Relevance of governance quality on the effect of foreign direct investment on economic growth: new evidence from African countries

Njangang, Henri and Nawo, Larissa

LAREFA, University of Dschang, Cameroon, LAREFA, University of Dschang, Cameroon

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Njangang Henri
LAREFA, University of Dschang
Cameroon

Nawo Larissa
LAREFA, University of Dschang
Cameroon

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Abstract

Despite the large volume of studies on the direct impact of foreign direct investment on economic growth, the results remain inconclusive. This has led researchers to examine the channels through which FDI affects economic growth. Evidence suggests that institution quality can improve economic growth by increasing foreign direct investment in the host countries. As governance quality is improving in African countries during the last decade, the aim of this study is to investigate the relationship between foreign direct investment, governance quality and economic growth in 51 African countries over the period 1998-2015. The empirical evidence is based on Generalized Method of Moments. the following findings are established. First, there is an unconditional positive effect of foreign direct investment on economic growth in African countries. We also find a positive and significant relationship between governance quality and economic growth. Second, these findings are still robust when we use the composite governance quality indicators. Three, when regards at interaction terms between governance quality and foreign direct investment, we find a convincing evidence that governance quality moderate favorably the effect of FDI on economic growth. Four, the moderate effect of governance quality on foreign direct investment and growth nexus still robust with composite governance quality indicators. Overall this study has established net direct positive and significant effect of foreign direct investment on economic growth and that this effect is enhanced by good governance. The major implication from our study is that African countries should improve their governance quality to benefit more from FDI in terms of achieving better growth outcomes.

keywords: FDI, governance, economic growth, Africa, GMM
JEL Code: F23, F63, G30, O55

1 Introduction

This paper investigates the effects of foreign direct investment (FDI) and governance quality on economic growth. More precisely, it investigates the role of governance quality on the economic effects of foreign direct investment. We use six unbundled governance quality indicators and construct four composite governance indicators. We first estimate the direct effect of foreign direct investment and governance quality on economic growth. We then estimate the interaction effects of foreign direct investment and governance quality on economic growth. The data cover 51 African countries between 1998 and 2015, and come from different sources. Overall, we find that foreign direct investment and governance quality have a strong positive effects on economic growth and that the effect of foreign direct investment on economic growth is enhanced by governance quality.

During the past two decades, foreign direct investment inflows have rapidly increased in developing countries, particularly in Africa, even if the amount of FDI received by African countries is less compared to others developing regions. This influx of foreign capital has revitalized the long debate in both academic and policy spheres about their economic benefits.

The nexus between foreign direct investment and economic growth has been intensively analyzed by a number of studies. Despite the theoretical justification for positive relationship between foreign direct investment and economic growth (Markusen and Venables, 1999; Rugman, 2010), the empirical evidence still an unresolved empirical puzzle with three major strands. The first branch of the literature argues that foreign direct investment is good for host countries and can improved their economic growth (Ram and Zhang, 2002; Campos and Kinoshita, 2002; Hoang et al., 2010; Kotrajaras et al., 2011; Gunby et al., 2017). Conversely, another stream of the literature does not support the positive effects of foreign direct investment. This stream of the literature argues that the effect of foreign direct investment on economic growth is non-significant and somewhat negative (Busse et al., 2016; Akinlo, 2004; Hermes and Lensink, 2003; Fry, 1993). At the crossroads of these two opposing groups, there is a third group of researchers who believe that the effects of FDI on economic growth is conditioned by absorptive capacity. Indeed, it has been shown in the literature that the positive effects of foreign direct investment on economic growth are conditioned by factors such as human capital (Borensztein et al., 1998) , financial development (Alfaro et al., 2004), quality of institutions (Jude and Levieuge, 2017) , democracy (Malikane and Chitambara, 2017) , economic freedom (Azman-Saini et al., 2010) and regulations (Adams and Opoku, 2015). This study is related to this third group of researchers.

