1985, 1985-1990, 1990-1995 and 1995-2001. Most of the data are from *World Development Indicators* (World Bank, 2002). Using panel data makes meaningful empirical research possible even in a case of data limitations such as restricted time frames or missing data, inhibiting factors noted by Barro (1991) and Xavier Sala-i-Martin (1994). Further, the time-dimension of the panel is fairly small in comparison to the number of countries, which helps to avoid some of the business-cycle complications that may arise in time series data.

We estimate the following equations:

$$F_{it} = \beta_1 + \beta_2\eta_{it} + \beta_3 X_{it} + e_{it} \text{ ...} \qquad (1)$$

$$F_{it} = \beta_1 + \beta_2\eta_{it} + \beta_3 X_{it} + \pi_{it} + z_{it} . \qquad (2)$$

where,
F_{it} = FDI in the ith country and t time periods
η_{it} = measures of openness (where i is economy-wide openness, openness in the manufacturing sector, openness in the services sector and openness in the primary sector)
X_{it} = a vector of other determinants of FDI (Taxes on Investment, Infrastructure, Wages, Real Effective Exchange Rate, Market Size and Corruption)
e_{it} and z_{it} = error terms
π_{it} = country special effects.

Our estimation starts with a simple pooling method that employs the OLS estimation technique (equation 1). In this model, we do not take into consideration π_{it}, unobservable country special effects, which are time-invariant and account for any country-specific effects not included in X (equations 2). A rejection of the poolability test (F-test) will imply preference of the Fixed Effects method. Considering that many African countries have data limitations in terms of time span and endogeneity issues, which are potential problems in cross-country analysis, the Fixed Effects approach may yield unbiased results. In order to avoid the potential bias associated with this approach, we use the one-step generalised method of moments (GMM) estimator derived by Arellano and Bond (1991). The one-step GMM's robust results are derived from the use of first-differences to remove the country-specific effects that are part of the error term. The instrumental variable estimation, where the instruments are the lagged explanatory variables (in differences) and the dependent variable in level lagged twice, deals with the presence of endogeneity[8]. The dynamic nature of the model and use of the first difference and instruments remove the two inconsistencies of incorrect treatment of country-specific effects and endogeneity.

3.2 Data definition

Openness to trade is defined as ((**imports + exports**)/ **GDP**) for the whole economy and separately for three sectors (primary, manufacturing and services). **Taxes on international trade** are import duties, export duties, profits of export or import monopolies, exchange profits and exchange taxes. The expectation is that a less restrictive trade policy environment will attract more FDI. **Foreign Direct Investment** (FDI) is the net inflow of investment to acquire a lasting management interest (10 per cent or more of voting stock). **FDI business enterprises** are those that operate in a country other than that of the investor. Investment tax is tax on income, profits and capital gains (per cent of total taxes). This is a fiscal incentive offered by the host country to attract FDI. The tax incentive can also be viewed as a way of subsidizing the cost of capital. **Infrastructure (roads)** represents roads, and is taken as 1000 km per 1 million inhabitants. The availability of good infrastructure in a host country potentially favours FDI. Kumar (2002) finds that the positive benefits of good infrastructure are more pronounced in developing countries. **Wages** represent real wages and salaries in millions adjusted for the quality of labour[9]. Low cost of labour may give the host country an advantage over other countries in terms of attracting FDI (Wheeler & Mody, 1992). This issue is still open for investigation in the case of Africa.

Real effective exchange rate (REER) measures the value of currency against a weighted average of several foreign currencies divided by a price deflator or index of cost. Exchange rate appreciation may crowd out exports, which in turn could discourage FDI if the motive is to use the host country to produce and then export the goods. **Market size** captures Gross Domestic Product (GDP) per capita Purchasing Power Parity (PPP) adjusted. GDP is measured as the sum of the gross value added by all resident and non-resident producers in the economy plus any taxes and minus any subsidies not included in the value of the products. GDP is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of

natural resources. Value added is the net output of a sector after adding up all outputs. The International Standard Industrial Classification (ISIC) determines the value added. The GDP is converted to international dollars using the PPP rates. GDP per capita is GDP divided by mid-year population. Growth rates are calculated as annual averages and represented as percentages. Market size is important when FDI is market-seeking. The data source for all these variables is *World Development Indicators 2002* (World Bank, 2002).

