Economics Bulletin

Volume 39, Issue 4

# Foreign direct Investment and economic growth: The role of the governance

Najeh Bouchoucha
*FSEG Sousse*

Ismahen Yahyaoui
*FSEG Sousse*

## Abstract

This paper contributes to the literature on the impact of foreign direct investment on economic growth, conditionally, by the good institutional quality in African countries over the period 1996-2016. For this purpose, our survey uses the Pedroni panel cointegration test to detect the existence of a long-run relationship, fully modified ordinary least square, dynamic ordinary least square, and system GMM to check the endogeneity problem. Indeed, FDI unaccompanied by good governance quality (the fight against corruption, political stability, and sound regulatory quality, rule of law, government effectiveness, voice and accountability) has adverse effects on economic activity. Our results show that the interaction between overall governance indicators and FDI has a positive and statistically significant effect on economic growth in the African countries using the FMOLS, DOLS and S-GMM. Then this paper suggests that African governments aiming at attracting more FDI and thus improving their economic growth need to ameliorate the structure governance added to their business climate.

**Citation:** Najeh Bouchoucha and Ismahen Yahyaoui, (2019) "Foreign direct Investment and economic growth: The role of the governance", *Economics Bulletin*, Volume 39, Issue 4, pages 2711-2725
**Contact:** Najeh Bouchoucha - najeh.bouchoucha@hotmail.fr, Ismahen Yahyaoui - asmahen.yahyaoui@gmail.com.
**Submitted:** February 11, 2019. **Published:** November 29, 2019.

# 1. Introduction

To start, it is interesting to say that Foreign Direct Investment (FDI) is seen as an important factor on promoting economic growth in developing countries. In fact, FDI improves productivity gains in host countries through the transfer of their innovative technology, their know-how, their managerial skills and their staff training. In this context, Romer (1993) suggests that multinational firms bring new knowledge to developing countries. Those firms can reduce the technological gap between the developing countries and the developed countries. As a result they can be considered as a powerful factor for growth and economic convergence.

The theory of endogenous growth is based on the idea of a multiplier effect of FDI on domestic firms, which in turn can have positive effects on productivity and economic growth (Grossman Helpman (1991)), Liu (2008)). Due to the suffering of developing economies suffer from a problem of lack of liquidity, FDI replaces local investment in the process of capital accumulation (Mody Murshid (2005)).This fact leads the governments in developing countries to adopt more effective strategies to benefit more from FDI .Thus, it becomes more competitive concerning in the international market. Despite the abundant theoretical and empirical literature the relationship between the FDI and the economic growth, finding empirical evidence remains inconclusive. For example, Bruno Campos (2013) show that 50% of empirical studies report a positive effect of FDI on economic growth, while 11% of empirical studies pop out with a negative effect of the FDI on economic growth. Besides 39% of empirical studies confirm the independence between economic growth and the FDI. Still other studies show that the relationship between FDI and economic growth is unclear (Herzer et al. 2008).

However, Duasa (2007) and Mohamed et al. (2013) do not support the idea that FDI has a positive impact on the economic growth. Recently, Bouchoucha et Ali (2019) have put under investigation the impact of Foreign Direct Investment on economic growth in Tunisia for the period 1980-2015 by applying the ARDL bounds test. Their results show that FDI exerted a positive effect on the economic growth on both the short as well as the long run term.

Other studies show that the relationship between FDI and the economic growth is conditional. Indeed, in order to ensure a positive relationship between FDI and economic growth, certain conditions are mandatory, namely the level of development (Blomstrom et al. (1994)), the degree of commercial openness (Balasubramanyam et al. (1996)) ,the human capital (Borensztein et al. (1998)),there financial development (Alfaro et al. (2004)) and the existence of a business environment (Busse and Groizard (2008)).

Institutional quality and good governance are also necessary conditions for a positive relationship between FDI and economic growth. Although the concept of sound institutional quality is rather difficult to define, we consider that good institutions are those that ensure an efficient allocation of factors (capital and labor), encourage investment in higher-yielding activities, and reduce the uncertainty linked to the business environment. In other words, the bad quality of institutions is associated with low levels of investment, a slower productivity growth, and production. Thus, institutions play a significant modulator role in the relationship between FDI and economic growth. Indeed, a healthy institutional environment can promote synergies between FDI and local businesses and thus enhance the benefits of productivity. It can also play a complementary role between foreign investment and domestic investment.

On the one hand, we can highlight the fact that the countries which have the same level of FDI can achieve a very different level of economic growth depending on their institutional quality. On the other hand, a less developed institutional framework can weaken the activities of production and prevent the exploitation of knowledge spillovers for domestic firms.

