Governance and Foreign Direct Investment : A comparative Analysis between Low and Middle Income African Countries

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Abstract

This paper investigates the effect of governance on FDI on a sample of 41 African countries: 20 low income countries and 21 middle income countries, over the period of 1996-2013.Our study moves from an aggregated analysis to a disaggregated analysis by applying the system generalized method of moments (System-GMM). The aggregated approach consists to use a composite institutional quality index, which includes the six dimensions of governance to identify the overall impact of governance on FDI inflows. While, the iterative approach examines the effect of the six dimensions of governance on FDI. Our results indicate that good governance is a deterministic condition in attractiveness of FDI in African economies.

1.Introduction

Foreign direct investment plays a crucial role in a country's development and poverty reduction. Indeed, it is considered as an engine of economic growth because it is a source of capital and serves to create jobs. With the phenomenon of financial liberalization in the 1980s, FDI flows to the developing countries have considerably grown considerably. However, competition for FDI is strong as both advanced and developing countries opted for faster economic growth. In this context, Africa registered a remarkable increase in FDI inflows in 2013, reaching $ 57 billion, an increase of 4% compared to 2012. This increase was recorded in the main countries of Eastern and Southern Africa. Indeed, the inflow of FDI doubled in Southern Africa to reach $ 13 billion, besides, the main countries that attracted most FDI were South Africa and Mozambique.

Actually, these two countries attracted a significant share of FDI through the development of infrastructure and gas sectors, while East Africa attracted only $ 6.2 billion, an increase by 15% during 2012. Most of the inward FDI in this sub-region was directed to Kenya and Ethiopia. For instance, in Kenya, the investors were attracted mainly by the natural resources of this country (gas and oil) as well as by the manufacturing and transport sectors which are certainly important in this country. However, the inflow of FDI in North Africa declined by 7% to reach $ 15 billion. In addition, FDI inflows in Central and East Africa decreased by 8 and $ 14 billion, respectively. This decline is due to both political instability and the lack of security. On the other hand, inequality, in terms of foreign direct investment, led researchers to wonder about the main factors that explain the attractiveness of FDI.

 Although the previous literature is abundant on the determinants that are likely to attract FDI, the results are in most cases unconvincing and depend on the adopted methodology or the used sample. Indeed, Ayachi and Berthomieu (2006) analyzed the determinants of FDI in the MEDA region on a sample of 10 countries over the period from 1990 to 2002. They concluded that the political infrastructure (governance), physical infrastructure, market size, agglomeration between firms and distance are the main determinants of FDI in Europe. For their part, Alaya et al. (2007) suggested that FDI depends on several factors, namely industrial factors (transport, implementation, and production costs, as well as the technological advantage and the agglomeration of activities), commercial factors (market size, proximity to demand, barriers to trade) and institutional factors (tax or trade policy, country's risk and statutory provision for repatriation of capital). On the other hand, Mazbahul and Tanin (2010) examined the main determinants of FDI location in Bangladesh over the period from 1975 to 2006.They found that the degree of openness, the exchange rate and the infrastructure positively affected FDI in this country. As for Jadhav (2012), he studied the role of economic, institutional, and political factors in attracting FDI into the BRICS countries using the panel data approach over a period from 2000 to 2009. The results indicate that market size, trade openness and the rule of law play an important role in attracting FDI to the BRICS countries, while the availability of natural resources has a negative impact on FDI inflows, which implies that FDI in the BRICS countries is largely market-oriented. Similarly, Jadhav and Katti (2012) found that government efficiency and the quality of regulation have a positive effect on FDI inflows while political instability, voice and accountability, and the control of corruption have a negative effect on FDI inflows into the BRICS countries. Moreover, Sayed Mohammed Alavisab (2013) analyzed the economic determinants of FDI in Iran over the period from 1991 to 2009. The empirical results suggest that the economic factors that attract

FDI are: the real GDP growth, the share of imports into GDP and the return on investment and infrastructure. This divergence of empirical results drives us to focus our attention on the most relevant determinants of foreign direct investment, while emphasizing the role of the institutional environment in attracting FDI in African countries and sub-regions(low-income African countries and middle income Africa). For econometric analysis, the present study employs system GMM (Arellano-Bover/Blundel-Bond) to deal with endogeneity problem, omission of relevant variables , measurement error.

Our contribution consists firstly to construct a synthetic index that encompasses the various of measures of governance indicators weighted by their contribution to explaining of total inertia using a Principal Component Analysis (PCA). Due to the existence of hight correlation between the overall dimensions of institutional quality(Globerman and Shapiro (2002) and Buchanan et al(2012)), most of the papers in the literature use only one aspect or a set of institutional quality. Secondly, our interest is to individualize the effect of governance, measured using different dimensions developed by Kaufmann et al. (2010), on the attractiveness of foreign direct investment that have not the subject of previous studies. In other words, the iterative approach makes it possible to determine which dimension is the origin of the attractiveness of FDI. Our study differs from previous work in the sense that we conduct cross-sectional regressions for the cases of countries belonging to the same region, unlike the majority of studies that take the form of time series or panel data, or cross section (different regions). The implication of this study will not only provide the appropriate policy mix that would aim to increase the attractiveness of Foreign Direct Investment in the African region and these sub-regions, but also to identify which of governance indicators is associated with attractiviness of FDI in the region.

The rest of the study is structured as follows: the second section presents the review of the theoretical literature. The third section presents the econometric model and the main results. Finally, we finish this work with a conclusion and some political implications.