Although institutions have been gaining popularity in recent years, especially in enhancing economic performance (Acemoglu et al., 2014) , only few scientific papers treat the role of governance quality on the relationship between foreign direct investment and economic growth, particularly in Africa. This paper contributes to this literature in many ways. First, unlike previous studies for African countries which concentrated on the two variables case, we include governance quality as a third variable. By incorporating governance quality as a third variable, we

not only attempt to underline the potential importance governance for economic growth but also test the hypothesis that governance quality alter favorably the economics effects of foreign direct investment. Second,the most recent study on the role of governance quality study in Africa (Agbloyor et al., 2016) uses data from 1996 to 2010. This study extends this period to 2015 and therefore takes into account the improvements in the quality of governance that have been observed over the past five years. According to the Mo Ibrahim report, the quality of governance in Africa has improved over the period 2012-2016. Thus, between 2012 and 2016, 37 out of 54 African countries improved their governance with an average improvement of +1.4 points. The report goes further by stating that 70% of African citizens live in a country that has seen improved governance. This improvement may therefore call into question the previous results, which for the most part showed that governance has no significant effect on growth (Agbloyor et al., 2016). Moreover, the originality of this paper lies in the treatment of governance variable. In this paper we proceed to the construction of several composite indicators of governance to take into account the specificity of each of these indicators. So instead of having only six individual governance indicators has in past studies (Jude and Levieuge, 2017; Agbloyor et al., 2016) we use six individual governance indicators and four governance composite indicators, namely: political governance, economic governance, institutional governance and general governance index. Our results suggest that both FDI and governance quality increase economic growth and that governance quality enhanced the effects of FDI on economic growth.

The rest of the paper is organized as follows: Section 2 reviews the related literature. Section 3 details the model specification and data description. Section 4 presents the estimation and analysis of the results, and Section 6 is the conclusion and policy recommendations.

2 Literature reviews

Because of the potential economic benefits of foreign direct investment, such as increasing competitiveness, Job creation, transfer of technology and most importantly economic growth earnings (Borensztein et al., 1998; Karlsson et al., 2009; Makiela and Ouattara, 2018), many African governments have implemented various policies incentives to attract more foreign direct investment. Analyzing the relationship between FDI and economic growth has been one of hotly debated topic. However, researchers have reached mixed results.

The relationship between foreign direct investment and economic growth has been recently tested empirically in a number of studies both at micro and macro level for many specific country or panel of countries. However, there is no general consensus on the relationship between foreign direct investment and economic growth in terms of the role and importance of foreign direct investment on growth and the direction of causality. The enormous and growing literature on this subject can be summarized under three main strands. The first strand claims that foreign direct investment is a major driver of economic growth, and this view is referred to as the FDI-led growth hypothesis. The second view is that FDI does not contributes to the growth. The last view

argues that the effect of FDI on economic growth is conditional to absorptive capacity of host countries.

The first strand of the literature included studies of Iamsiraroj and Ulubaşoğlu (2015) ; Feeny et al. (2014); Li and Liu (2005); Pegkas (2015); Sunde (2017). These studies confirmed the direct positive effects of FDI on economic growth. For example, Pegkas (2015) estimates the effect of foreign direct investments on economic growth in the Eurozone countries over the period of 2002–2012. The paper employs panel data estimations to test the relationship between the variables. The empirical analysis reveals that there is a positive long-run cointegrating relationship between FDI stock and economic growth. The results also indicate that the stock of foreign direct investment is a significant factor that positively affects economic growth in the Eurozone countries. Sunde (2017) investigates the relationship between foreign direct investment and economic growth in South Africa. By using the ARDL bounds testing approach to cointegration and the VECM Granger causality approach, results show that foreign direct investment spur economic growth. Iamsiraroj and Ulubaşoğlu (2015) assesses the effect of foreign direct investment on economic growth utilizing a global sample of 140 countries in the period 1970 to 2009. They found that FDI positively affects economic growth. Moreover, they found that this association holds globally as strongly as in the developing world. Feeny et al. (2014) examine the impact of foreign direct investment to the Pacific region. Results from the estimation of a number of empirical models suggest that the impact of FDI is positive even if lower in Pacific countries than it is in host countries on average. In the case of the ASEAN5 countries, Ahmad et al. (2018) found a bi-directional causal relationship between FDI and growth in the long run. The direct effects of FDI on economic growth are supported by several other studies such as Ram and Zhang (2002); Campos and Kinoshita (2002); Hoang et al. (2010); Kotrajaras et al. (2011); Gunby et al. (2017).

