

What Drives Foreign Direct Investments in Africa? An Empirical Investigation with Panel Data

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Abstract

This paper analyses factors that drive Foreign Direct Investments (FDI) in Africa. To do so, for the first time in the literature, the paper uses five-year panel data with the system-GMM technique, over the period 1970-2009 including 53 African countries. The main results are as follows: (a) Larger countries attract more FDI. (b) However, regardless of their size, more open countries, politically stable countries and countries offering higher return to investment also attract FDI. (c) FDI inflows are persistent in Africa. This suggests that countries that manage to attract FDI today are likely to attract more FDI in the future.

Key words: FDI, Africa

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1. Introduction

In 1970 (the first year for which FDI data were available), the total amount of Foreign Direct Investments (henceforth, FDI) inflows in Africa was US\$1.26 billion, and it rose to US\$55.04 billion in 2010. Thus, between the two periods, FDI inflows have increased by 4,247%, and one can say that Africa has done well in attracting FDI. However, for a good assessment of the situation, it is better to put Africa's performance in relative perspective. Here the picture is different. Indeed, in 1970, Africa's share in the global FDI inflows was 9.5% and it dropped to 4.4% in 2010. Likewise, the share of Africa in developing countries' FDI inflows was 32.8% in 1970, and it dropped to 9.6% in 2010.¹

The aforementioned figures show that there is absolute progress but relative decline of Africa as far as FDI attractiveness is concerned. Thus, the question is why African countries fail to attract more FDI compared to the rest of the world. In other words, it is important to find out factors that drive or deter FDI in Africa. This is where this paper seeks to make a contribution.

The study of the drivers of FDI in Africa is important because FDI can play a fundamental role in the process of the continent's development. Indeed, FDI can stimulate domestic investment, facilitate technology transfer, create employment, promote exports and generate economic growth.² The role of FDI as a source of capital is particularly important to Africa, because FDI can fill the annual financings gap of US\$64 billion, or 12% of GDP that the continent needs to achieve the objective of halving poverty by 2015.³ Moreover, net official development assistance to Africa had declined from US\$17.8 billion in 1995 to US\$12.2 billion in 2000, a decrease of about 31% (World Bank, 2003). Net official development assistance will probably continue to decline given the recent global economic crisis, which reduces the capacity of developed countries to provide development assistance to developing world, including Africa. Thus, Africa needs to find other resources for financing its development, and FDI is one of those alternative financing sources.

Despite the importance of FDI for the development of Africa, few evidences exist on the determinants of FDI inflows in Africa. For instance, a search in Econlit reveals that about 10 papers have been published in economic journals on the determinants of FDI inflows in

¹ According to FDI data from the UNCTAD.

² See Mody and Murshid (2002) for a discussion on the relationship between domestic investment and FDI, De Mello (1997) for a survey on FDI and economic growth and Blomstorm and Koklo (1988) for a survey on FDI and technology spillovers to host countries.

³ From Asiedu (2004), reported from NEPAD declaration document.

Africa. Moreover, though the existing studies are important contributions to the literature, these papers present three main limitations, as discussed later in the paper. Thus, this paper seeks to make a contribution to the literature by analyzing factors that drive or deter FDI in Africa, whilst trying to deal with the limitations of the existing studies on the determinants of FDI inflows in Africa.

The rest of the paper is organised as follows. In the next section, I analyse the trend of FDI inflows in Africa and across African sub-regions over the period 1970-2009. Section 3 of the paper focuses on the review of empirical studies. In section 4, I present the econometric model and carry out the empirical analysis. Section 5 analyses the results of econometric regressions and section 6 concludes the paper.

2. Trends of FDI inflows in Africa and across Africa sub-regions

Over the period 1970-74, the average FDI inflows in Africa was US\$24.4 million, but it shrank to US\$22.6 million during the period 1975-79; probably, because of the effects of the 1970s' oil crises. From the period 1980-84 FDI inflows recovered and hit a record in 2005-09, when the average FDI inflows was US\$1.06 billion. Probably, in the absence of the

Table 1: Trends of FDI inflows in Africa and across African sub-regions over the period 1970-2009

	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09
	FDI inflows (million US\$)							
Africa	24.4	22.6	30.6	55.4	83.6	171	340	1,060
Sub-regions								
Central Africa	15.7	29.9	37.8	41.3	31.2	147	647	1,670
Eastern Africa	7.6	8.6	6.4	12.7	19.3	70.7	106	265
Northern Africa	35.1	26.3	74.4	224	278	392	807	3,420
Southern Africa	95.7	-11.8	62.6	-4.4	47.7	369	544	1,280
Westerns Africa	26.7	40.1	26.9	61.3	115	147	177	613

Note: Author's calculation based on FDI data from the UNCTAD (www.unctad.org/fdistatistics).

recent global economic crisis, Africa's average FDI inflows would have been higher during the last period. Though from the period 1980-84 FDI flows to Africa steadily increased, 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, and better economic performance that Africa experienced from mid-1990s.