The variable capturing **corruption** represents the degree of corruption in government.[10] Corruption is defined as demands for special payments and bribes in connection with import and export licenses, exchange controls, tax assessment or loans. The data range is from 0 to 6, with 0 being the highest corruption and 6 the lowest corruption. The data source is the International Country Risk Guide (ICRG), a monthly publication by the Political Risk Services. In general, countries that are perceived to be corrupt attract less FDI (Wei, 2000). Table 3 in the appendix shows a correlation matrix of all the variables defined here.

4
Empirical analysis

Table 1 gives the econometric results of our model through various estimation techniques. The Wald Joint procedure in Table 1 tests the significance of all the variables except the constant term. This procedure could be thought of as the equivalence of the F-test.

Table 1
Regression results, 1980–2001, dependent variable FDI to GDP

	OLS	Fixed effects	GMM1	GMM2	GMM3	GMM4	GMM5
Constant	–0.6512		7.684	4.350	29.3013	29.3860	34.1322
Openness	0.0363* (0.0088)	0.0354 * (0.0042)	0.0520* (0.0161)				
Openness (services)				0.1161* (0.0478)			
Openness (manufacturing)					0.0098 (0.0353)		
Openness (primary)						–0.0586* (0.0059)	
Trade tax							–0.1142* (0.0492)
Tax on investment	–0.1198* (0.0343)	0.0113 (0.0310)	–0.0417* (0.0141)	–0.02593** (0.01302)	–0.0595* (0.0115)	–0.0867* (0.0159)	–0.1198* (0.034)
Log REER	–5.683*** (3.355)	–3.731 (2.915)	–2.8160 (2.111)	–2.0855*** (1.206)	–5.3271 (3.802)	–5.9469* (2.040)	–5.6826*** (3.355)
Log road	1.3908* (0.3303)	0.1708 (0.2548)	0.3191** (0.1871)	0.2351 (0.2787)	0.8953* (0.2953)	1.2915* (0.3732)	1.3901* (0.3303)
Wages	–0.00014 (0.0001)	–0.0003 (0.0003)	–0.000045 (0.0002)	–0.0001* (0.0003)	0.0006** (0.0002)	0.0006* (0.0002)	–0.0001 (0.0001)

Market size	−0.0426	−0.1075	0.5517*	0.5451*	−0.4654*	-0.1370	−0.0426
	(0.1942)	(0.4439)	(0.1312)	(0.09297)	(0.1952)	(0.1261)	(0.19422)
Corruption	−0.2158	0.0341	−0.1301	0.08165	0.4117*	0.5142*	−0.2159
	(0.2410)	(0.3776)	(0.2043)	(0.2947)	(0.159)	(0.1193)	(−0.2410)
Number of observations	204	204	204	204	204	204	204
Wald joint		633.3 [0000]**	4784 [0.000]**	194 [0.000]**	557 [0000]*	17.37 [0.015]*	537 [0.000]*
Wald dummy		348.5 [0.000]**	0.8627 [0.353]	0.825 [0.364]	2.479 [0.115]	8.261 [0.004]**	3.568 [0.059]
AR 1 test		−0.6562 [0.512]	−0.8493 [0.396]	−1.407 [0.159]	1.026 [0.305]		−1.269 [0.204]
AR 2 test		0.8388 [4.02]	0.6085 [0.543]	1.398 [0.162]	−0.2454 [0.806]		1.378 [0.168]

Notes:
*1% significance level, **5% significance level, ***10% significance level
The four periods of estimation are 1980-85, 1985-90, 1990-95 and 1995-2001
Pooling Test: F(6,44)=3.843[0.004]
OLS DW =1.96

The Fixed Effects, GMM1 and GMM2 models are significant at the 5 per cent significance level, while GMM3, GMM4 and GMM5 are significant at 1 per cent level. The absence of first and second order autocorrelation in the Fixed Effects and GMM model residuals implies that the estimates are consistent. From the actual results, the GMM estimation results are our preferred choice as the estimations yield superior results.