There are other studies underlining the negative or insignificant impact of foreign direct investment on economic growth, mainly in developing countries (Carkovic and Levine, 2005; Beugelsdijk et al., 2008; Musibah et al., 2015; Saltz, 1992; Mencinger, 2003; Ang, 2009; Hermes and Lensink, 2003). For example, Carkovic and Levine (2005) shows that foreign direct investment does not impact the level of economic growth of states regardless of their level of development. Similarly, Beugelsdijk et al. (2008) sustain that FDI influence on the economic growth of developing countries is ambiguous. Other studies have shown that tax benefits to foreign firms can have negative consequences for the economy. For example, Easterly and Rebelo (1993) notes that policies in the form of preferential tax treatments and other concessions can distort domestic incentives. If foreign firms obtain significant benefits from host governments, the distortions caused could have large negative effects on growth. Alvarado et al. (2017) examine the effect of foreign direct investment on economic growth in 19 Latin American countries. Using panel data econometrics, they found robust empirical evidence that the effect of FDI on economic growth is not statistically significant in aggregated form. Additionally they found that FDI is not an adequate mechanism to accelerate economic growth in Latin America, with the exception of high-income countries. Recently, Bermejo Carbonell and Werner (2018) found no evidence for FDI to stimulate economic

growth in Spain over the period 1984-2010.

The third group of study claimed that the effect of foreign direct investment on economic growth depend on the local conditions of host countries such as, financial market development (Alfaro et al., 2004; Choong et al., 2004; Hermes and Lensink, 2003) , economic freedom (Azman-Saini et al., 2010) , democracy (Malikane and Chitambara, 2017) and recently institution quality (Jude and Levieuge, 2017; Agbloyor et al., 2016; Brahim and Rachdi, 2014).

For example, Borensztein et al. (1998) analyses the effect of FDI on growth. From a sample of 69 developing countries over the period 1970-1989 and based on the Romer model, the authors seek to account for the mechanisms underlying technology transfer. They conclude that FDI is an important channel for technology transfer. Moreover, they show empirically that FDI has a positive impact only if the level of education of the population exceeds a given threshold. Borensztein et al. (1998) estimate that it is from the 0.52 year high school threshold that FDI begins to drive economic growth gains in the host country. As a result, the positive influence of FDI on host economies would depend on their interactions with human capital. Bengoa and Sanchez-Robles (2003) show that the benefits of FDI for host countries require adequate human capital, political and economic stability, and a liberalized market environment. Lumbila (2005) and Li and Liu (2005) go in the same direction and give prominence to human capital as prerequisite for positive and significant impact of FDI on the economic growth of host countries. Gui-Diby (2014) tests the impact of FDI on the growth rate of 50 African countries over the period 1980-2009 and finds that FDI has a positive and significant impact on the growth rate. On the other hand, he does not find the links highlighted by Borensztein et al. (1998) between FDI, human capital and economic growth. Alfaro and Charlton (2009) show that human capital is not an important channel for technology transfer. The direct effects of FDI on economic growth are supported by the work of Ram and Zhang (2002); Campos and Kinoshita (2002); Hoang et al. (2010); Kotrajaras et al. (2011); Gunby et al. (2017). These authors, while using different methods and samples, come to a similar conclusion: FDI contributes to economic growth, regardless of any prior level of human capital.

Jude and Levieuge (2017) investigate the effect of foreign direct investment on economic growth conditional on the institutional quality of host countries. By using a panel smooth regression model on a large sample of developing countries, they show that FDI has a positive effect on growth only beyond a certain threshold of institutional quality. Therefore, for developing countries to benefit from FDI, institutional reforms should thus precede FDI attraction policies. Moreover, Brahim and Rachdi (2014) investigates the relationship between foreign direct investment, institutions and economic growth in 19 MENA countries over the period 1984-2011. The empirical evidence is based on the Panel Smooth Transition Regression (PSTR) modeling. The major finding of this study is that the effect of FDI on economic growth is conditional to the development of institutions in MENA countries. Therefore, only countries with good institutions can exploit the advantages of FDI on growth. However, others studies do not confirmed the role play by institutions in the relationship between FDI and growth. For example, Agbloyor et al. (2016) analyze the relationship between foreign direct investment, institutions and economic growth in sub-Saharan

Africa in different country over the period 1996-2010. Using a two step generalized methods of moments estimator with Weidmeijer corrected standard errors and orthogonal deviations, they do not found convincing evidence that institutions alter favorably the effect of FDI on economic growth in Sub Saharan African as a whole.