2.Review of the theoretical literature

To be able to explain the differences in the levels of FDI flows between countries and why investors choose to locate in such a country and not in another, it is obvious to examine the main determinants of the FDI location. The economic literature in this theme cited two major families of the determinants of FDI namely: traditional determinants that are related to the characteristics of the economy in general and non-traditional determinants that are related to institutions of the host countries. Regarding the traditional factors, several empirical studies analyzed the effects of the various economic factors on the attractiveness of FDI (Root and

Ahmed 1979, Lee and Tan 2006, Wheeler and Mody 1992, Dunning and Narula 1996 and UNCTAD 2006). Other studies that the market size, the key resource endowments and the efficiency factor are the main determinants of FDI (Dunning 1998a, b, Stoian and Filippaios 2008).

Similarly, Stoian and Filippaios (2008) and Jensen (2006) found that the market potential measured by GDP growth, infrastructure in the host country, trade openness and macroeconomic stability and the quality of work are as determinants of FDI. In the same direction of research, Dupasquier and Osakwe (2006) and Deichmann et al (2003) showed that the existence of natural resources has a positive effect on the flow of FDI. In addition, Mohamed and Sidiropoulos (2010) found that the main determinants of FDI flows into the MENA region are the natural resources, the size of the host countries, the size of the government, and the institutions. In addition, other studies linked the financial development with FDI. They found that financial system development favors the attraction of FDI (Deichmann et al., 2003, Jenkins and Thomas 2002 and Kinda 2009). Other recent studies showed the need to improve and strengthen the benefits in the host countries through the attractive role played by the governments of these countries. Thus, the debate on the location choice shifted towards the government policies, that is, towards the role of the quality of institutions other than the economic factors as an important determinant of FDI.

In this context, several empirical studies examined the role of institutions in the attractiveness of FDI. The literature on this issue can be divided into three groups: The first group focuses mainly on the effect of a specific institutional dimension, such as corruption and the political regime on FDI. For example, Wei's (2000) study showed that corruption has a negative impact on the location preferences of multinational firms. Indeed, corruption increases the costs of doing business and also uncertainty. Similarly, the work of Habib and Zurawicki (2002) and Voyer and Beamish (2004) lead to the same result as the one found by Wei (2000).

 In addition, the work of Jensen (2003) and Ahlquist (2006) showed that countries with a democratic regime attract more foreign direct investment than the ones with an authoritarian regime given that countries with a democratic regime tend to reduce political and expropriation risks and increase the credibility of the host countries for foreign direct investors. However, O'Neal (1994) found that authoritarian regimes offer investors in the developing countries higher returns in terms of profit. On the other hand, Staats and Biglaiser (2012) analyzed the determinants of FDI using a sample of 17 Latin American countries and

found that the rule of law and the judicial strength are important determinants of FDI inflows into Latin America.

The second group of literature deals with the importance of different dimensions of institutional quality in the attractiveness of FDI. For example, the study of Gastanaga et al (1998) showed that low levels of corruption and better contract enforcement attract more FDI. On the other hand, Asiedu (2006) showed that the poor quality of institutions measured by corruption, the lack of the rule of law and political instability discourage FDI inflows. In the same vein of research, Daude and Stein (2007) by examining the dimensions of the quality of institutions that affect the foreign direct investment decision.Daude and Stein (2007) found that an unpredictable policy and the lack of government commitment discourage the attractiveness of FDI.

In addition, Gani (2007) investigated the relationship between governance indicators and foreign direct investment on a sample of Asian and Latin American countries. He found that the rule of law, corruption control, regulatory quality, government efficiency and political stability are positively correlated with FDI. Recently, Gangi and Abdrazak (2012) have studied the impact of governance on FDI flows in 50 African economies using World Bank indicators. They found that three of six governance indicators, such as voice and accountability, government effectiveness and the rule of law, are significant. In addition, Gani and Al-Abri (2013) examine the effect of institutional quality on FDI inflows in GCC countries. Their results show that political instability and the absence of democracy enhance FDI inflows. In the same context, Helmy (2013) studies the determinants of FDI inflows to MENA countries after changes following the Arab Spring in 2010. Their results revealed that freedom and security of investments have a positive effect on FDI, while chances of expropriation and corruption rates have a negative influence as they lead to an unsafe business environment. In the same context, Bouchoucha et Benammou (2018) examined the link between governance and FDI in 41 African economic using World Bank indicators.The empirical results show that the attractiveness of FDI to African countries is positively correlated with the control of corruption, the effectiveness of governments, the quality of regulation and the voice and accountability.

A third group of researchers examined the effect of a composite indicator of governance quality constructed from the different dimensions of institutional variables on the attractiveness of FDI. For example, Wheeler and Mody (1992) studied the effect of the composite index of governance calculated from the following variables: bureaucracy, corruption, political instability and legal system efficiency on multinational firms US. They

found that the governance index does not affect the location decision of US multinationals. On the other hand, Globerman and Shapiro (2002) and Buchanan et al (2012) constructed a composite governance index based on the following variables: the control of corruption, the rule of law, the regulatory environment and political stability. They found that the political infrastructure (measured by governance) positively affects the attractiveness of FDI inflows. More recently, Samimi and Ariani (2010) have studied the impact of good governance on foreign direct investment. They used aggregated annual data for 16 countries in the Middle East and North Africa (MENA) for the period 2002-2007. They used three governance indicators, namely political stability, control of corruption and the rule of law. They concluded that improving governance has a positive impact on FDI inflows in the MENA countries. As a result, policies for the improvement of the governance indicators in the region are recommended.