The data also show that all the African sub-regions experienced an acceleration of FDI inflows from mid-1990s. Moreover, a detailed analysis at sub-regions level reveals that East Africa is the least performing sub-region in attracting FDI, for all the periods except in the period 1975-79 and 1985-89. For the latter two periods, Southern Africa was the least performing sub-region. The data show that until the 1980s, there was no single dominant sub-region in terms of FDI inflows. Indeed, from the 1980s, Northern Africa became the highest performing African sub-region in attracting FDI. However, in the early 1970s, Southern Africa was the highest performing sub-region, and in the second half of the 1970s; Western Africa was the leading sub-region as far as FDI attractiveness is concerned.

The trend of FDI inflows differs from one African sub-region to another. In Central Africa, the average FDI inflows was US\$15.7 million, one of the lowest average amounts of FDI inflows in the early 1970s. However, from the 1970s, the amount of FDI inflows steadily increased until early 1990s, when FDI inflows declined in Central Africa. 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 second half of the 1990s, there was recovery of FDI inflows in Central Africa, largely because of the beginning of oil production and mining extraction in a number of countries in the sub-region.

Regardless of the period considered, the performance of Eastern Africa is lower than the African average. The socialism political ideology and political instability that prevailed in most of the Eastern African countries did not favour the development of FDI in the sub-region. However, from the 1980s, FDI inflows steadily increased in Eastern Africa.

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 that Northern Africa is highly endowed in natural resources, one can expect that the sub-region will continue to attract a significant amount of FDI. Over the period of analysis, it is only during the period 1975-79 that FDI inflows declined in Northern Africa; probably, because of the effects of oil crises in the 1970s.

In Southern Africa, there were FDI outflows during the period 1975-79 and 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 the performance of Southern Africa was higher than the continent's average.

Starting in the period 1970-74 with an amount of US\$26.7 million, the average FDI inflows in the Western Africa sub-region rose to US\$40.1 million in the period 1975-79 before shrinking to US\$26.9 million in the early 1980s. From the period 1985-89, FDI inflows steadily increased and reached the amount of US\$613 million, an amount however lower than the continent's average in the period 2005-09. Western Africa would have performed better in the absence of civil wars and political instability that the sub-region experienced from the early 1980s. Indeed, Western Africa has a long history of FDI; in the period 1974-75, it was the highest performing African sub-region in attracting FDI. Recent developments in the sub-region suggest that the future performance of Western Africa is uncertain as far as FDI inflows are concerned. Indeed, while some countries like Senegal and Ghana with successful democratic transition send a good signal to foreign investors, other governments in the sub-region have to exert much more efforts to restore political stability in their countries.

3. Review of Empirical Literature

The review of literature is based on articles published in all economic journals found in the Econlit database. All the reviewed papers analyse factors that promote or impede FDI in Africa and/or in Sub-Saharan Africa (SSA).

Morisset (2000) is one of the pioneer authors who analyse factors that determine FDI flows to Africa. According to the author, African countries can also be successful in attracting FDI that is not based on natural resources or the size of local markets, by improving their business climate. Using FDI that does not arise from market size and the natural resources available in the host country as an indicator of the business climate for FDI, the paper finds that GDP growth rate and trade openness can be used to improve the business climate. The paper combines econometric and country analyses to identify factors that contribute to FDI attractiveness to Africa. The econometric analysis covers 29 SSA countries, with cross-sectional and panel data over the period 1990-1997.

In the same vein, Asiedu (2006) analyses the relative influence of natural resources and market size *vis-à-vis* government policy, host country's institutions and political instability in attracting FDI to SSA. The main result is that countries that are endowed with

natural resources or have large markets will attract more FDI. However, good infrastructure, an educated labour force, macroeconomic stability, openness to FDI, an efficient legal system, less corruption and political stability also promote FDI. According to the author, her findings suggest that small countries and/or countries that lack natural resources in the region can also attract FDI by improving their institutions and policy environment. The analysis utilises annual panel data for 22 countries in SSA over the period 1984-2000.

Asiedu (2002) explores whether factors that affect FDI in developing countries affect countries in SSA differently. The author finds that SSA is different from other developing regions as far as FDI attractiveness is concerned. Indeed, the paper finds that: (a) a higher return and better infrastructure have a positive effect on FDI to non-SSA but not to SSA; (b) trade openness promotes FDI in SSA and non-SSA countries, but the marginal effect of openness is lower for SSA. This is a cross-sectional analysis with data from 71 developing countries (32 SSA and 39 non-SSA countries), and the data are averaged over the 10-year period, 1989-1997.

In the same line with her 2002 paper, Asiedu (2004) analyses the relative performance of SSA compared to other developing regions in attracting FDI, as well as in improving the environment for FDI. The author argues that SSA's share of FDI to developing countries has declined over time, because of less attractiveness of SSA for FDI over time, relative to other developing regions. The main finding is that, with regard to FDI determinants, SSA's experience can be characterised as absolute progress but relative decline. Indeed, from 1980-89 to 1990-99, SSA has reformed its institutions, improved its infrastructure and liberalised its FDI regulatory framework. However, compared with other developing regions, the degree of changes in SSA has been meagre. The analysis focused on policy-related factors like openness to FDI, infrastructure and quality of institutions. This is not an econometric analysis, but a statistical analysis comparing the average performance of SSA to other developing regions.

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.