The present study, as a complement to the last strand of the literature, investigates the relevance of the quality of governance in FDI and growth relations in Africa with new data. Therefore, in the following section, the relationship between foreign direct investment, governance quality and economic growth in African countries is being investigated.

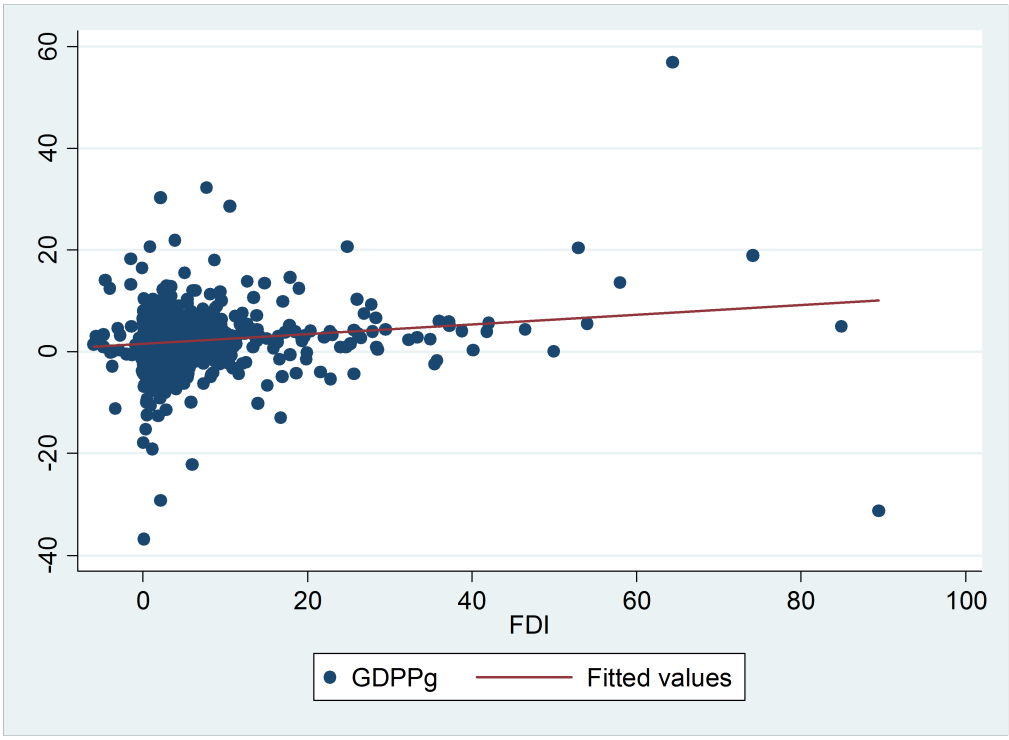
3 Data and methodology

The empirical approach is designed to assess the role of governance quality in the relationship between foreign direct investment and economic growth using four governance composite indicators in African countries. In this section our data is described (section 3.1) and the estimations strategy is discussed (section 3.2).

3.1 Data

We investigate a panel of 51 African countries over the period 1998-2015 with data from: World Development Indicators (WDI) and World Governance Indicators (WGI). The periodicity under