3. The econometric method and the data

3.1. Econometric modeling

The objective of the paper is to focuse on the attractiveness factors of Foreign Direct Investment in low and middle income African countries over the period 1996-2013. However, the empirical literature does not agree on the main attractiveness factors of FDI in the developing countries. Some authors emphasized the role of the economic factors (such as the market size, openness policy), while others emphasized the role of the political factors, and a third group attached great importance to the institutional factors. In this empirical study, we will take into account the economic, political and institutional determinants of the attractiveness of foreign direct investment. Since the FDI levels of the current year influenced by past investment decisions in the sense of Singh and Jun (1995), we will take into account the lagged variable of a period as an explanatory variable in our model. Therefore, equation (1) can be written in a dynamic form as follows:

$$FDI_{it} = \alpha_0 + \beta FDI_{it-1} + \delta X_{it} + \varepsilon_{it} \quad (1)$$

Where FDI_{it} is the net inflows of FDI as a percentage of GDP in country i at time t, FDI_{it-1} represents the lagged dependent variable of foreign direct investment in year t-1, X_{it} (is the set of the explanatory variables (Gov,inv, open rate, inf, infra, FD, GDP per cap,GExp, HC, tax).In fact, Gov is the composite index of institutional governance calculated from the following six indicators: political stability, the control of corruption, voice and accountability, the rule of law, government effectiveness and regulatory quality; α_i: are the individual effects,

β_i the parameters to be estimated, *Inv* measures domestic investment, *Open* measures the degree of trade openness, *inf* is the consumer price index, *infra* is a proxy for the infrastructure, FD measures the level of financial system development, *GDP* per capita is a proxy for market size, *GE*xp measure the government expenditure ; *HC* is the human capital, *tax* means taxation, *Éit* is the error of the model relating to individual i at date t. $\varepsilon_{it}=U_i+V_{it}$: admits two components, U_i is the specific unobservable fixed effect for each country and finally V_{it} is the temporal effect.

Arellano and Bond (1991) proposed the Generalized Moment Method which encompasses all orthogonality conditions between the endogenous delayed variable and the error term. Moreover, besides $FDI_{i,t-2}$ all endogenous variables delayed by more than two are validated instruments for the equation of the first difference. They proposed to differentiate equation (2) as follows

$$(FDI_{it} - FDI_{it-1}) = (FDI_{it-1} - FDI_{it-2}) + (X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \quad \text{(2)}$$

Differentiation eliminates country specific effects, but it does not solve the problem of correlation between the residual and the lagged dependent variable. They proposed the following timing conditions:

$$E\left[(\text{FDI}_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0 \; for \; s \geq 2; t = 3,...T$$

$$E\left[(X_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1}))\right] = 0 \; for \; s \geq 2; t = 3,...T$$

Using these moment conditions, they proposed the estimation by the GMM method in two stages: in the first, the error terms are homoscedastic and independent between individuals and over time. The second is to use the resulting residuals to construct an appropriate estimate of the variance-covariance matrix that ignores the previous assumptions. These two steps make it possible to take into consideration the hypothesis of heteroscedasticity, the autocorrelation of the error terms. Indeed, the GMM method of Arellano and Bond (1991) is based on the hypotheses of the absence of second order autocorrelation in the errors of the first difference equation and that all the instruments are validated.

Also, Monti Carlo's simulations have found that the weaknesses of the instruments in the case of small samples, can induce biased coefficients. To overcome the shortcomings related to the estimator of first differences. Arellano and Bover (1995) and Bondell and Bond (1998) proposed a system GMM estimator. The latter combines both the regression in difference and the regression in level. In addition, GMM can take account the possibility of endogeneity

between the explanatory factors. Thus, the system GMM estimator is more efficient and superior to that of the first difference GMM estimator.

Delayed levels are used as difference regression instruments, while only the most recent regression of the difference is used as the instrument of the level regression.

$$E\left[(X_{i,t-s} - X_{i,t-s-1)})(\mu_{i,t} + \varepsilon_{i,t}) \right] = 0 \; for \; s = 1$$

The efficiency of the Generalized Moments Method (GMM) System estimator is based on the validation of two hypotheses: the validity of the instruments and the absence of autocorrelation of the errors. To test the validity of the instruments, we will use the following two tests: the first is Hansen's test of overidentification restrictions, which tests the overall validity of the instruments (the null hypothesis is that the instruments are valid) (Leitão 2015) ; the second is the second-order autocorrelation test for the error term, which tests the null hypothesis of no autocorrelation (Abdouli and Hammami, 2015).

3.2.Data

The data cover 41 African countries, 20 of which are considered low-income countries and 21 middle-income countries. On the other hand, the period of our study runs from 1996 to 2013. The data of the governance indicators are available from the year 1996, however, it should be noted that the data about the different dimensions of governance for the years 1997, 1999 and 2001 are missing. In fact, all the variables in our series are collected from the World Bank database, excepting the governance indicators and tax which are extracted from the World Governance Indicators and Freedom House. The different sources of our data are summarized in table A.1.2 in the appendix.

3.4.Main results and discussions

3.4.1.Descriptive statistics

Tables 1, 2, 3 contains the descriptive statistics of all the variables of interest used in our study. The level of governance is low in African countries, on average the index of governance achieved (-0,557). Indeed, the highest value is recorded in Morocco (1,838) in 2000, but, the minimum value of governance index is reached in Central African Republic (-1.994) in 2011. Indeed, the highest value (1.838) is recorded in middle-income economies in Morocco in 2000, while the highest value (-0.122) of governance in low-income economies was marked in Benin in 1996. On the other hand, the minimum value of the governance index in Middle-income Africa is reached in Congo Republic (-1.978) in 1996.While, the minimum value of the governance index in low-income Africa is reached in Congo Democratic Republic (-1.994) in 2011.

Regarding the variable FDI inflows, Africa received an average of 4.300, where middle-income and low-income countries received, on average respectively 3.866 and 4.7641million dollars. We find that low-income economies attract more FDI inflows than middle-income economies. Indeed, middle-income countries reaches a maximum value of FDI inflows of 37.27million dollars in Mauritania in 2005, while the minimum value of FDI inflows is -3.28 in sawzialand in 2003. While the highest value of FDI inflows in low-income economies in Liberia (91.1) in 2003. But, the minimum value of the FDI inflows is in Liberia (-82.89) in 1996.