In our first two models, OLS and Fixed Effects, the economy-wide openness coefficient is statistically significant at the 1 per cent level. The rejection of the poolability test in the OLS model reveals the presence of fixed effects. Controlling for fixed effects, however, does not yield better results. This could mean that other problems, for example endogeneity, could be present in this cross-country analysis. The GMM1 estimates yield better results than the previous models, with a statistically significant coefficient of magnitude 0.0520 (tables 1 and 2). An increase of 10 per cent in the economy-wide openness will increase the FDI to GDP ratio by 13 per cent. This supports the argument that countries that are more open to trade are likely to attract foreign firms. Asiedu (2002), Singh and Jun (1995) and Edwards (1990) also find

similar results. In the same model, economic variables such as investment tax and wages have a negative impact on FDI, while infrastructure and market size have a significantly positive impact on FDI. Generally, only in the case of export-oriented FDI does cheap labour in terms of lower wages work as an incentive (Wheeler & Mody, 1992).

The GMM2 model replaces economy-wide openness with openness in the services sector variable. The positive coefficient, 0.1161, is also significant at the 1 per cent level. From Table 2, an increase in openness in the services sector by 10 per cent will increase the FDI to GDP ratio by 7 per cent. Based on our discussion in the previous sections, FDI to the services sector has increased (this type of FDI is mainly in the form of commercial presence or Mode 3 (Hodge, 2002)). Changes in regulation in the financial and communication sectors could have been the cause of these positive effects. Since we cannot separate the effects in this case, another study should be carried out focusing solely on services and regulation. In spite of these positive results, the sector has more barriers to trade than do other sectors such as primary and manufacturing. Therefore, these results tell us that further liberalisation in the services

sector is likely to yield significant gains in terms of attracting FDI. In the same model, exchange rate appreciation and investment tax have a significantly negative impact on FDI, while market size has maintained a positive coefficient.

In the case of the GMM3 model, more openness in the manufacturing sector does not seem to have any significant impact on the FDI to GDP ratio. One of the explanations for this result could be that most of the barriers to trade affecting FDI in the manufacturing sector seem to have been phased out. In this regard, more openness in this sector may not have a major impact. In this model, variables such as corruption, wages, infrastructure and investment tax are also important. A study by Wei (2000) supports the argument that less corruption may attract FDI.

Table 2
Openness elasticities

Openness variables	Mean	GMM1	GMM1 elasticity	GMM2	GMM2 elasticity	GMM4	GMM4 elasticity	GMM5	GMM5 elasticity
Openness	77.308	0.0520	1.30652						
Openness services	19.773			0.1161	0.7461				
Openness primary	3.7692					−0.0586	−0.07178		
Trade tax	24.692							−0.1142	−0.9165

In the GMM4 model, primary sector openness is statistically significant at the 1 per cent level but has a negative coefficient, −0.0586. An increase of 10 per cent in openness in the primary sector will reduce the FDI by 0.7 per cent. The pattern of data in the previous sections shows that while FDI to the services sector has increased, FDI to the primary sector has decreased. In Figure 1 in the appendix, FDI to the primary sector can be seen to have declined significantly from $5 billion in 1998 to $2 billion in 2000, while most of the African countries have opened their economies. It is possible that efficiency gains and increased investments from increased openness in sectors such as services may enable a country to support some of the activities in the primary sectors, reducing some investment by foreign firms. It is also probable that the sign could be reflecting other interactions in the function. In this model, investment tax and real effective exchange rate are statistically significant at the 1 per cent level and negatively associated with FDI to GDP, while an increase in wages is also statistically significant but has a positive association. In this model, an improvement in the corruption index by 1 per cent will increase FDI to GDP by 60 per cent.

The GMM5 model includes the international trade tax variable to test the robustness of our economy-wide openness variable. This variable is used because trade taxes are also considered as an important indicator of openness. The results in tables 1 and 2 indicate that a reduction in trade taxes by 10 per cent will increase the FDI to GDP ratio by 9 per cent. Loree and Guisinger (1995) also find a negative relationship between trade taxes and FDI. The elasticity of the economy-wide variable is 13 per cent, indicating that the two variables are consistent. Based on the regression results, therefore, increased openness to trade will increase the FDI to GDP ratio in African countries.