Lemi and Asefa (2002) examine the impact of economic and political uncertainty on FDI flows to African economies. Total FDI flows from all source countries, total U.S. FDI, U.S. manufacturing FDI, and U.S. nonmanufacturing FDI flows to sample host countries in Africa are analyzed. Generalized autoregressive heteroscedastic (GARCH) model is used to generate economic uncertainty indicators of the inflation rate and the real exchange rate. The results of the study are as follows: (a) The impact of uncertainty on the flows of FDI from all source countries is insignificant. (b) For aggregate U.S. FDI, economic and political uncertainties are not major concerns. (c) For U.S. manufacturing FDI, only political instability and government policy commitment are important factors, whereas for U.S. non-manufacturing FDI, economic uncertainties are the major impediments only when coupled with political instability and debt burden of host countries. Other economic factors such as labour, trade connection, size of export sector, external debt, and market size are also significant in affecting FDI flows to African economies. The period of analysis for the flows of FDI from all source countries is 1987-1999; whereas for U.S. FDI flows available data spans from 1989-1998. The analysis covers 32 African countries.

Yasin (2005) empirically investigates the relationship between official development assistances and FDI flows using panel data from 11 SSA countries for the period 1990-2003. The results show that bilateral official development assistance has a significant and positive effect on FDI flows. The results also show that trade openness, growth rate in the labour force, and exchange rates have a positive and significant effect on FDI. But multilateral development assistance, the growth rate in GDP per capita, the country's composite risk level, and the index for political freedom and civil liberties do not have a statistically significant effect on FDI.

Anyanwu (2012) analyses factors that influence FDI inflows in Africa. The paper finds that market size, openness to trade, rule of law, foreign aid, natural resources, and past FDI inflows have a positive effect on FDI inflows. However, higher financial development has a negative effect on FDI inflows. The paper also finds that East and Southern African sub-regions appear positively disposed to obtain higher levels of inward FDI. The paper uses cross-country data from 53 countries for the period 1996-2008.

Dupasquier and Osakwe (2006) examine the performance, promotion, and prospects for FDI in Africa. Factors such as 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. The paper emphasises the need for more trade and investment relations between Africa and Asia. It also argues that countries in the region should pay more attention to the improvement of relations with existing investors and offer them incentives to assist in marketing domestic investment opportunities to potential foreign investors. Finally, the paper emphasises the need for concerted efforts at the national, regional, and international levels in order to attract significant investment flows to Africa given the intensification of competition for FDI among developing countries.

The above reviewed papers are important contributions to the literature. However, these papers have three main limitations. First, most of the existing studies on FDI determinants in Africa use cross-sectional data and do not deal with endogeneity issues. However, with cross-sectional data, one cannot control for country and time fixed effects, which causes omitted variables bias and therefore, bias in the estimations. Second, most of the papers use data from the 1980s, 1990s and early 2000s. By doing so, the existing studies do not cover early or latest years; thus, they do not provide comprehensive time coverage for the analysis. The exceptions are Bende-Nabende (2002) who uses data going back to the 1970s, but the year 2000 is the latest year covered by the study; and Anyanwu (2012) who uses data spanning to the year 2008, but 1996 is the earliest year covered by the study. 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. Third, the existing papers are not comprehensive in the sense that they cover few African countries (except Anyanwu, 2012). Indeed, in the other cases, the number of countries included in the studies ranges between 11 and 32.

This paper contributes to the literature by analysing factors that drive FDI flows, whilst seeking to find solutions to the limitations of the existing papers. To deal with the first limitation, I use panel data with the system-GMM technique, which allows controlling for country and time fixed effects whilst correcting for the endogeneity of the explanatory variables. The review of literature shows that, this would be the first paper that uses the system-GMM technique to analyse the determinants of FDI inflows in Africa. To deal with the second limitation, I use FDI inflows data over the period 1970-2009. As highlighted by the review of literature, this would be the first paper that uses FDI data over such a long period. This paper uses FDI data from 53 African countries, which allows a comprehensive analysis of the determinants of FDI flows to Africa.

4. Empirical analysis

According to the OLI paradigm, three advantages can explain why multinational enterprises (MNEs) invest outside their home countries, or why FDI occur (Dunning, 2001). These are ownership, locational and internalisation advantages, giving the name to the OLI paradigm.

The *ownership advantages* are specific to the firms, and are advantages to overcome the extra costs of operating in a different or less familiar environment. These advantages are costly to generate, but can be transferred from one location to another at low cost. Examples of ownership advantages are firm-specific technology, brand names, managerial skills that enable MNEs to operate competitively with local enterprises in less favourable environment to MNEs. The *locational advantages* are specific to the locations or countries where FDI occur. These are advantages that make a country or a location attractive for FDI. The locational advantages can be economic, political or social country-specific factors that attract FDI to a country. Some locational advantages are controllable by policy makers, i.e., policy makers can influence those factors in order to improve their countries' attractiveness to FDI. Examples of "controllable" locational advantages are good infrastructure, well educated population, macroeconomic stability, political stability, just to cite a few. Other locational advantages are not controllable by policy makers; an example is natural resources endowment. The *internalisation advantages* are advantages that justify why MNEs decide to internalise their ownership advantages directly by investing instead of selling them to other firms. The internalisation advantages can explain vertical FDI, where a production process or function is located abroad by MNEs to serve its production system, instead of subcontracting to independent suppliers.