Several studies have examined the role of institutions in attracting FDI such as Busse and Hefeker (2007), Alfaro et al. (2008), Javorcik and Wei (2009), Ali et al. (2010), Buchanan et al. (2012), Jadhav (2012), Saidi et al (2013), Esew and Yaroson (2014) and, Bouchoucha and Benamou (2018). However, few studies have focused on the role of institutions in ameliorating the relationship between FDI and economic growth. For instance, Mengistu and Adams (2007) showed that the two most important determinants of economic growth were FDI and institutional infrastructure. In addition, Adeleke (2014) examined the effect of governance on the link between FDI and growth in Africa, both at aggregate and disaggregated levels. Adeleke (2014) confirmed that governance in many African countries was quite weak and deteriorated economic growth. As for, the interaction of governance with FDI it led to positive and increased growth. In the same context, Jude and Levieuge (2015) studied the effect of FDI on promoting economic growth conditionally by institutional quality. They showed that FDI had a positive and significant effect on economic growth only beyond a level of institutional quality. Later, Jilenga and Helian (2017) investigated the impact of FDI on economic growth conditionally by the role of quality institutions. In examining the interaction term between FDI and institutional quality, their empirical studies show that institutional quality increased FDI and thus stimulated economic growth.

Our objective is to decompose the effect of Foreign Direct Investment on economic growth in two parts: a direct effect and an indirect effect conditioned by good institutional quality. It is needless to say that we try to participate in the enrichment of the previous literature and to provide some elements of answers to the gaps and the questions mentioned above.

Therefore, our contribution is to analyze and identify an indirect effect of FDI on economic growth through a good institutional quality environment. In other words, we study the interaction between FDI and the various dimensions of governance which are developed by Kaufmann et al (2016) on economic growth. Thus, we can notice that each of the dimensions of governance, namely Control of Corruption (CC), Government Effectiveness (GE), Political Stability (PS), Regulatory Quality (RQ), Rule of Law (RL), and Voice and Accountability (VA), contribute differently in improving the link between FDI and economic growth.

The majority of previous studies examined the direct relationship between FDI and economic growth for time series or panel data. Nevertheless, it neglected the role of good governance in promoting long-run economic growth. In this paper, we use two new panel approaches (FMOLS and DOLS) to examine the long-run relationship between FDI and economic growth in the presence of institutional quality. In order to target achieve our objective; we use a sample of 49 African countries over the period of 1996-2016. First, we estimate our regressions using the Fully Modified Ordinary Least Squares (FMOLS) and dynamic ordinary least squares (DOLS) methods to correct the endogeneity biais and eliminate the correlation between the regressions and the error term. In order to strengthen our findings, to ensure the robustness of results, we use the Generalized System Moments Method (S-GMM) on panel data to take into account the endogeneity problem arising from the lagged variable. Our findings confirm that the positive effect of FDI on economic growth is ameliorated in the presence of good institutional quality.

The rest of this paper is organized in the following way: the second section provides the model specification and data and the third section discusses the empirical results on the relationship between FDI and economic growth; the fourth section analyzes the effect of the governance on the relationship between Foreign Direct Investment and economic growth. We put an end this work through a conclusion.

## 2. Model specification and Data

The main objective of this study is to analyze the role of governance on promoting the effect of FDI on economic growth for 49 African countries using annual data over the period of 1996–2016. To start, we study the direct relationship between Foreign Direct Investment and economic growth. As a natter of fact, we will estimate by cointegration methods (FMOLS and DOLS) Equations (1). However, in order to estimate the GMM in our model, we need to add the lagged dependent variable in order to solve the endogeneity bias. As a result, we test GMM method Equations (2).
Regression equations will be as follows:

$$GDP_{it} = \beta_1 FDI_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it} \qquad (1)$$

$$GDP_{it} = \alpha_0 GDP_{it-1} + \beta_1 FDI_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it} \qquad (2)$$

With: $GDP_{it}$ is log of real GDP in countries i at time t, $GDP_{it-1}$ is the lagged variable of GDP; $FDI_{it}$ refers to foreign direct investment as a percentage of GDP; X the set of control variables such as: HC refers to human capital which is approximated by the tertiary enrollment rate, inv refers to the domestic investment that is approximated by gross fixed capital formation as a percentage of GDP, inf refers to the inflation that is approximated by the percentage change in the consumer price index, open refers to the trade opening that is measured by the sum of export and import which are relative to GDP and BM refers to the Broad Money supply as a share percentage of GDP; β is the parameters to be estimated, $\mu_i$ represents the individual effects (i=1…. 49) and t denotes the time (t=1996, …2016) ;$\varepsilon_{it}$ designates the model error term.