3.4.2.Results of the principal components analysis

We have created a composite index contrary to Barro (1991) and Barro and Lee (1994), among others, who used political rights and civil liberties as proxy for indicators of the quality of institutions and governance. The advantage of this measure is that it allows us to summarize multidimensional and complex questions in order to help decision-making. Also, it helps to rank countries and evaluate progress over time.

In this context, many weighting techniques have been developed, some of which are derived from statistical methods such as factor analysis and others have been based on participatory approaches such as the analytic hierarchy process. But whatever the method, weights represent value judgments. While some analysts may choose weightings based solely on statistical methods, others may choose elements that are more influential, based on expert opinion, to better reflect political priorities or theoretical factors.

The construction of our governance index is based on the statistical method called Principal Component Analysis (PCA) in order not to prejudge the importance of a particular indicator in the measurement of the quality of governance (Appendix 2 , 3 and 4). Principal component analysis groups together individual indicators that are collinear to form a composite indicator that captures as much as possible common information about individual indicators. It makes it possible to reduce the dimensions of the initial data by replacing it with the initial variables by appropriate factors.

As a result, the composite index no longer depends on the dimensionality of the dataset, but is based on the statistical dimensions of the data. Composite indices are the weighted average of the principal components of each governance variable, which will be calculated by the share of the variance.

The Principal Component Analysis (PCA) allows us to extract two main components in the case of global Africa and their sub-region (formed by middlle- and low-income Africa) from

our study. The first factor was chosen as a composite index in our analysis since it accounts for more than half of the total inertia in the entire study sample. Thus, our composite indices will be calculated as the linear combination of weighted governance indicators by the share of the variance of the variables explained for each principal component.

According to the result of the tables of the eigenvalues reported in the appendix see (Tables (A.2.4), (A.3.3) and(A.4.3)), the first factorial axes account for 87.35%, 90.16% and 81.84% respectively in global Africa, Africa with middle income and low income total information contained in the six initial active variables in the case of the regions studied, therefore, the six governance indicators can be reduced to only two components to apprehend governance

3.4.3. Dynamic model results

Our econometric study was started by estimating eq (1) by applying the GMM system in African countries and these two sub-regions (low-income countries and middle-income countries). In this framework, we will introduce the governance variable measured, initially, by the composite index of the six dimensions of governance of the World Bank. Our results are recapitalized in the specifications M1, M8 and M15 for the African countries, the low-income African countries and the middle-income African countries, respectively. In a second place, we will again estimate the eq (1) by integrating separately the indicators of the good governance developed by Kaufman Kraay and Mastruzy (2010) (government effectiviness(GE), control of corruption(CC), rule of law(RL), political stability(PS), voice and accountability(VA), regulatory quality(RQ)). Their results will be reported in the following specifications: M2, M3, M4, M5, M6 and M7, in the case of African countries, M9, M10, M11, M12, M13, and M14 for low-income countries, and M16, M17, M18, M19, M20 and M21 for the case of middle-income countries. The purpose of this disaggregation will be to determine the dimension that may be behind the attraction of Foreign Direct Investment. In addition, when we introduce all governance indicators simultaneously, we can achieve fallacious results because there is a strong correlation between these governance indicators developed by the World Bank (see the appendix(tables (A.2.1),(A.3.1) and (A.4.1)).

Table 4. Results for whole sample

Table 5. Results for the middle income African countries

Table 6. Results for the low income African countries

We start our dynamic analysis with the instrument validity test. Tables (4),(5) and (6) show that the two specifications tested in the case of African countries and the low-income and the middle-income African countries do not reject the sur- identification of Hansen and accept the null hypothesis of no second-order autocorrelation as well as the validity of the instruments.

Our results test the validity of the instruments used according to Hansen and the AR-autocorrelation test(2).

The results reported in Tables (4),(5) and (6) show that the different determinants of foreign direct investment in Africa varies with the income level by re-estimating the models for the sub-samples: lower and middle-income countries. Indeed, the results of system -GMM estimator showed that the lagged FDI inflows variable is positive and statistically significant in all models, whether in the global African countries, in the middle-income or in the low-income countries. This shows the important role of the training effect of last year's FDI. These results are consistent with the studies of Diaw and Camille Guidime (2013) and Bouchoucha and Benammou (2018).

According to Tables (4),(5) and (6) and specifically in the specifications (M1, M8 and M15), the governance coefficients have a positive and statistically significant, respectively, at 5%, 10% and 10% thresholds. In the case of the Global African countries (M1), governance (measured by the composite index) improves the attractiveness of Foreign Direct Investment. This improvement in FDI in African economies can be explained in large part by the improvement of the following indicators: government effectiveness (5,771), control of corruption (5,025), voice and accountability (5,948), and quality of regulation (5.177). Nevertheless, governance (measured by the composite index) in African middle-income economies (M8) has attracted foreign direct investment through the improvement of the following dimensions: Government efficiency (5,696), corruption control (8,052), the rule of law (2,968) and political stability (2,886). As for low-income African countries (M15), governance (measured by the composite index) can attract FDI notably through the development of the following institutional indicators: government efficiency (11,539), rule of law (6.106), political stability (3.641), voice and accountability (7.808) and regulatory quality (12.79). It is interesting to infer that governance (a composite measure) as well as its six disaggregated components (efficiency of government, control of corruption, rule of law, political stability, voice and accountability and regulatory quality) are good drivers of FDI inflows into the African countries and there sub-regions.