4.1 Model specification and sources of the data

The OLI paradigm highlights that firms specific advantages and country specific advantages can explain why FDI occur or do not occur. Based on the OLI paradigm, this paper's empirical analysis focuses on locational advantages, and more specifically, on the locational advantages that are controllable by policy makers. By doing so, it is possible to highlight African countries' specific advantages that can be influenced by policy makers to attract more FDI to the continent. Thus, I estimate the following model:

$$(FDI/GDP)_{it} = c + \alpha(FDI/GDP)_{it-1} + \beta X_{it} + u_i + v_t + \varepsilon_{it} \quad (1)$$

The explained variable is net FDI inflows as a percentage of GDP; this is a commonly used indicator in empirical studies on the determinants of FDI inflows. More specifically, data on FDI inflows measure the amount of investment by non-resident investors with a minimum of 10% of companies' shares. Net FDI inflows are the sum of new capital invested, profits reinvested, and inter-enterprises capital invested, all corrected from transfers of capital in the home countries of foreign investors and the reimbursements of debt. FDI data are from the UNCTAD database.

The first explanatory variable is five-year lagged FDI inflows as a percentage of GDP. Because of the agglomeration effect, I expect a positive and significant effect of the lagged FDI inflows on current FDI inflows. The intuition is that because of information and knowledge sharing, the presence of FDI in a country will attract more FDI flows from the same home country or other countries. In addition, the use of lagged-value of FDI inflows as an explanatory variable allows controlling for initial conditions, like for instance the presence of natural resources that may attract FDI to a country.

The list of explanatory variables includes \mathbf{X} , which stands for a matrix of other potential factors that can attract or deter FDI in a country. The \mathbf{X} vector comprises the following policy-related variables.

Trade openness. The effect of trade openness on FDI inflows depends on the type of FDI. When a country receives market-seeking FDI, i.e. when foreign firms aimed at serving local market, trade openness may reduce FDI inflows. The reason is the “tariff jumping” theory, which argues that multinational firms that seek to serve local markets may decide to set up subsidiaries in the host country when it is difficult to import their products in that country. In contrast, multinational firms that are engaged in export-oriented activities may prefer to locate in a more open economy, since trade protectionism may increase transaction costs; thereby, reducing economic competitiveness and exports. Thus, the effect of trade openness on FDI inflows is ambiguous. However, several authors have found that countries that are more engaged in international trade, i.e. more open countries receive more FDI (see Asiedu, 2002; Noorbakhsh et al., 2001; Morrisset, 2000; Aizenman and Noy, 2006).

As an indicator for trade openness, I use the sum of exports and imports as a percentage of GDP; this is a commonly used indicator for trade openness in the literature.

Infrastructure Development. Several studies highlight the role of physical infrastructure in economic growth and development (see the World Bank, 1994; Temple

1999; Demurger, 2001; Willoughby, 2003). Beyond its direct effect on economic growth, good infrastructure may also affect economic growth by increasing the productivity of investment and stimulates investment, either foreign or domestic. Empirically, Wheeler and Mody (1992) find that good infrastructure is an important factor for developing countries seeking to attract FDI from the United States. In a cross-sectional study, Loree and Guisinger (1995) find that countries with developed infrastructure receive more FDI from the United States than countries with less developed infrastructure. Other authors have also found a positive effect of infrastructure on FDI (see Kumar, 2001; Asiedu, 2002; Kinda, 2010; Ngowi, 2001; Jenkins and Thomas, 2002).

As a proxy for available physical infrastructure, I use the natural logarithm of the sum of the number of mobile phone and telephone lines per 100 people, and I expect a positive effect of this variable on FDI inflows.⁴

Macroeconomic stability. Macroeconomic stability is generally cited as one of the factors that MNEs consider when deciding to locate in developing countries. For instance, Asiedu (2006) reviews the results of four surveys on business environment and finds that macroeconomic instability is cited as one of the deterrents to FDI in Africa. High inflation rate is a sign of macroeconomic instability and a source of uncertainty in the economy. High inflation rate may create uncertain economic environment and makes it difficult for economic agents to extract correct signals from relative prices (Barro, 1976 and 1980). By creating uncertain economic environment, high inflation rate reduces the expected return to investment and so the volume of investment. Empirically, Asiedu (2006) finds that African countries with high inflation rate less attract FDI. Based on case studies relating to seven African countries that had attracted a significant amount of FDI, Basu and Srinivasan (2002) conclude that macroeconomic stability was one of the factors that rendered these countries more attractive to FDI. Likewise, Braga de Macedo et al. (2009) assess the determinants of Chinese direct investment in Africa compared with those of global FDI. They find that macroeconomic stability (measured by low inflation rate) is positively correlated with Chinese and global FDI in Africa.

⁴ Another proxy for physical infrastructure could be electric power production or the number of paved roads. However, these alternative proxies for physical infrastructure are not available for most of the countries and for a large part of the analysis period. Moreover, instead of analysing only the effect of infrastructure availability, the analysis could also consider the quality of infrastructure. However, because of data availability constraint; this cannot be done.

As a measurement for inflation rate, I use the annual growth rate of consumer price index. To correct for the effect outlier observations, I use the following variable: $\log(1 + \text{inflation rate})$. I expect a negative effect of inflation rate on FDI inflows.