Our study starts by studying the effect of foreign direct investment on economic growth. Our model starts from the equation of Carkovic and Levine (2002) and that of Mengistu and Adams (2007). Then, in order to evaluate its impacts on promoting the effect of FDI on economic growth, we add each time one of the six indicators of governance of the World Bank developed by Kaufmann et al. (2016) and the term interaction between these indicators and the FDI. In this case, it is important to mention that we cannot introduce all indicators in the same model because of the high correlation between these six dimensions of Kaufmann et al.(2016) (table 1).

**Table 1. Correlation between the different indicators of governance**

| | CC | GE | RQ | RL | VA | PS |
|---|---|---|---|---|---|---|
| CC | 1.0000 | | | | | |
| GE | 0.8397 | 1.0000 | | | | |
| RQ | 0.7361 | 0.8578 | 1.0000 | | | |
| RL | 0.8795 | 0.8944 | 0.8540 | 1.0000 | | |
| VA | 0.7347 | 0.7147 | 0.7595 | 0.7886 | 1.0000 | |
| PS | 0.6540 | 0.6221 | 0.5945 | 0.7347 | 0.6005 | 1.0000 |

Thus, we will estimate by cointegration methods (FMOLS and DOLS) Equation (3) and by GMM method Equation (4).

$$GDP_{it} = \beta_1 FDI_{it} + \beta_2 X_{it} + \beta_3 Gov_{it} + \beta_4 Gov_{it} \times FDI_{it} + \mu_i + \varepsilon_{it} \qquad (3)$$

$$GDP_{it} = \alpha_0 GDP_{it-1} + \beta_1 FDI_{it} + \beta_2 X_{it} + \beta_3 Gov_{it} + \beta_4 Gov_{it} \times FDI_{it} + \mu_i + \varepsilon_i \quad (4)$$

Where GOV*FDI refers to the interaction term between the quality of governance and foreign direct investment in order to test if the effectiveness of foreign direct investment in terms of economic growth is conditioned by the quality of governance.

## 2.1. Data and source

We consider an unbalanced panel of annual data from 49 African countries that covers the period 1996-2016.The countries included in our dataset are Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, cape Verde, Cameroon, Central African Republic ,Chad, Comoros, Congo, Democratic Republic, Congo. Republic, Cote d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Seychelles, South Africa, Sierra Leone, Sudan, Tanzania, Tunisia ,Togo, Uganda, Zambia and Zimbabwe.
The choice of the period was dictated by the availability of governance indicators which started from 1996. All data came from the World Bank's statistics; except for governance indicators that were collected from Worldwide Governance Indicators (WGI). We rely on Table (2) to sum up the definitions of the variables and their source.

**Table 2. Data Description and source**

| | **Variable** | **Source** |
|---|---|---|
| GDP | log of real GDP for country *i* in year *t*; | WDI |
| FDI | Foreign direct investment, net inflows(%of GDP) in countries i at time t | WDI |
| GI | The variables of institutional quality (voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption) | WGI |
| HC | Human capital measured by the tertiary enrollment ratio as percentage of GDP | WDI |
| Open | Openness measured by export + import of goods and services/GDP | WDI |
| Inv | Domestic investment measured by the gross fixed capital formation as a percent of GDP | WDI |
| Inf | Inflation approximated by inflation, consumer prices (annual %) | WDI |
| FD | Financial development measured by the broad money supply as percentage of GDP (M2) | WDI |

# 3. Empirical results on the relationship between FDI and economic growth

## 3.1. Descriptive statistics

Table (3) provides the different statistics of all variables which describe our sample. On average, foreign direct investment is around 4.90565 in the Africa region. Indeed, the minimum value of foreign direct investment is recorded in Liberia in 1996, while the maximum value is observed in Equatorial Guinea in 1996. Otherwise, on average, Africa had registered a growth rate around 11.7496. Indeed, the highest value of growth (91.9) is registered in Liberia in 2003. The same country recorded the lowest value of FDI in 1996, it was (-82.89). Regarding governance indicators, on average, the level of the most indicators of Kaufmann et al (2016) is low in African countries. Indeed, on average, the governance indicators are around the interval [- 712091, - 519329] and the most important indicator of governance is the political stability (-.519329). In fact, the highest value (1.282) is recorded in Seychelles in 2000, While the lowest value of political stability was marked in Democratic (-2.844) in 1998. However, on average the poorest governance indicator is government effectiveness (-.712091). Indeed, the highest value is in scored Central Africa Republic in 2014. However, the lowest value is observed in Seychelles in 2000.