Regional dummies

Our study attempts to divide the countries into regions (i.e. Middle East and North Africa (MENA) and Southern Africa Development Community (SADC)) to identify some of the differences between these sectors. These areas may differ in terms of identity, culture of doing

business, geography, size of countries and size of their economies. Specifically, MENA countries have tended to view sub-Saharan countries as backward in terms of integration. Interestingly, after these regions have been separately controlled for, the estimate of the regional dummy is not statistically significant (see table 4 in the appendix). However, stable economic variables such as openness, investment tax, exchange rate, infrastructure and market size remain the key determinants of FDI, regardless of the region.

Political instability

This study also includes the political instability variable as a proxy for how the political climate many impact FDI. A study by De Soto (2000: 69) makes a strong case for the need for political awareness in managing capital. The estimate for political instability is not statistically significant, meaning that this variable does not seem to pose a major risk in terms of FDI flows to Africa. This result is rather surprising, but is born out by the evidence of countries like Angola, an oil-exporting country, which has experienced political instability for many years and yet seen an increase in FDI. A plausible explanation is that FDI to Angola is highly profitable and the return even after adjusting for risk is still quite substantial. Overall, however, the empirical relationship between political instability and FDI is still unclear. On one hand, Schneider and Frey (1985) find a positive relationship between FDI and political instability and on the other, Asiedu (2002), Hausmann and Fernandez-Arias (2000) and Jaspersen, Aylward and Knox (2000) find no such link. Nonetheless, we cannot ignore the importance of political climate in investment decisions if Africa would like to "Walk the Walk" (Loots, 2005: 19). After controlling for political instability, estimates in the new model indicate that economic variables such as openness, tax incentives and market size are key determinants of FDI.

5
Conclusions and recommendations

FDI to Africa is affected by many factors, including market size, investment taxes,

corruption and wages. The principal goal of this study was to investigate the impact of openness to trade in the whole economy as well as its different sectors. The FDI to GDP ratio responds well to increased openness in the whole economy and in the services sector in particular. Further reduction in tariff and non-tariff barriers such as licensing or cumbersome procedures will increase FDI. Increasing market access in the area of services is high on Africa's agenda. Due to high protection in the services sector, gains from further liberalisation are expected to be high. Beyond this study, a more liberal financial system, for example, is likely to attract more foreign banks, leading to more FDI. As a caveat, liberalisation in the services sector should be accompanied by effective regulation to ascertain that issues related to market failure and infrastructure are addressed. In Southern Africa, to date, only South Africa, Tanzania, Zambia and Zimbabwe have competition policies and institutions to support further liberalisation in the services sector (Hartzenberg, 2002). To improve access in the services sector, the issue of temporary movement of natural persons (Mode 4) should also be taken into consideration. Currently cumbersome visa processes and precarious contracts block movement of labour in sectors such as construction, where most African countries have a comparative advantage. Movement of labour should be encouraged to attract more skilled workers. The removal of these barriers is likely to increase competitiveness in the services sector. All these avenues offer areas for further research.

Greater openness is one route for Africa to catch up with the rest of the world's developing countries in attracting FDI. Even though opening the services sector seems to influence the FDI to GDP ratio more than opening the primary and manufacturing sectors, economy-wide openness measures give the best results. In addition to openness, other factors such as investment tax, wages, infrastructure, institutional frameworks and regulation should also be taken into consideration if Africa is to attract more FDI.

For future research, it would be interesting to conduct a similar exercise using more disaggregated data such as mining, forestry, financial services, etc.

Endnotes

1 The views and opinions expressed in this paper are those of the authors and do not necessarily represent the views and polices of the National Treasury. The authors are grateful for the useful comments and suggestions made by the two anonymous referees. We gratefully acknowledge the comments of participants at the Economic Society of Southern Africa 2003 Annual Conference, Cape Town, South Africa. We would also like to thank Christine Mugoya for her research support.

2 Even though Angola is considered politically unstable, the high returns from oil have attracted FDI flows.

3 It is beyond the scope of this paper to review the vast literature on the FDI-growth relationship and the determinants of FDI. The interested reader should refer to De Mello (1997) for a comprehensive survey of the link between FDI and growth as well as for further evidence on the FDI-growth relationship. The author concludes that the impact of FDI on growth will depend on the scope for efficiency spillovers to domestic firms, by which FDI leads to increasing returns in domestic production, and increases in the value-added content of FDI-related production.