Political Stability. Political instability can be harmful for investment and for a country's economic performance broadly speaking. It is not surprising that a country's level of political stability is one of the factors that firms' executive directors consider when making decision for the location and the amount of investment (see for example Asiedu, 2006). Indeed, political instability entails uncertainty when it induces change of policy makers and economic policies. For instance, when following a political regime change, there is repudiation of former contracts with foreign firms, the risk of expropriation increases, which reduces the volume of FDI. Likewise, political instability in the form of civil war can destroy a country's physical and human capital infrastructure, which is deterrent to the productivity of investment. Empirically, Asiedu (2006) finds that political instability negatively affects FDI inflows in Africa. In the same vein, Woodward and Rolfe (1993) find that political stability increases the probability that a country is selected as an investment location. Similar results have been found by Globerman and Shapiro (2003) and Li (2006).

For the empirical analysis, I use the political risk index from the International Country Risk Guide (ICRG). The political risk index is a composite index of twelve different components. The index ranges between 0% and 100%, the higher the index, the lower the country's level of political risk.⁵

Return to investment. By definition, FDI activities should be profitable; therefore, FDI will go to countries that pay higher return to capital. The intuition is clear but testing it can be problematic, especially in Africa where most of the countries do not have well-functioning capital markets, making it difficult to measure the return on capital. As a proxy for the return to investment, I use the inverse of natural logarithm of real GDP per capita and I expect a positive effect of this variable on FDI inflows. Indeed, since capital-scarce countries tend to be poor; this implies that investment in countries with a higher income per capita would yield lower return to investment, which suggests a positive link between the inverse of real GDP per capita and FDI inflows. The inverse of real GDP per capita has also been used as a proxy for the return to investment by Asiedu (2002), Jaspersen *et al.* (2000),

⁵ More details on political risk index can be found from the following website link: http://www.prsgroup.com/ICRG_Methodology.aspx#PolRiskRating.

and Edwards (1990). I use GDP per capita (constant 2000 US\$) as a measurement for real income per capita.

Size of host countries' domestic markets. Countries with larger domestic markets are likely to attract more FDI, especially when FDI inflows aim at serving domestic market. Thus, one can expect a positive link between the size of domestic market and FDI inflows. As a proxy for domestic market, I use the natural logarithm of a country's population size.

All the explanatory variables except the political stability are from the World Bank, 2012 World Development Indicators. As outlined before, my objective is to focus on "controllable factors", which means I focus my analysis on factors that can be influenced by policy makers in order to attract more FDI to their countries. However, given the techniques of estimation that I use, the risk of bias in the estimation would be minimized. Moreover, later on, for robustness checks, I also examine the effect of natural resources on FDI inflows.

4.2 Methods of econometric estimation

As outlined in equation (1), I use panel data whilst controlling for country and time fixed effects. More specifically, I use non-overlapping five-year averages panel data to run regressions. The use of five-year averages data allows smoothing fluctuations in FDI data. By controlling for country and time fixed effects, I reduce omitted variables bias and thus endogeneity bias in the estimations. Indeed, some unobservable factors, like ideological values can affect FDI flows; however, without controlling for country fixed effects it would not be possible to consider the effects of those factors despite their importance. On the other hand, time fixed effects enable to control for the effects of events that determine FDI flows simultaneously in several countries. An example of such event is oil crises in the 1970s, or debt crisis in the 1980s, or the recent global crisis.

The use of time and country fixed effects can reduce omitted variables bias. However, this may not be enough to deal properly with endogeneity issues, especially in a dynamic panel model that includes lagged value of the dependent variable in the list of independent variables, as it is the case in this paper. Such a model suffers from endogeneity bias, especially when the time dimension of the panel data is short (Nickell, 1981). Moreover, some variables like trade openness for instance, may have a bidirectional relation with FDI; thereby, causing bias in the econometric estimations (see Aizenman and Noy, 2006). To deal with this situation, I use the system-GMM technique, proposed by Blundell and Bond (1998). This technique has been proved more efficient in estimating a dynamic panel model, and it

has an additional advantage of dealing with the endogeneity of all the explanatory variables by using their lagged values (in level and in first difference) as instrumental variables.

This paper uses five-year panel data from 53 African countries over the period 1970-2009. However, some of the variables, like the political stability index for instance, is not available for all the period of analysis; therefore, I use unbalanced panel data. I use two econometric techniques to run regressions: the fixed effects model, and the system-GMM technique. However, my comments will focus on the results found with the system-GMM technique because those results are corrected from endogeneity bias and thus, are more convincing.

5. Results

According to the results in Table 2, in the system-GMM model, five variables are positively and significantly linked with FDI inflows. The fixed effects model confirms this result except that in the latter model, the lagged FDI inflows is not significant, though it has a positive effect on FDI inflows, as expected. Moreover, the Hansen-Sargan test shows that the lagged-values of the endogenous variables used as instruments are valid.

In the system-GMM model, the coefficient associated with the lagged-value of FDI inflows is positive and significant at the 1% level. The result shows that a one percentage point increase in the lagged value will increase the ratio of FDI inflows to GDP by 0.5 points. The coefficient associated with lagged FDI inflows indicates that FDI are persistent in Africa. This result also reveals the existence of agglomeration effect in FDI activities, and it suggests that the presence of FDI in a country today will attract more FDI to that country in the future.