**Table 3. Descriptive Statistics**

| Variable | Obs | Mean | Std.Dev | Min | Max |
|---|---|---|---|---|---|
| GDP | 1004 | 11.74965 | 1.113955 | 8.099681 | 13.84374 |
| FDI | 1011 | 4.90565 | 10.27521 | -82.8921 | 161.8237 |
| Open | 966 | 77.04642 | 45.74827 | 17.85861 | 531.7374 |
| HC | 576 | 8.434482 | 9.624879 | .21989 | 60.50664 |
| Inv | 934 | 22.85473 | 15.95429 | -2.424358 | 219.0694 |
| Inf | 934 | 1.815704 | .4004216 | -1.527068 | 2.484336 |
| DF | 978 | 36.87285 | 27.23404 | 2.857408 | 151.5489 |
| CC | 882 | -.6292983 | .5983816 | -1.81344 | 1.216737 |
| GE | 881 | -.712091 | .6099507 | -1.891474 | 1.049441 |
| RQ | 882 | -.6706892 | .6100446 | -2.297536 | 1.12727 |
| RL | 882 | -.6685901 | .636813 | -2.129996 | 1.07713 |
| VA | 882 | -.6136993 | .7191801 | -2.226054 | 1.015621 |
| PS | 882 | -.519329 | .889951 | -2.844653 | 1.28206 |

### 3.2. Panel Unit Root tests

The first step in our econometric analysis is to test the stationarity of all variables using the test of Levin et al (2002 LLC) and the test of Im et al (2003 IPS). According to Table 4, the majority of our series is stationary at first difference.

**Table 4.Panel Unit Root test**

| | Level | | First difference | |
|---|---|---|---|---|
| | Levin, Lin & Chu t | Im, Pesaran and Shin W-stat | Levin, Lin & Chu t | Im, Pesaran and Shin W-stat |
| GDP | -0.66328 | 0.08765 | -11.6869 | -11.5611 |
| | (0.2536) | ( 0.5349) | ( 0.0000)*** | ( 0.0000)*** |
| FDI | -0.97233 | -4.86216 | -23.7868 | -25.4818 |
| | (0.1654) | (0.0000)*** | (0.0000)*** | (0.0000)*** |
| CC | -2.75133 | 1.10427 | -24.9913 | -14.4537 |

| | | | | |
|---|---|---|---|---|
| | (0.0030)*** | (0.8653) | (0.0000)*** | ( 0.0000)*** |
| RL | -10.1144 | -5.93406 | -19.5269 | -12.4814 |
| | (0.0000)*** | (0.0000)*** | (0.0000)*** | (0.0000)*** |
| PS | -6.62929 | -2.78744 | -24.7777 | -16.3499 |
| | (0.0000)*** | (0.0027)*** | ( 0.0000)*** | ( 0.0000)*** |
| VA | -0.82681 | 5.90878 | -137.712 | -21.8727 |
| | (0.2042) | (1.0000) | (0.0000)*** | ( 0.0000)*** |
| RQ | -5.92063 | -1.65863 | -21.9689 | -15.1776 |
| | (0.0000)*** | ( 0.0486)** | (0.0000)*** | ( 0.0000)*** |
| EG | -7.68206 | -4.19123 | 0.8653 | -26.4392 |
| | ( 0.0000)*** | ( 0.0000)*** | ( 0.0000)*** | ( 0.0000)*** |
| Inf | 2.16022 | 5.95159 | -11.5343 | -7.50443 |
| | ( 0.9846) | (1.0000) | (0.0000)*** | (0.0000)*** |
| Inv | 1.97131 | -1.68783 | -15.4435 | -11.5869 |
| | ( 0.9757) | (0.0457)** | (0.0000)*** | (0.0000)*** |
| DF | -0.02457 | 2.38367 | -37.4680 | -20.9134 |
| | ( 0.4902) | (0.9914) | (0.0000)*** | ( 0.0000)*** |
| Open | -0.98002 | -0.93329 | -17.9615 | -12.6952 |
| | (0.1635) | ( 0.1753) | (0.0000)*** | (0.0000)*** |
| HC | 2.60113 | -4.20535 | -23.7397 | -13.6606 |
| | (0.9954) | (0.0000)*** | (0.0000)*** | (0.0000)*** |

Note : P-value in parenthesis *** and ** indicate the significance level at 1%and 5% respectively

In the second step, we proceed with Pedroni's (2004) and Kao (1999) tests in order to examine the existence of the long-run relationship among the variables.