Regarding the control variables, the infrastructure has a negative and statistically significant effect on FDI in Africa in all models (M2, M3, M4, M5, M6, M7). On the other hand, the infrastructure coefficients are negative and statistically significant only in middle-income African economies in the models (M8, M11 and M13). This result implies that middle-income African countries are characterized by poor infrastructure quality, which can be an inhibiting factor for the attractiveness of foreign direct investment in the region.

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Regarding the inflation coefficients, we found that inflation has a positive and statistically significant on FDI only in middle-income African economies (M12 and M14). But, they are not significant for the case of African and low income African countries. These results are in contrast with most previous studies examining the FDI-inflation relationship. These findings are in line with those of Kinoshita and Campos (2003).

The coefficients of trade openness are positive and statistically significant at the threshold of only 10% in low-income Africa in the model (M15), but not significant for the case of Africa and Middle-Income Africa. Foreign investors can be well informed about the local conditions of their international trading partners when trade is released. As a result, foreign investors prefer to invest in countries with large volumes of trade. This result is consistent with Elfakhani and Matar (2007).

For the coefficients associated with the financial development, they are positive and statistically significant in Africa in the models (M4 and M5) and significant in case of middle income African countries(M13). This means that an enhancement of financial development leads to generating positive influences on the attractiveness of Foreign Direct Investment. In other hand, middle-income African economies need a highly developed financial system so that they can finance investment projects.

Finally,the coefficients of tax are negatives and statistically significants for overall sample in the models (M2, M4 and M7) . However, the variable's cofficient is significant only in these models (M8, M9 and M10) and (M15, M16, M17, M18, M19, M20 and M21) in middle and low income African countries, respectively. This imply that a very high corporate tax rate will discourage FDI inflows into Africa regardless of income level. Thus, tax relief is an attractive factor for foreign direct investment in the African region.

4.Conclusion and policy implication

The purpose of this paper is to examine the role of governance on the attractiveness of FDI into 41 African countries grouped into two subgroups of which 20 countries are considered to have low incomes and 21countries realize intermediate income. Our econometric analysis was based firstly on an aggregated approach to construct a synthetic index of governance using principal component analysis (PCA).

The results indicate that global governance affects positively and significantly the attractiveness of Foreign Direct Investments in the region of Africa and its sub-regions (low- and middle-income African countries). In a second step, our objective is to individualize the effect of governance, measured through the different dimensions developed by Kaufmann et al. (2010), on the attractiveness of Foreign Direct Investment. In other words, we used six

indicators to measure the quality of institutions and tested their effects on the attractiveness of FDI. Indeed, the iterative approach makes it possible to determine which dimension is at the origin of the attractiveness of FDI.

The attractiveness of FDI in African economies (overall sample) can be explained mainly by the improvement of the following indicators: government effectiveness(GE), corruption control(CC), voice and accountability(VA) and regulatory quality(RQ). While the attractiveness of FDI in African middle-income economies depends on improving of government efficiency(GE), control of corruption(CC), rule of law(RL) and political stability(PS). For low-income African economies, the most importants institutionals factors that affect the attractiveness of FDI are government effectiveness(GE), rule of law(RL), political stability(PS), voice and accountability(VA), and regulatory quality(RQ). We found also that when we subdivise our sample size in two, countries with better institutions were able to attract FDI more than countries with poorer institutional development. The study revealed the importance of other determinants of FDI for global sample. These factors include lagged FDI, trade openness, infrastructure, financial development, inflation and tax.

The main policy implications of our study can be presented as follows. Firstly, policymakers need to formulate policies that attract more FDI inflows into the region by strengthening the institutional framework. Secondly, the attractiveness of FDI depends on the financial system development. This drives the African countries to improve the quality of their financial systems in order to be integrated into international financial markets and therefore make their economies more attractive in terms of investment. A stable macroeconomic environment can be important for attracting FDI flows and it is important for growth. In addition, the region needs to improve the degree of trade openness by eliminating the tariff and non-tariff barriers and creating a climate conducive to investment. Finally, there is a need for a tax system for Foreign Direct Investors.

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Tables
Table 1.Descriptive statistics in African countries

variable	obs	Mean	Std. Dev.	Min	Max
FDI	730	4.300	8.876	-82.89	91.1
Gov	615	-.557	.597	-1.994	1.838
Inv	695	1.301	.232	-.53	1.9
Open	711	.741	.361	.18	2.3
Inf	655	.788	.495	-1.39	2.82
HC	690	1.219	.254	.31	1.9
Infra	724	.078	.744	-2.21	1.9
DF	710	1.228	.430	-.7	2.7
GExp	690	1.219	.254	.31	1.9
GDP per cap	733	2.534	.833	.48	3.84
Fisc	418	7.700	9.430	.3	59.24

Table 2.Descriptive statistics of Middle-income African countries

Variable	Obs	Mean	Std. Dev.	Min	Max
FDI	377	3.866	5.263	-3.28	37.27
Gov	315	-.332	.640	-1.994	1.838
Inv	343	1.348	.186	.67	1.9
Open	357	.868	.353	.31	2.1
Inf	355	.738	.440	-1.25	1.9
HC	211	12.115	11.363	1.19	59.24
Infra	377	.529	.639	-.9	1.9
DF	368	1.394	.393	.32	2.7
GDP per cap	375	2.545	1.153	.48	3.84
GExp	342	1.252	.211	.45	1.9
Fisc	369	1.745	.067	1.46	1.88

Table 3.Descriptive statistics Low-income African countries

Variable	Obs	Mean	Std. Dev.	Min	Max
FDI	353	4.764	11.540	-82.89	91.1
Gov	300	-.794	.438	-1.978	-.122
Inv	352	1.255	.262	-.53	1.9
Open	354	.612	.321	.18	2.3
Inf	300	.847	.549	-1.39	2.82
HC	207	3.200	2.840	.3	19.4
Infra	347	-.410	.503	-2.21	.9
DF	342	1.048	.394	-.7	2.2
GExp	348	1.187	.287	.31	1.9
GDP per cap	358	2.522	.172	1.87	2.87