4 For more details see Asiedu (2002), Hausmann and Fernandez-Arias (2000), Gastanaga, Nugent and Pashamova (1998), Singh and Jun (1995) and Edwards (1990).

5 See Casselli, Esquivel and Leffort (1996) for a detailed discussion.

6 The recent increase in FDI from South Africa to other parts of Africa has been both market-rent-seeking and market-seeking (Akinboade & Lalthapersad, 2005). FDI ranges from finance, telecommunications, mining and retail trade to transport.

7 According to the WTO, Africa only accounted for 2.6 per cent of global exports in 2004, a decline from 3.1 per cent in 1990.

8 This methodology was first suggested by Anderson and Hsiao (1981) and later developed further by Arellano and Bond (1991).

9 The adjustment is carried out by regressing the variable on gross enrolment for secondary and tertiary education.

10 Unfortunately the (ICRG) index captures only government corruption; a more comprehensive index containing both government and private sector corruption would have been better.
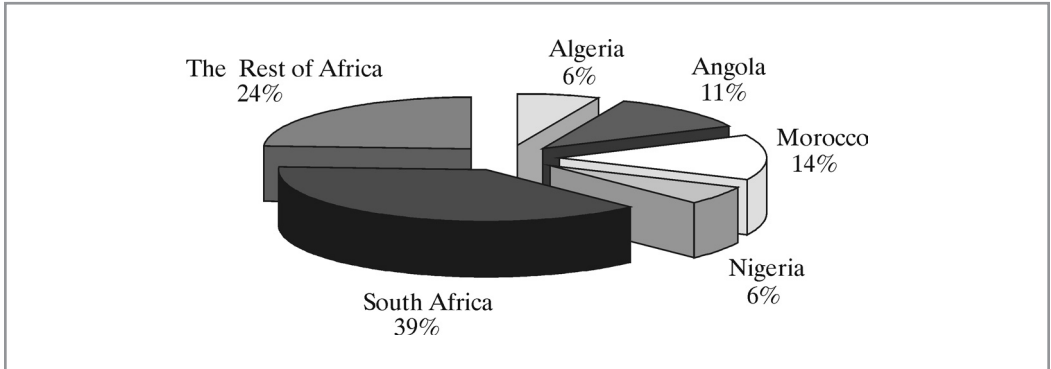
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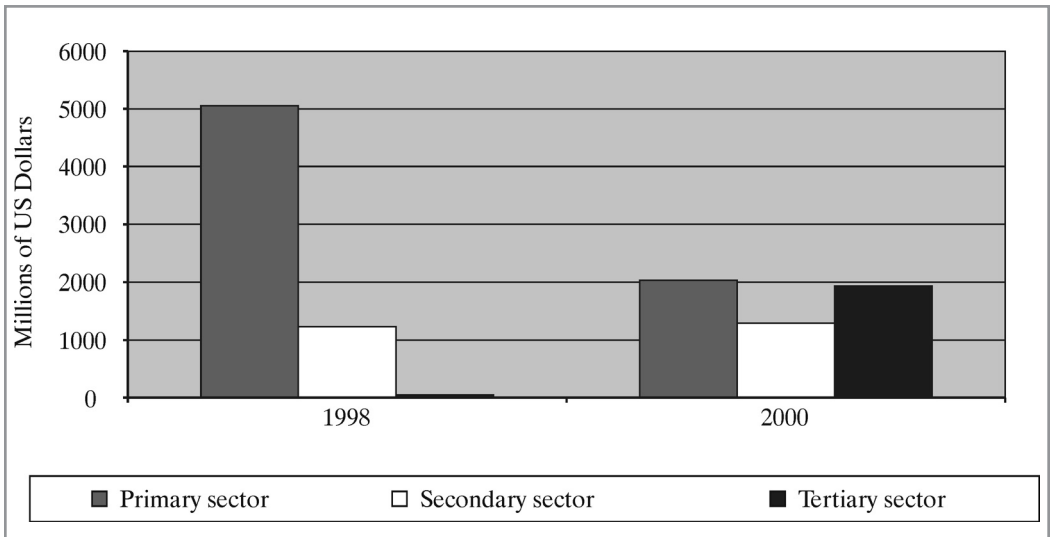31 WORLD BANK (2002), *World Development Indicators*, CD-Rom.