**Table 5 . Cointegration tests results**

| Pedroni'scointegration test(2004) | | |
|---|---|---|
| | Tstatistic | Prob |
| **within-dimension** | | |
| Panel v-Statistic | 3.017628 | 0.0013*** |
| Panel rho-Statistic | 7.277675 | 1.0000 |
| Panel PP-Statistic | 4.157839 | 1.0000 |
| Panel ADF-Statistic | -1.805319** | 0.0355** |
| **between-dimension** | | |
| Group rho-Statistic | 9.034998 | 1.0000 |
| Group PP-Statistic | -1.394264* | 0.0816* |
| Group ADF-Statistic | -1.654116 | 0.0491** |
| Kao'scointegration test(1999) | | |
| Kao'scointegration test | 0.0491 | 0 .0157** |

Note : P-value in parenthesis *** and ** indicate the significance level at 1%and 5% respectively

Regarding the analysis of co-integration (table (5), Pedroni's (2004) and Kao (1999) tests confirm the rejection of the null hypothesis of no co-integration at 5% level of significance. Then, our findings confirm the existence of a long run relationship among the variables. Definitely, we use Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) estimators. Those estimators solve the problem of endogeneity and they are free from serial correlation, small sample bias (Phillips and Hansen (1990), Stock and Watson (1993)). Similarly, they give us an idea about the long-run relationship between variables.

Therefore, Generalized Method of Moments (GMM) has been employed because it solves the endogeneity problem by introducing lags variable and thus it makes model dynamic. In addition, it will serve to robustify DOLS and FMOLS results. Which are reported in Table (6) showing a long-term relationship between the independent variables (FDI, DF, Inf and HC) and the dependent variable. They confirm the importance of all these variables in explaining long-run economic growth, except for the domestic investment variable which is not significant in the DOLS model. Regarding foreign direct investment, its coefficients are positive and significant at 10% and 1% level in the FMOLS and DOLS models, respectively. So, we can point out that in the long term, foreign direct investment has a positive effect on economic growth in the region. The results are in line with findings of Abbes et al. (2014), Benmamoun and Lehnert (2013) and Omri et al. (2014).

For the control variables, the coefficients associated with the two variables (Financial Development and Inflation) have opposite signs in the FMOLS and DOLS models. Indeed, the financial development is negatively and significantly correlated with economic growth at 10% threshold in the FMOLS model. However, that same variable has a positive and significant coefficient at 1% level in the DOLS model.

For the coefficient of inflation measured by the consumer price index, it is negative and statistically significant at 1% level of significance in the FMOLS model. However, in the DOLS model, it is positive and statistically significant at the 1% level.

Regarding domestic investment, it has a positive impact on the economic growth only in the FMOLS regression. This implies that public and private investment in the productive sector is essential for economic growth. Moreover, the results of FMOLS and DOLS show that the coefficient of human capital is positive and statistically significant at 10% and 1% level of significance in FMOLS and DOLS models, respectively.

Our findings presented in table (6) confirm that trade openness has a negative impact on economic growth for both the FMOLS and DOLS regressions. This negative relationship can be explained by the fact that African countries are unable to use their resources to produce goods and services in the country and export them to their foreign counterparts.

**Table 6. Results of estimation by FMOLS and DOLS models**

| Variables | **FDI** | **DF** | **Inf** | **Inv** | **Open** | **HC** |
|---|---|---|---|---|---|---|
| FMOLS | 0.005033* | -0.000547* | -0.001517** | 0.002047** | -0.000222** | 0.004998* |
| | 0.0542 | 0.0867 | 0.0000 | 0.0000 | 0.0401 | 0.0662 |
| DOLS | 0.003627*** | 0.005451*** | 0.001328*** | 0.000271 | -0.000720*** | 0.005890*** |
| | 0.0024 | 0.0000 | 0.0000 | 0.7117 | 0.0059 | 0.0000 |

*,**,and***indicate significance at 10, 5, and 1% levels, respectively

In this section, we use a dynamic model by applying the System GMM (table 7) where the the dependant variable is changed into the growth form because it is necessary to use GMM by treating the same variables as I(0). The consistency of the GMM estimator depends on the validity of instruments. To overcome this issue, we use two specification tests: the validity of Hansen's instruments and the second order autocorrelation test.

**Table 7 .Results of estimation by GMM system method**

| | **M1** |
|---|---|
| GDP(-1) | .1508587<br>(0.000)*** |
| FDI | 5.47e-06<br>(0.059)* |
| Open | 6.65e-06 |

| | |
|---|---|
| | (0.000)*** |
| HC | -.0000138<br>(0.051)* |
| Inv | 9.17e-06<br>(0.001)*** |
| Inf | -.0003973<br>(0.000)*** |
| DF | -4.43e-06<br>(0.045)** |
| Cons | .0017303<br>(0.000)*** |
| AR(1) : p-$value^b$ | 0.006 |
| AR(2) : p-$value^b$ | 0.289 |
| Sargan test: p-$value^a$ | 0.148 |
| Hansen test: p-$value^a$ | 0.580 |

*,**,and***indicate significance at 10, 5, and 1% levels, respectively

Table (7) shows that the two specifications tests do not reject the over-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 estimation of our model using GMM system statistically and economically gives satisfactory results.