Fisc	295	1.716	.074	1.33	1.94		

Table 4 .Results for whole sample

FDI	(M1)	(M2)	(M3)	(M4)	(M5)	(M6)	(M7)
FDI(-1)	.424**	.832**	.955***	.911***	1.012*	.642***	.720***
	(2.40)	(0.016)	(0.007)	(0.003)	(0.057)	(0.008)	(0.000)
Gov	10.102**						
	(1.95)						
GE		5.771*					
		(0.061)					
CC			5.025*				
			(0.099)				
RL				2.820			
				(0.181)			
PS					.129		
					(0.947)		
VA						5.948*	
						(0.057)	
QR							5.177**
							(0.025)
Infra	-2.463	-2.426**	-3.577**	-2.906**	-1.742*	-3.490* **	-2.310*
	(-1.36)	(0.048)	(0.040)	(0.036)	(0.072)	(0.010)	(0.067)
Inf	2.315	1.176	1.036	1.192	1.384	1.147	1.293
	(2.77)***	(0.157)	(0.207)	(0.140)	(0.187)	(0.259)	(0.160)
Open	1.303	-1.465	4.541	3.117	3.112	6.094	.902
	(0.59)	(0.629)	(0.390)	(0.430)	(0.563)	(0.212)	(0.815)
FD	4.148*	1.577	1.356	2.050**	2.744***	1.116	1.731
	(1.83)	(0.170)	(0.162)	(0.033)	(0.002)	(0.624)	(0.162)
GExp	-1.560	-2.419	-1.473	-1.646	-1.497	-2.444	-1.896
	(-0.89)	(0.131)	(0.428)	(0.310)	(0.491)	(0.170)	(0.113)
GDP per cap	1.293	-.041	-1.113	-.458	-.258	. -2.442**	-.434
	(1.11)	(0.959)	(0.225)	(0.410)	(0.624)	(0.037)	(0.598)
HC	.0329	-.025	-.0007	-.004	-.020	.035	-.004
	(0.44)	(0.598)	(0.987)	(0.902)	(0.528)	(0.663)	(0.934)
Inv	5.437	4.685	1.899	3.711	3.946	2.138	4.819
	(1.60)	(0.228)	(0.511)	(0.242)	(0.354)	(0.676)	(0.230)
Fisc	-11.091	-34.778**	-22.575	-18.752*	-7.798	-26.976	-34.243**
	(-0.74)	(0.050)	(0.169)	(0.086)	(0.464)	(0.153)	(0.041)
Cons	11.339	60.437*	39.249	27.891	5.042	51.265	57.167*
	(0.42)	(0.068)	(0.265)	(0.212)	(0.816)	(0.234)	(0.098)
Hansen: p-$value^a$	0.647	0.403	0.233	0.630	0.471	0.543	0.462
AR(2) : p-$value^b$	0.722	0.950	0.764	0.998	0.959	0.820	0.948

Notes : the values in parenthesis are t- Student. ***significance at 1%. **significance at 5% and*significance at 10%. *** Significance at 1%, * Significance at 5% and * Significance at 10%.
a: The values reported in the table are the p-values of the Hansen test. According to these values, we cannot reject the null hypothesis of the instrument validity at threshold of the annual risk

Table 5. Results for the middle income African countries

FDI	(M8)	(M9)	(M10)	(M11)	(M12)	(M13)	(M14)
FDI(-1)	.345***	0.437***	0.458***	0.473***	0.446***	.568***	0.607**
	(3.46)	(0.000)	(0.000)	(0.000)	(0.000)	(3.92)	(0.014)
Gov	8.525*						
	(2.05)						
GE		5.696***					
		(0.009)					
CC			8.052**				
			(0.043)				
RL				2.968***			
				(0.091)			
PS					2.886***		
					(0.068)		
VA						-4.287	
						(-1.34)	
QR							2.181
							(0.384)
Infra	-5.873*	-3.194	-4.666	-3.841***	-3.104	-2.585*	-2.969
	(-1.83)	(0.180)	(0.183)	(0.069)	(0.181)	(-1.85)	(0.139)
Inf	2.187	2.478	2.353	2.598	3.208***	3.000	2.755*
	(1.20)	(0.130)	(0.172)	(0.146)	(0.084)	(1.55)	(0.085)
Open	1.576	-1.694	-1.241	.431	-.968	5.147	3.779
	(0.64)	(0.625)	(0.770)	(0.885)	(0.721)	(1.15)	(0.404)
FD	-.339	-.282	.201	1.257	1.655	5.547**	1.874
	(-0.09)	(0.879)	(0.939)	(0.498)	(0.222)	(2.41)	(0.418)
GExp	-1.599	-.956	-2.827	-1.081	-1.139	.754	-1.945
	(-0.41)	(0.686)	(0.394)	(0.598)	(0.645)	(0.33)	(0.366)
GDPper cap	-1.342	-0.137	-1.036	-0.278	-0.670	1.112	-.488
	(-0.91)	(0.881)	(0.443)	(0.713)	(0.459)	(0.86)	(0.387)
HC	.077	0.012	0.056	0.032	0 .029	-.030	0.021
	(1.03)	(0.818)	(0.403)	(0.344)	(0.465)	(-0.94)	(0.644)
Inv	10.484	13.096	7.539	11.854	11.829	11.703*	10.535
	(1.22)	(0.188)	(0.383)	(0.162)	(0.187)	(1.70)	(0.142)
Fisc	-37.109***	-24.946*	-35.153*	-13.651	-15.555	15.246	-15.829
	(-3.30)	(0.085)	(0.069)	(0.396)	(0.155)	(0.70)	(0.194)
Cons	61.318***	32.895	63.140	10.684	14.955	-58.677	12.941
	(3.04)	(0.235)	(0.067)	(0.784)	(0.516)	(-1.14)	(0.651)
Hansen: p-$value^a$	0.704	0.961	0.994	0.999	0.980	0.970	0.923
AR(2) : p-$value^b$	0.941	0.986	0.533	0.994	0.976	0.030	0.945