APPENDIX A

Figure 1
FDI Net inflows, 2001, (millions of US$)

Figure 2
FDI to Africa by sector, 1998 and 2000

Table 1

Openness to trade and ranking in Africa, 1995-2001

Country	Openness	Rank	Country	Openness	Rank
Equatorial Guinea	173	1	Malawi	63	21
Swaziland	173	1	Kenya	63	21
Seychelles	153	2	Guinea-Bissau	63	21
Lesotho	129	3	Comoros	63	21
Mauritius	129	3	Morocco	62	22
Congo, Rep.	123	4	Madagascar	56	23
Angola	119	5	Algeria	55	24
Sao Tome and Principe	118	6	Mozambique	55	24
Gambia, The	115	7	Congo, Dem. Rep.	53	25
Eritrea	112	8	Chad	53	25
Namibia	107	9	Cameroon	51	26
Djibouti	103	10	Guinea	50	27
Gabon	100	11	South Africa	50	27
Mauritania	96	12	Benin	47	28
Tunisia	89	13	Tanzania	44	29
Ghana	89	13	Egypt, Arab Rep.	43	30
Cote d'Ivoire	84	14	Sierra Leone	42	31
Nigeria	82	15	Burkina Faso	41	32
Botswana	79	16	Ethiopia	41	32
Togo	79	16	Uganda	40	33
Cape Verde	78	17	Niger	39	34
Zambia	73	18	Central African Republic	36	35
Zimbabwe	70	19	Rwanda	31	36
Senegal	70	19	Burundi	28	37
Mali	64	20	Sudan	27	38

Source: Authors' calculation based on data from World Bank, 2002.

Table 2
FDI to Africa, 1990-2001 (US$ millions)

Foreign direct investment,	1990	1995	2000	2001	2000	2001
Net inflows (BoP, current US$) (mill)					% of Total	% of Total
Algeria	0	0	438	1,196	5	6
Angola	−335	472	879	2,146	10	12
Benin	62	7	64	131	1	1
Botswana	96	70	57	57	1	0
Burkina Faso	0	10	23	26	0	0
Burundi	1	2	12	0	0	0
Cameroon	−113	7	31	75	0	0
Cape Verde	0	26	21	1	0	0
Central African Republic	1	3	5	8	0	0
Chad	9	13	15	80	0	0
Comoros	0	1	1	2	0	0
Congo, Dem. Rep.	-15	−22	23	32	0	0
Congo, Rep.	7	−60	−75	59	−1	0
Cote d'Ivoire	48	212	235	246	3	1
Djibouti	0	3	3	3	0	0
Egypt, Arab Rep.	734	598	1,235	510	14	3
Equatorial Guinea	11	127	120	88	1	0
Eritrea	–	0	35	34	0	0
Ethiopia	12	14	135	20	2	0
Gabon	74	−315	252	200	3	1
Gambia, The	0	8	44	36	1	0
Ghana	15	107	110	89	1	0
Guinea	18	1	10	2	0	0
Guinea-Bissau	2	0	23	30	0	0
Kenya	57	33	111	5	1	0
Lesotho	17	275	118	117	1	1
Liberia	0	0	12	13	0	0
Libya	–	–	–	–	–	–
Madagascar	22	10	83	11	1	0
Malawi	23	25	45	58	1	0

Mali	6	111	106	103	1	1
Mauritania	7	7	9	30	0	0
Mauritius	41	19	266	–48	3	0
Morocco	165	438	201	2,658	2	14
Mozambique	9	45	139	480	2	3
Namibia	–	–	–	–		
Niger	41	7	19	13	0	0
Nigeria	588	1,079	930	1,104	11	6
Rwanda	8	2	8	5	0	0
Sao Tome and Principe	0	0	2	6	0	0
Senegal	57	32	88	126	1	1
Seychelles	20	46	25	59	0	0
Sierra Leone	32	–2	5	4	0	0
Somalia	6	1	0	0	0	0
South Africa	–	1,248	969	7,162	11	39
Sudan	0	0	392	574	5	3
Swaziland	30	52	35	21	0	0
Tanzania	0	120	194	224	2	1
Togo	18	26	42	67	0	0
Tunisia	76	264	752	457	9	2
Uganda	0	121	161	145	2	1
Zambia	203	97	122	72	1	0
Zimbabwe	–12	118	23	5	0	0
Total	2041	5458	8553	18542	100	100

Source: World Bank, 2002.