The results of the system GMM estimator indicate that the coefficient of the lagged GDP is positive and statistically significant at 1% level of significance. This result shows that current African economic growth depends on its previous level. In other words, the previous economic growth of the previous year represents an accumulation of wealth and a considerable development of the financial and economic infrastructure that leads to increase productivity, raise consumer purchasing power, and promote savings that can finance the investment of the current year. The results are in line with Haj Fraj and Hamdaoui (2018).

Regarding the coefficient associated with FDI inflows, it is positive and statistically significant at 10% threshold similarly for the FMOLS and DOLS models. These results are similar to those found by Benmamoun and lehnert (2013) and Omri et al (2014).

For the coefficient of the trade openness, it changes its sign compared to FMOLS and DOLS models. Indeed, trade openness has a positive and statistically significant effect on economic growth at 1% level of significance in the SGMM model. This implies that an increased liberalization policy facilitates technology transfer which improves productivity and therefore stimulates economic growth. These results are confirmed by the previous work of Tiba et al. (2015).

For the inflation, its coefficient is positive and significant in the DOLS model. However, it becomes negative and statistically significant at 1% level in the S-GMM and the FMOLS models. This result makes sense as when costs increase, the consumer price index rises. Then, the investment decreases. So, the long-run economic growth is deteriorating.

# 4. Effect of the governance on the relationship between Foreign Direct Investment and economic growth

In this section, in order to test the existence of a long-run relationship between the foreign direct investment and economic growth in the presence of governance, we will estimate equation (2) using the KAO test which checks the existence of a co-integration relationship

among the considered variables. Results of KAO test are resumed in table 8. In this case, we found KAO 1, KAO 2, KAO 3, KAO 4, KAO 5and KAO 6 which presented the KAO test of eq (2) when we introduce each time Control of Corruption, Government Effectiveness, Political Stability, Rule of Law, Regulatory Quality and Voice and Accountability, respectively.

**Table 8.Kao test Results**

| **ADF** | **t-statistic** | **Prob** |
|---|---|---|
| KAO 1 | 1.573475 | 0.0578* |
| KAO 2 | 2.460023 | 0.0069*** |
| KAO 3 | 2.078675 | 0.0188** |
| KAO 4 | 3.722113 | 0.0001*** |
| KAO 5 | 2.479458 | 0.0066*** |
| KAO 6 | 3.696221 | 0.0001*** |

*,**,and***indicate significance at 10, 5, and 1% levels, respectively

Accordingly to table (8), we show that most of the statistics associated with T statistics is less than 10% significance level. Furthermore, it is possible to reject the null hypothesis of no co-integration relationship. This implies the existence of a long-run relationship between all the considered variables. After detecting the existence of cointegration relationship, Panel FMOLS and DOLS estimator will be adopted to estimate the long-run link between all variables.

The results of the role of good institutional quality, measured by the six dimensions of Kaufman et al (2016) (PS, CC, GE, RL, VA, RQ) in ameliorating the impact of FDI on economic growth are resumed in columns (2), (4), (6), (8), (10) and (12), respectively, in the case of African countries, using the FMOLS models. While, the columns (3), (5), (7), (9), (11) and (13) present the analysis of the results of the impact of these same dimensions for the case of the DOLS model.