Notes : the values in parenthesis are t- Student. ***significance at 1%. **significance at 5% and*significance at 10%. *** Significance at 1%, * Significance at 5% and * Significance at 10%.
a: The values reported in the table are the p-values of the Hansen test. According to these values, we cannot reject the null hypothesis of the instrument validity at threshold of the annual risk

b: The values reported in the table are the p-values of the Arellano and Bond AR (2) test. According to these values, we cannot reject the null hypothesis of the absence of second-order autocorrelation

Table 6. Results for the low income African countries

FDI	(M15)	(M16)	(M17)	(M18)	(M19)	(M20)	(M21)
FDI(-1)	1.209***	1.151***	1.166***	1.157***	1.149***	1.197***	1.126***
	(6.39)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gov	5.680*						
	(1.82)						
GE		11.539*					
		(0.071)					
CC			3.531				
			(0.338)				
RL				6.106*			
				(0.077)			
PS					3.641*		
					(0.003)		
VA						7.808*	
						(0.089)	
QR							12.790*
							(0.055)
Infra	-1.306	-.304	-.387	-2.991	-2.640	-1.695	.052
	(-0.88)	(0.914)	(0.813)	(0.096)	(0.291)	(0.479)	(0.987)
Inf	.481	.193	.473	.517	.591	.472	.484
	(1.03)	(0.688)	(0.241)	(0.410)	(0.285)	(0.318)	(0.449)
Open	3.11*	-.434	-.079	9.623	4.973	1.870	-8.224
	(1.78)	(0.971)	(0.993)	(0.302)	(0.700)	(0.825)	(0.515)
FD	.738	1.477	1.196	.121	-.012	-.005	1.705
	(0.55)	(0.453)	(0.509)	(0.939)	(0.996)	(0.999)	(0.360)
GExp	-3.103	-6.020**	-2.569	-2.181	-2.849	-4.445	-6.262*
	(-1.50)	(0.044)	(0.291)	(0.477)	(0.372)	(0.133)	(0.071)
GDPper cap	3.698	4.975	6.574**	4.560	.062	-2.130	2.775
	(1.19)	(0.295)	(0.048)	(0.291)	(0.990)	(0.782)	(0.568)
HC	-.130	.062	-.243	-.018	-.016	-.102	.028
	(-0.59)	(0.846)	(0.245)	(0.955)	(0.945)	(-.652)	(0.942)
Inv	.477	-.696	1.509	-.915	1.166	-.621	-1.138
	(0.22)	(0.849)	(0.568)	(0.724)	(0.689)	(0.824)	(0.722)
Fisc	-32.908**	-64.972**	-23.273*	-29.170*	-25.191*	-45.226**	-90.568**
	(-2.29)	(0.017)	(0.059)	(0.053)	(0.054)	(0.031)	(0.016)
Cons	50.981*	116.056**	26.508	40.234	43.528	92.501*	170.118**
	(1.83)	(0.028)	(0.204)	(0.258)	(0.151)	(0.091)	(0.024)
Hansen: p-$value^a$	0.998	0.960	1.000	1.000	0.886	0.993	0.999
AR(2) : p-$value^b$	0.859	0.358	0.893	0.454	0.986	0.845	0.924

Notes : the values in parenthesis are t- Student. ***significance at 1%. **significance at 5% and*significance at 10%. *** Significance at 1%, * Significance at 5% and * Significance at 10%.
a: The values reported in the table are the p-values of the Hansen test. According to these values, we cannot reject the null hypothesis of the instrument validity at threshold of the annual risk
 b: The values reported in the table are the p-values of the Arellano and Bond AR (2) test. According to these values, we cannot reject the null hypothesis of the absence of second-order autocorrelation.

Appendix
Appendix 1 : list of countries and Data description and source
Table A.1. 1. Classification of African countries by income

Global African sample
Benin –Burkina Faso-Brundi- Chad - Comoros –Congo Democratic Republic -Guinea – Liberia –Madagascar –Malawi- Mali – Mozambique- Niger-Sierra Lione – Tanzanie- Togo-Uganda – Zimbabwe –Eriteria- Central African Republic-Botswana- Cameroon –Cape Verde-Congo Republic-Cote d'ivoire- Ghana- Kenya-Lesotho- Mauritius – Mauritania - Namibie - Nigeria –Senegal- South Africa -Swaziland- Zambia -Algeria- Egypte- Lybya- Morocco-Tunisia.
Low income Africa
Benin –Burkina Faso-Brundi- Chad - Comros – Congo Democratic Republic -Guinea – Liberia –Madagascar –Malawi- Mali – Mozambique- Niger-Sierra Lione – Tanzanie- Togo-Uganda – Zimbabwe –Eriteria- Centrale Africain Républic.
Middle income Africa
Botswana- Cameroun –Cape Vert-Congo République-Côte d'ivoire- Ghana- Kenya-Lesotho-Mauritius – Mauritania - Namibie -Nigeria –Senegal- South Africa -Sawzialand- Zambia -Algeria- Egypte- Lybya- Marocco- Tunisia.