The coefficient associated with trade openness is positive and significant at the 5% level. According to the result, a 10 percentage point increase in trade openness will increase the ratio of FDI to GDP by 0.01 points. This result suggests that trade openness is a catalyst factor for the improvement of African countries' attractiveness to FDI.

The results in Table 2 also show that more politically stable African countries attract more FDI. More specifically, according to the result, a 10 percentage point increase in the political stability index will increase FDI inflows as a percentage of GDP by 0.01 points. Thus, political stability has a similar effect as trade openness on FDI inflows in Africa. This suggests that in their efforts to attract FDI, African governments should give the same weight to political stability as they give to trade openness.

The coefficient associated with the natural logarithm of population is positive and significant at the 5% level. This suggests that larger countries or countries with larger domestic markets attract more FDI. More specifically, according to the result, a doubling in the domestic markets size (approximated by the size of population) will increase the ratio of FDI inflows to GDP by 1.3 points.

Table 2: Baseline results

VARIABLES	(1) FDI inflows (%GDP) <i>Fixed Effect</i>	(2) FDI inflows (%GDP) <i>System-GMM</i>
Five-year lagged FDI inflows	0.244 (1.47)	0.465*** (4.08)
Trade openness	0.0006*** (2.97)	0.001** (2.57)
Log(1 + inflation rate)	-0.002 (0.65)	-0.0004 (0.07)
Political stability	0.0005** (2.15)	0.001** (2.09)
Infrastructure	0.002 (0.47)	0.004 (0.40)
Market size = log (population)	0.085** (2.57)	0.013** (2.30)
ROI ¹ = 1/[log (GDP per capita)]	5.325*** (2.91)	8.147** (2.40)
Constant	-1.462*** (2.66)	-0.359*** (3.02)
Observations	180	180
R-squared (adjusted)	0.73	-
Number of countries	36	36
Sargan-Hansen test ²	-	0.138
AR(1) ³	-	0.033
AR(2) ³	-	0.123

Note: ***, **, * denote significant coefficients at 1%, 5% and 10% level. The figures in brackets are robust t-student. All the estimations include time fixed effects whose coefficients are not reported.

1/ Stands for return on investment.

2/ Stands for the p-values associated with the Sargan-Hansen test. The p-values show that the lagged values of the endogenous variables that I use as instruments in the system-GMM model are good.

3/ Stands for the p-values associated with the test of absence of autocorrelation of second order. The result shows that there is no such autocorrelation in the data; thereby, validating the use of lagged variables of a minimum of two periods as instruments in the system-GMM model.

According to the results in Table 2, African countries that offer higher return to investment attract more FDI. In that sense, Africa is not different from the rest of the world. Indeed, regardless of the world's region, investments are supposed to rise where they are profitable. The coefficient associated with the return on investment (approximated by the inverse of the natural logarithm of real GDP per capita) is positive and significant at the 5% level. More specifically, the result suggests that a one percentage increase in the return to

investment will increase FDI inflows as a percentage of GDP by 8 points in Africa. This is higher than the sample mean value of the ratio of FDI inflows to GDP (2.7%, see appendix).

5.1 Robustness checks

The basic results show that five variables positively and significantly affect FDI inflows in Africa. Those variables are: lagged FDI inflows, trade openness, political stability, market size, and the return to investment. The question is whether or not these results are robust. I run some robustness checks.

Table 3: Robustness check after controlling for natural resources endowment

VARIABLES	(1) FDI inflows (%GDP) <i>Fixed Effect</i>	(2) FDI inflows (%GDP) <i>System-GMM</i>
Five-year lagged FDI inflows	0.188 (1.18)	0.495 (3.71)***
Trade openness	0.0004 (2.39)**	0.001 (2.18)**
Inflation rate	-0.001 (0.34)	0.004 (0.91)
Political stability	0.0006 (2.64)***	0.002 (2.01)**
Infrastructure	0.003 (0.69)	0.004 (0.39)
Market size = log (population)	0.083 (2.34)**	0.012 (1.95)**
ROI ¹ = 1/[log (GDP per capita)]	3.990 (2.29)**	7.113 (2.32)***
Natural resources rent (% GDP)	0.001 (1.76)*	0.001 (1.72)*
Constant	-1.450 (2.44)**	-0.363 (2.72)***
Observations	180	180
R-squared (adjusted)	0.74	-
Number of countries	36	36
Sargan-Hansen test ²	-	0.268
AR(1) ³	-	0.046
AR(2) ³	-	0.147

Note: ***, **, * denote significant coefficients at 1%, 5% and 10% level. The figures in brackets are robust t-student. All the estimations include time fixed effects whose coefficients are not reported.

1/ Stands for return on investment.

2/ Stands for the p-values associated with the Sargan-Hansen test. The p-values show that the lagged values of the endogenous variables that I use as instruments in the system-GMM model are good.

3/ Stands for the p-values associated with the test of absence of autocorrelation of second order. The result shows that there is no such autocorrelation in the data; thereby, validating the use of lagged variables of a minimum of two periods as instruments in the system-GMM model.