**Table 9. Results of FMOLS and DOLS models**

| | **M2 FMOLS** | **M3 DOLS** | **M4 FMOLS** | **M5 DOLS** | **M6 FMOLS** | **M7 DOLS** | **M8 FMOLS** | **M9 DOLS** | **M10 FMOLS** | **M11 DOLS** | **M12 FMOLS** | **M13 DOLS** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PS | -0.300 (0.254) | -1.283 (0.000)*** | | | | | | | | | | |
| CC | | | -0.015 (0.539) | -0.075 (0.012)** | | | | | | | | |
| RQ | | | | | -5.505 (0.000)*** | -3.73 (0.000)*** | | | | | | |
| VA | | | | | | | 0.012 (0.000)*** | -0.006 (0.381) | | | | |
| RL | | | | | | | | | -0.009 (0.630) | -3.423 (0.000)*** | | |
| GE | | | | | | | | | | | -4.835 (0.000)*** | -0.120 (0.000)*** |
| FDI | 0.491 (0.000)*** | 0.415 (0.031)** | 0.002 (0.031)** | 0.005 (0.000)*** | 1.174 (0.000)*** | 0.712 (0.000)*** | -0.001 (0.919) | -0.004 (0.512) | 0.010 (0.041)** | 0.769 (0.000)*** | 1.329 (0.000)*** | 0.005 (0.000)*** |
| Open | 0.023 (0.000)*** | 0.035 (0.000)*** | -0.000 (0.000)*** | -0.000 (0.001)**** | 0.017 (0.000)*** | 0.042 (0.000)*** | 0.000 (0.125) | -0.000 (0.142) | -0.000 (0.332) | 0.038 (0.000)*** | 0.015 (0.000)*** | -0.000 (0.000)*** |
| HC | 0.146 (0.126) | 0.205 (0.430) | -0.001 (0.304) | 0.002 (0.002)*** | -0.035 (0.709) | -0.119 (0.583) | -0.023 (0.135) | -0.022 (0.031) | 0.006 (0.042) | 0.023 (0.899) | 0.250 (0.052)* | 0.005 (0.000)*** |
| Inv | 0.076 (0.000)*** | 0.076 (0.000)*** | 0.003 (0.000)*** | 0.000 (0.433) | 0.081 (0.000)*** | 0.069 (0.000)*** | 0.001 (0.004)*** | 0.003 (0.000)*** | 0.002 (0.000)*** | 0.054 (0.000)*** | 0.048 (0.000)*** | 0.0008 (0.223) |
| Inf | 0.053 (0.000)*** | 0.042 (0.000)*** | 0.002 (0.000)*** | 0.001 (0.000)*** | 0.040 (0.000)*** | 0.038 (0.000)*** | 0.002 (0.000)*** | 0.002 (0.000)*** | 0.003 (0.000)*** | 0.026 (0.000)*** | 0.039 (0.000)*** | 0.001 (0.000)*** |
| Df | 0.037 (0.000)*** | 0.047 (0.000)*** | 0.003 (0.000)*** | 0.005 (0.000)*** | 0.031 (0.000)*** | 0.007 (0.611) | -7.61 (0.987) | 0.001 (0.180) | 0.002 (0.000)*** | 0.051 (0.000)*** | 0.054 (0.000)*** | 0.005 (0.000)*** |
| Ps*FDI | 0.211 (0.008)*** | 0.410 (0.003)*** | | | | | | | | | | |
| CC*FDI | | | 0.006 (0.000)*** | 0.004 (0.045)** | | | | | | | | |
| RQ*FDI | | | | | 1.979 (0.000)*** | 1.265 (0.000)*** | | | | | | |
| VA*FDI | | | | | | | 0.063 (0.004)*** | 0.173 (0.000)*** | | | | |
| RL*FDI | | | | | | | | | 0.010 (0.060)* | 0.832 (0.002)*** | | |
| GE*FDI | | | | | | | | | | | 1.552 (0.000)*** | 0.002 (0.100)* |

*,**,and***indicate significance at 10, 5, and 1% levels, respectively

According to the FMOLS and DOLS results which were reported in Table (9), the positive impact of FDI on economic growth has been ameliorating under the scope of governance. In fact, the coefficients of the variable of interaction between FDI and each of six governance indicator (FDI*GOV), in both models (FMOLS and DOLS) are more important than the coefficient of FDI (0.0003) in eq (1).Then , we can deduct that the positive impact of Foreign Direct Investment can be ameliorated, particularly in countries with good institutional quality.
By comparing the coefficients of interaction between FDI and each of six governance indicators, we can conclude that the most important indicators which improve the long-run economic growth are political stability (0.211 and 0.410 in FMOLS and DOLS models, respectively) and regulatory quality (1.979 and 1.265 in FMOLS and DOLS models, respectively).
We start our dynamic analysis with the instrument validity test. Table (10) shows that the two tested specifications in the case of African countries do not reject the over- 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).