Table A .1.2. Data description and source

Variables	Definitions of variables	Sources
FDI	Foreign Direct investment, net inflows (%of GDP) in countries i at time t.	WDI
Gov	the aggregate index of governance.	WGI
Inv	Domestic investment mesured by the Gross fixed capital formation as a percent of GDP.	
Open	Openess mesured by export+import of goods and services /GDP	WDI
Inf	Inflation approximated by inflation, consumer prices(annual%)	WDI WDI
Enrol	Human capital measured by the tertiary enrollment ratio	WDI WDI
Tel	Fixed telephone Subscriptions (per 100 people)	WDI
FD	Financial development Domestic credit to private sector(%of GDP)	WDI WDI
GDP	the market size mesured by GDP per capita	WDI
GE	the government expenditure, as a percentage of GDP	

Tax	Tax approximated by the index of the economic freedom	Freedom House

Appendix 2: Factors analysisis for Africains countries (global sample)

Table A.2.1. Correlation matrix

	CC	GE	PS	RQ	RL	VA
CC	1,000					
GE	0,823	1,000				
PS	0,707	0,665	1,000			
QR	0,730	0,868	0,615	1,000		
RL	0,864	0,895	0,776	0,847	1,000	
VA	0,684	0,718	0,662	0,759	0,767	1,000

Notes: CC: Control of Corruption, GE: Government Effectiveness, PS: Political Stability, QR: Regulatory Quality, RL: Rule of Law, VA: Voice and Accountability.

Table A.2.2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy.		,895
Bartlett's test of sphericity	Approx Chi-Square.	3996,767
	Ddl	15
	Sig	,000

Table A.2.3: Representation qualities(Communalitios)

	Initial	Extraction
CC	1,000	,810
GE	1,000	,903
PS	1,000	,963
Qr	1,000	,910
RL	1,000	,925
VA	1,000	,729

Extraction Method: Principal Component Analysis

Table A.2.4: Total varaiance explained

Component	Initial Eigenvalues			Extraction sums of Squared loadings		
	Total	% of variance	cumulation %	Total	% of variance	cumulation %
1	4,806	80,102	80,102	4,806	80,102	80,102
2	,435	7,248	87,350	,435	7,248	87,350
3	,352	5,860	93,210			
4	,219	3,657	96,867			
5	,106	1,775	98,642			
6	,081	1,358	100,000			

Table A.2.5. Component Matrix[a]

	Components	
	1	2

RL	,962	,006
GE	,930	-,197
QR	,901	-,313
CC	,898	,063
VA	,853	-,046
PS	,819	,540

Extraction Method: component Analysis Method. a. 2 components extracted.

Appendix 3: Factors analysisis for Africains countries (middle income)
Table A.3.1. Correlation matrix

	CC	GE	PS	RQ	RL	VA
CC	1,000					
GE	0.8803	1,000				
PS	0.7617	0.6767	1,000			
QR	0.8066	0.8936	0.6081	1,000		
RL	0.8971	0.9064	0.7821	0.8343	1,000	
VA	0.7758	0.7721	0.6101	0.7884	0.7871	1,000

Notes: CC: Control of Corruption, GE: Government Effectiveness, PS: Political Stability, QR: Regulatory Quality, RL: Rule of Law, VA: Voice and Accountability.

Table A.3.2.KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy.		,897
Bartlett's test of sphericity	Approx Chi-Square.	2260,284
	Ddl	15
	Sig	,000

Table A.3. 3. Representation qualities

	Initial	Extraction
CC	1,000	,894
GE	1,000	,913
PS	1,000	,969
QR	1,000	,903
RL	1,000	,923
VA	1,000	,808

Extraction Method: Principal Component Analysis

Table A.3.4. Total varaiance explained

Component	Initial Eigenvalues			Extraction sums of Squared loadings		
	Total	% of variance	cumulation %	Total	% of variance	cumulation %
1	4,942	82,372	82,372	4,942	82,372	82,372
2	,468	7,796	90,168	,468	7,796	90,168
3	,266	4,426	94,594			
4	,156	2,603	97,197			

5	,100	1,673	98,870
6	,068	1,130	100,000

Table A.3.5. Component Matrix[a]

	Components	
	1	2
RL	,943	,068
GE	,946	-,134
QR	,810	,560
CC	,909	-,276
VA	,959	,062
PS	,869	-,228

Extraction Method: component Analysis Method. a. 2 components extracted.

Appendix 4: Factors analysisis for Africains countries (low income)
Table A.4.1. Correlation matrix

	CC	GE	PS	RQ	RL	VA
CC	1,000					
GE	,583	1,000				
PS	,568	,592	1,000			
QR	,490	,773	,531	1,000		
RL	,714	,806	,736	,797	1,000	
VA	,447	,644	,694	,715	,720	1,000

Notes: CC: Control of Corruption, GE: Government Effectiveness, PS: Political Stability, QR: Regulatory Quality, RL: Rule of Law, VA: Voice and Accountability.

Table A.4.2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin measure of sampling adequacy.		,848
Bartlett's test of sphericity	Approx Chi-Square.	1429,747
	Ddl	15
	Sig	,000

Table A.4.3. Representation qualities

	Initial	Extraction
CC	1,000	,931
GE	1,000	,772
PS	1,000	,675
QR	1,000	,839
RL	1,000	,898
VA	1,000	,796

Extraction Method: Principal Component Analysis

Table A.4.4. Total varaiance explained

Component	Initial Eigenvalues	Extraction sums of Squared loadings

	Total	% of variance	cumulation %	Total	% of variance	cumulation %
1	4,292	71,534	71,534	4,292	71,534	71,534
2	,619	10,313	81,847	,619	10,313	81,847
3	,518	8,635	90,482			
4	,265	4,417	94,899			
5	,191	3,188	98,087			
6	,115	1,913	100,000			

Table A.4.5. Component Matrix[a]

	Components	
	1	2
RL	,741	,619
GE	,873	-,098
QR	,810	,134
CC	,856	-,324
VA	,946	,063
PS	,835	-,315

Extraction Method: component Analysis Method. a. 2 components extracted.