Table 3
Correlation matrix

	FDIGDP	OPENMAN	OPENSEV	OPENPRI	OPENECON	OPENTAX	WAGES	TAXINV	CORR	LREER	LMSIZE2	LROAD
FDIGDP	1.0000	-0.059970	0.66714	-0.068220	0.64864	-0.31427	0.018528	-0.24971	0.18876	-0.11952	-0.16862	0.15428
OPENMAN	-0.059970	1.0000	-0.26605	0.73530	-0.00557	0.041289	-0.24926	-0.10639	0.72796	0.36542	0.20482	0.35187
OPENSEV	0.66714	-0.26605	1.0000	-0.42758	0.91335	-0.11751	-0.24906	0.47181	-0.0509	0.07078	-0.54638	0.0843
OPENPRI	-0.068220	0.73530	-0.42758	1.0000	-0.27487	-0.21884	-0.12914	0.13444	0.6085	0.26184	0.08828	0.30555
OPENECON	0.64864	-0.00557	0.91335	-0.27487	1.0000	-0.14187	-0.33747	-0.3252	0.1689	0.08872	-0.40641	0.40424
OPENTAX	-0.31427	0.041289	-0.11751	-0.21884	-0.14187	1.0000	-0.04794	-0.4520	0.0094	0.10611	-0.27983	0.0243
WAGES	0.018528	-0.24926	-0.24906	-0.12914	-0.33747	-0.047944	1.0000	0.40559	-0.4057	-0.38793	0.45988	-0.0335
TAXINV	-0.24971	-0.10639	-0.47181	0.13444	-0.32522	-0.45207	0.40559	1.0000	-0.0720	-0.39153	0.67180	0.26451
CORR	0.18876	0.72796	-0.05099	0.60854	0.16896	0.0094794	-0.40572	-0.0720	1.0000	0.06213	0.19911	0.31361
LREER	-0.11952	0.36542	0.070780	0.26184	0.088729	0.10611	-0.38793	-0.3915	0.0621	1.0000	-0.39779	0.19105
LMSIZE2	-0.16862	0.20482	-0.54638	0.088283	-0.40641	-0.27983	0.45988	0.67180	0.1991	-0.39779	1.0000	-0.0502
LROAD	0.15428	0.35187	0.084356	0.30555	0.40424	0.024368	-0.0335	0.26451	0.3136	0.19105	-0.05021	1.0000

Table 4
Regression results, 1980-2001, dependent variable FDI to GDP

	GMM estimates	GMM estimates	GMM estimates
Constant	−0.1301 (0.09208)	−0.0920 (0.01794)	7.4499 (8.187)
Openness	0.0315* (0.0111)	0.0335* (0.01299)	0.0539* (0.01714)
Investment tax	−0.0369* (0.0137)	−0.0429146 (0.01791)*	−0.0403572 (0.0154)*
Real exchange rate	−0.6396 (0.4705)*	−0.4507* (0.09869)	−2.7236 (2.084)*
Roads	0.5515* (0.0739)	0.556949* (0.09108)	0.229741 (0.3001)
Corruption	−0.3637* (0.1070)	−0.413875* (0.09272)	−0.1089 (0.2160)
Market size	0.4373* (0.1660)	0.412282* (0.07075)	0.5470 (0.1333)*
Wages	0.0001 (0.0001)	8.17951e-005 (5.949e-005)	−3.91218e-005 (0.0001)
Mena dummy	0.0833 (0.4148)		
SADC dummy		−0.367054 (0.2913)	
Political instability			−0.0812 (0.1299)

* 1% significance level, **5% significance level, *** 10% significance level