In this paper, I made the choice to focus on policy-related factors for the analysis of the drivers of FDI to Africa. Thus, in the baseline model I did not control for the effect of natural resources endowment. However, given the importance of natural resources in the attractiveness of FDI to Africa, it is possible to suspect that the results may be driven by the absence of natural resources in the list of explanatory variables. To deal with this situation, as a first robustness check, I run regressions whilst controlling for the effect of natural resources endowment. As a proxy for natural resources endowment, I use the total natural resources rent as a percentage of GDP. This variable is from the World Bank, 2012 World Development Indicators. As we can see from Table 3, natural resources have a positive and significant effect on FDI inflows in Africa, but controlling for natural resources does not call into question the results that I initially found.

The results of the rest of robustness checks are reported in the appendix. The second robustness check that I carry out consists of running regressions with a sub-sample of SSA countries. By doing so, it is possible to check whether or not the results are also valid in the sub-sample of SSA countries.⁶ As one can see, the results with the sub-sample of SSA countries are qualitatively similar to those that I initially found. In other words, in the sub-sample of SSA countries, lagged FDI inflows, trade openness, political stability, market size, and the return to investment positively and significantly affect FDI inflows.

The analysis of the trend of FDI shows that from the 1980s, FDI inflows steadily increase in Africa. Thus, it is important to check whether or not the results will change if the analysis focuses only on the period during which the continent experienced a steady increase in FDI inflows. To do so, I run regressions with data covering the period 1980-2009 only. Table A3 shows qualitatively similar results with data over the period 1980-2009, like those I found with data over the period 1970-2009. Thus, the results do not change with the period of analysis.

Instead of the period 1980-2009, I run regressions with data over the period 1995-2009. Indeed, the analysis of FDI trend shows that during the period 1995-2009, the increase in FDI inflows has accelerated in Africa. Thus, it is important to check whether or not the five variables have the same effects on FDI inflows during the period of FDI acceleration. The results in the appendix show that with data over the period 1995-2009, lagged FDI

⁶ SSA countries are the 53 African countries excluded the following six countries that are considered Middle East and Northern African countries according to the World Bank country classification: Algeria, Djibouti, Egypt, Libya, Morocco and Tunisia.

inflows, trade openness, political stability, market size, and the return to investment have positive and significant effects on FDI inflows. This confirms the results that I initially found.

6. Conclusion

In this paper I analyse factors that drive FDI flows to Africa. For the first time in the literature, I use five-year panel data over the period 1970-2009 with the system-GMM technique including 53 African countries. The analysis focuses on policy-related factors, i.e. factors that policy makers can influence to attract more FDI to their countries. The results show that five variables are significantly and positively linked with FDI inflows. These variables are: lagged FDI inflows, trade openness, political stability, market size, and the return to investment.

Based on the findings of the paper, three policy stances can be suggested for the efforts that African policy makers can do to improve the continent's attractiveness to FDI. Firstly, the fact that lagged FDI inflows have a positive and significant effect on current FDI inflows indicates the persistence of FDI and the existence of agglomeration effects in FDI activities in Africa. This suggests that the presence of FDI today in a country will attract more FDI to that country in the future. Thus, African governments need to collaborate with existing foreign investors in their countries in order to promote their countries to other potential investors. For instance, country promotion trips can be organised between government officials and existing foreign investors. Thus, African countries should avoid mistreating traditional western foreign investors because of the arrival of new potential investors from China or other southern emerging countries. An appropriate strategy would be to work hand in hand with existing investors for the promotion of African countries. By doing so, it is possible to change the perceptions about Africa and new foreign investors will consider the continent as a destination for their investments.

Secondly, this paper highlights the need to strengthen regional integration in Africa because regional integration can boost some of the factors that contribute to the development of FDI in Africa. Indeed, the paper finds that larger countries, more open countries and more politically stable countries attract more FDI. It is important to note that regional integration can boost each of these three factors. Indeed, regional integration creates larger domestic markets, stimulates trade and thereby can contribute to FDI attractiveness to the continent. Regional integration can also contribute to ensure political stability across the continent.

Thus, this paper's findings suggest that African countries can use regional integration to attract FDI because regional integration can increase trade openness, enlarge the size of domestic markets, and generate more political stability.

Thirdly, the paper highlights the need to improve the return to investment in Africa. By doing so, African countries can attract more FDI. It is true that by international standards, the return to investment is higher in Africa. However, African countries should strive maintaining and improving the return to investment, because of fierce competition among developing countries for the attractiveness of FDI. To improve the return to investment, African countries should increase the quantity as well as the quality of physical infrastructure. Likewise, the skills of labour force should be improved. Unskilled labour force and poor infrastructure hamper the return to investment in Africa. Thus, by finding solutions to poor infrastructure and unskilled labour force, the return to investment will rise and investors will seize the opportunity to increase their investments in Africa.

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Appendix

Table A1: Statistical description of the main variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
FDI inflows (% GDP)	377	2.8	5	-4.9	38
Five-Year Lagged FDI inflows (% GDP)	325	2.3	4.6	-4.9	38
Trade openness (% GDP)	374	78.61	36	12.9	224.2
Log (1 + Inflation rate)	325	0.160	0.409	-0.316	4.466
Political stability	209	52.8	12.1	15.3	78.7
Infrastructure	400	6.9	16.4	0.02	122.4
Log (population)	424	15.3	1.6	10.9	18.8
Domestic market size	370	0.002	0.002	0.0001	0.01

List of the countries

Countries included in the analysis are indicated below. Countries marked with one star are not sub-Saharan African countries and are considered as Middle East and Northern African countries according to the World Bank's country classification. Thus, in this paper by African countries, we mean sub-Saharan countries and the 6 other non-sub-Saharan African countries.