**Table 10.Results of estimation by GMM system method**

| | **M14** | **M15** | **M16** | **M17** | **M18** | **M19** |
|---|---|---|---|---|---|---|
| GDP(-1) | .1329682<br>(0.068)* | .326222<br>(0.031)** | .0770465<br>(0.002)*** | .0715423<br>(0.002)*** | .0561041<br>(0.054)** | .4336999<br>(0.007)*** |
| FDI | .0000385<br>(0.032)** | .0000559<br>(0.072)*** | .000021<br>(0.023)** | .0000264<br>(0.187) | .0000151<br>(0.019)** | .0000212<br>(0.144) |
| Open | 8.61e-06<br>(0.023)** | 6.79e-06<br>(0.099)* | 8.45e-06<br>(0.005)*** | 9.71e-06<br>(0.005)*** | 7.12e-06<br>(0.004)*** | 4.61e-06<br>(0.196) |
| HC | -.000036<br>(0.108) | -.0000142<br>(0.632) | -.000061<br>(0.008)* | -.0000394<br>(0.114) | -.0000235<br>(0.223) | -.000046<br>(0.180) |
| Inv | 7.80e-06<br>(0.215) | 4.05e-06<br>(0.555) | 7.43e-06<br>(0.090)* | 8.60e-06<br>(0.102) | .0000125<br>(0.001)*** | 3.60e-06<br>(0.664) |
| Inf | -.0002852<br>(0.167) | -.0003707<br>(0.079)*** | -.0001373<br>0.562 | -.0004147<br>(0.088)*** | -.0004706<br>(0.045)** | -.0001356<br>(0.581) |
| DF | 1.49e-06<br>(0.878) | -6.15e-06<br>(0.603) | .0000132<br>(0.136) | -2.06e-06<br>(0.828)) | -5.49e-06<br>(0.328) | 3.29e-06<br>(0.785) |
| CC | -.0003756<br>(0.053)* | | | | | |
| CC*FDI | .0000608<br>(0.051)* | | | | | |
| GE | | -.0002524<br>(0.274) | | | | |
| GE*FDI | | .0000805<br>(0.068)* | | | | |
| RL | | | -.0004871<br>(0.003)*** | | | |
| RL*FDI | | | .0000386<br>(0.031)** | | | |
| RQ | | | | -.0002266<br>(0.404) | | |
| RQ*FDI | | | | .0000615<br>(0.072)* | | |
| PS | | | | | -.0001059<br>(0.068)* | |
| PS*FDI | | | | | .0000469 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | (0.000)*** | |
| VA | | | | | | -.0003056 (0.111) |
| VA*FDI | | | | | | .0000529 (0.019)** |
| _cons | .001196 (0.023) | .0014095 (0.021) | .0007822 (0.199) | .0017479 (0.010) | .0020231 (0.000) | .0008732 (0.154) |
| AR(1) : p-$value^b$ | 0.003 | 0.006 | 0.006 | 0.012 | 0.005 | 0.002 |
| AR(2) : p-$value^b$ | 0.416 | 0.272 | 0.654 | 0.250 | 0.273 | 0.204 |
| Sargan test: p-$value^a$ | 0.111 | 0.175 | 0.385 | 0.151 | 0.137 | 0.150 |
| Hansen test: p-$value^a$ | 0.631 | 0.698 | 0.364 | 0.606 | 0.552 | 0.689 |

*,**,and***indicate significance at 10, 5, and 1% levels, respectively

The empirical results presented in table (10) show that the lagged GDP variable is positive and statistically significant at 1% level. This result retains their sign and significance as in eq (1). This implies that the current GDP is influenced by the previous GDP in all models.

Regarding the variable of interest in our study, Foreign Direct Investment improves economic growth, in the presence of governance. The results presented in columns 14, 15, 16, 17, 18 and 19 resume our regressions by introducing each time each of six dimensions (CC,GE, RL, RQ, PS,VA),using the System GMM model.

At this stage, it is substantial to point out that the coefficients of the interaction of FDI with each of the six dimensions of governance have positive and statistically significant effects on economic growth in African economies. So, we can conclude that the dimensions of governance are indirect complementary factors in improving the effectiveness of FDI in terms of economic growth. In other words, all dimensions of governance are important for attracting FDI and growth in Africa countries, but with varying degree. Indeed, the two governance indicators namely voice and accountability and regulatory quality largely stimulate the attraction of FDI to Africa and hence promote economic growth.

# 5. Conclusion

At the end of our current research, it appears that the improvement of economic growth increases with the presence of the good quality of governance which was measured by the indicators of the governance of the World Bank. In fact, we studied the relationship between FDI and growth for a sample of 49 African countries. To do this, we used the FMOLS, DOLS and S-GMM approaches. The results show that FDI has a positive effect on economic growth in African countries. Last on, we examined the effect of FDI on economic growth, in the presence of governance. In this framework, we have integrated each time each one of six indicators of good governance developed by Kaufman et al. (2016) (Voice and accountability, the efficiency of the government, Political stability, regulatory quality, control of corruption, rule of law) to avoid any correlation effect that may exist between these indicators. Actually, we tested the interaction between FDI and the different dimensions of governance in order to determine which indicator stimulates the effect of FDI on promoting economic growth to a large extent. The results show that the efficiency of FDI in terms of economic growth improves with the introduction of governance. Certainly, we found that the terms of the interactions between FDI and the different dimensions of governance are positive and statistically significant in the long term as well as when we had corrected the endogeneity problems.

Regarding the six institutional dimensions, the most important governance indicators that improve the relationship between FDI and growth are political stability and regulatory quality in the FMOLS and DOLS model, while in the S-GMM model, the most relevant indicators are voice and accountability and regulatory quality. Nonetheless, we can confirm the fact that FDI

brings its benefits for economic growth in Africa in the presence of a healthy institutional environment.

A major political consequence can be interpreted from our results: the good institutional quality ameliorates the positive effect of FDI on economic growth. Surely, the Government must keep an eye on the political stability in each country. And it must give great importance to improving the Regulatory Quality and Voice and Accountability. However, we cannot neglect the effect of highlight that enhancing Foreign Direct Investment which would require a strong commitment from the policymakers side in order to ensure law and contracts enforcement.

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