Algeria*, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Dem. Rep., Congo, Rep., Cote d'Ivoire, Djibouti*, Equatorial Guinea, Egypt*, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Indonesia, Kenya, Korea, Rep., Lesotho, Liberia, Libya*, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Morocco*, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Singapore, Somalia, South Africa, Sudan, Swaziland, Tanzania, Thailand, Togo, Tunisia*, Uganda, Zambia, Zimbabwe.

Table A2: Robustness check excluding Northern African countries from the sample

VARIABLES	(1)	(2)
	FDI inflows (%GDP) <i>Fixed Effect</i>	FDI inflows (%GDP) <i>System-GMM</i>
Five-year lagged FDI inflows	0.252 (1.44)	0.489*** (4.92)
Trade openness	0.0006*** (2.80)	0.001** (2.51)
Inflation rate	-0.001 (0.31)	-0.0002 (0.04)
Political stability	0.001** (1.96)	0.001* (1.79)
Infrastructure	0.002 (0.38)	-0.0003 (0.02)
Market size = log (population)	0.106** (1.96)	0.010* (1.85)
ROI ¹ = 1/[log (GDP per capita)]	5.934*** (2.96)	7.720** (1.93)
Constant	-1.815** (2.06)	-0.309** (2.32)
Observations	147	147
R-squared (adjusted)	0.73	-
Number of countries	30	30
Sargan-Hansen test ²	-	0.411
AR(1) ³	-	0.061
AR(2) ³	-	0.107

Note: ***, **, * denote significant coefficients at 1%, 5% and 10% level. The figures in brackets are robust t-student. All the estimations include time fixed effects whose coefficients are not reported.

1/ Stands for return on investment.

2/ Stands for the p-values associated with the Sargan-Hansen test. The p-values show that the lagged values of the endogenous variables that I use as instruments in the system-GMM model are good.

3/ Stands for the p-values associated with the test of absence of autocorrelation of second order. The result shows that there is no such autocorrelation in the data; thereby, validating the use of lagged variables of a minimum of two periods as instruments in the system-GMM model.

Table A3: Robustness check with data over the period 1980-2009

VARIABLES	(1) FDI inflows (%GDP) <i>Fixed Effect</i>	(2) FDI inflows (%GDP) <i>System-GMM</i>
Five-year lagged FDI inflows	0.244 (1.47)	0.465*** (4.08)
Trade openness	0.0006*** (2.97)	0.001** (2.57)
Inflation rate	-0.002 (0.65)	-0.0004 (0.07)
Political stability	0.0005** (2.15)	0.001** (2.09)
Infrastructure	0.002 (0.47)	0.004 (0.40)
Market size = log (population)	0.085** (2.57)	0.012** (2.30)
ROI ¹ = 1/[log (GDP per capita)]	5.325*** (2.91)	8.147** (2.40)
Constant	-1.462*** (2.66)	-0.359** (3.07)
Observations	180	180
R-squared (adjusted)	0.73	-
Number of countries	36	36
Sargan-Hansen test ²	-	0.138
AR(1) ³	-	0.033
AR(2) ³	-	0.123

Note: ***, **, * denote significant coefficients at 1%, 5% and 10% level. The figures in brackets are robust t-student. All the estimations include time fixed effects whose coefficients are not reported.

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3/ Stands for the p-values associated with the test of absence of autocorrelation of second order. The result shows that there is no such autocorrelation in the data; thereby, validating the use of lagged variables of a minimum of two periods as instruments in the system-GMM model.

Table A4: Robustness check with data over the period 1995-2009

VARIABLES	(1) FDI inflows (%GDP) <i>Fixed Effect</i>	(2) FDI inflows (%GDP) <i>System-GMM</i>
Five-year lagged FDI inflows	-0.178 (0.88)	0.455*** (3.71)
Trade openness	-0.0001 (0.30)	0.001*** (2.88)
Inflation rate	-0.007 (0.88)	-0.004 (0.42)
Political stability	0.001* (1.75)	0.001** (2.17)
Infrastructure	-0.008 (0.85)	-0.002 (0.12)
Market size = log (population)	0.208* (1.88)	0.012** (2.22)
ROI ¹ = 1/[log (GDP per capita)]	16.452** (2.62)	7.859** (2.24)
Constant	-3.47** (1.90)	-0.364*** (3.25)
Observations	101	101
R-squared (adjusted)	0.78	-
Number of countries	36	36
Sargan-Hansen test ²	-	0.268
AR(1) ³	-	0.052
AR(2) ³	-	0.127

Note: ***, **, * denote significant coefficients at 1%, 5% and 10% level. The figures in brackets are robust t-student. All the estimations include time fixed effects whose coefficients are not reported.

1/ Stands for return on investment.

2/ Stands for the p-values associated with the Sargan-Hansen test. The p-values show that the lagged values of the endogenous variables that I use as instruments in the system-GMM model are good.

3/ Stands for the p-values associated with the test of absence of autocorrelation of second order. The result shows that there is no such autocorrelation in the data; thereby, validating the use of lagged variables of a minimum of two periods as instruments in the system-GMM model.