Figure 1: Foreign direct investment vs Growth

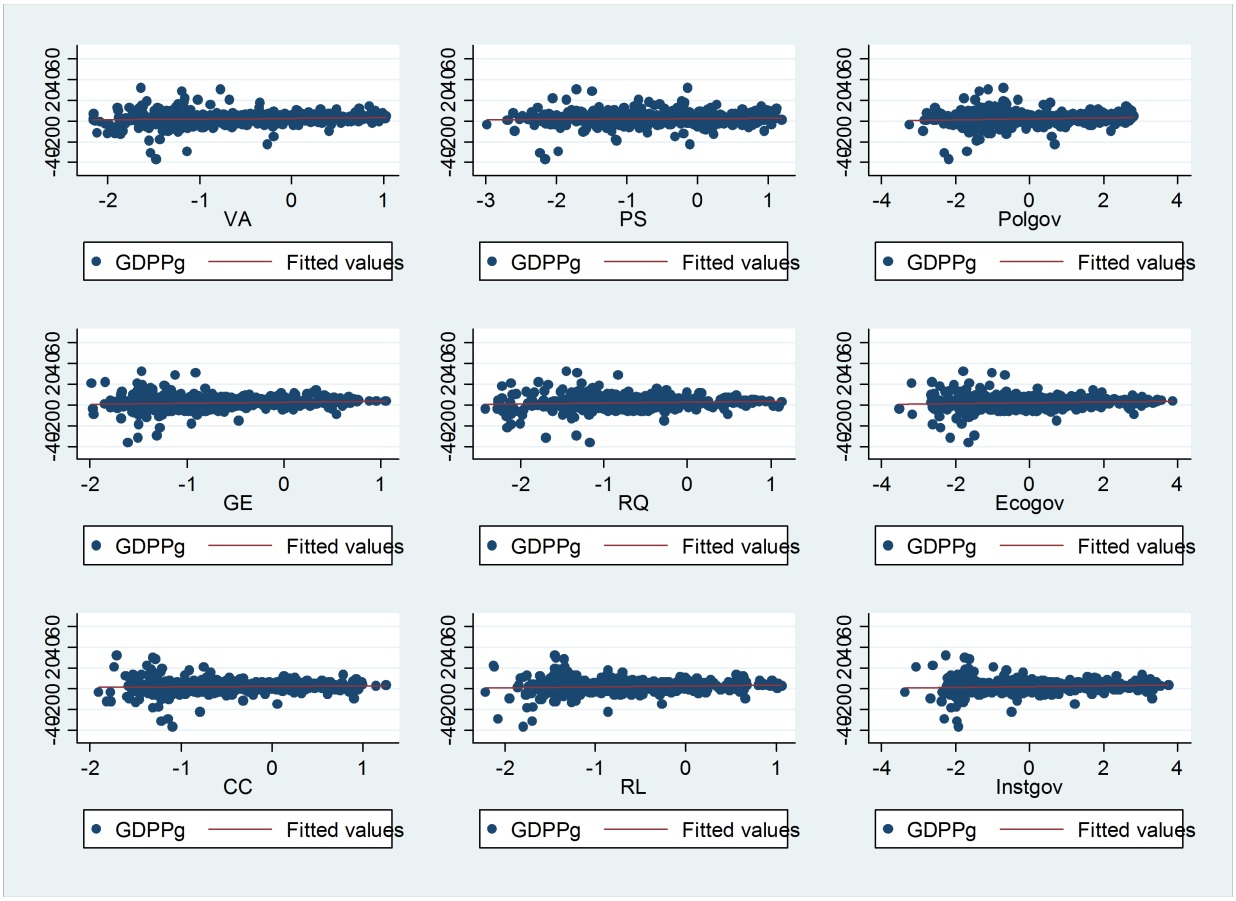


investigation starts from 1998 due to the fact that governance variables from WGI are only available from the year 1996 and at that date, several African countries have no data available.

This year period is divided into six three-year non-overlapping intervals: 1998-2000; 2001-2003; 2004-2006; 2007-2009; 2010-2012 and 2013-2015.

The dependent variable is economic growth measured by the GDP per capita growth rate. Our main independent variables are foreign direct investment as a percentage of GDP (FDI) and governance quality. Governance quality is made of six individual governance indicators from Kaufmann et al. (2010) ; namely: the rule of law, corruption-control, regulation quality, government effectiveness, voice and accountability, and political stability. For Robustness check, we additionally use four governance quality index, notably political governance, economic governance, institutional governance, and general governance. These four governance quality index are composite indicators that are combined by means of the Principal Component Analysis (PCA) technique. Such unbundled and bundled governance (Asongu and Nwachukwu, 2017; Agbloyor et al., 2016) variables are increasingly being used in the literature. Figure 1 plots the relationship between FDI and economic growth. The graph suggests a positive relationship between these two variables. The relationship between different governance indicators and economic growth is given in Figure 2. The figure illustrates a positive relationship between governance indicators and economic growth. Since correlation does not mean causality, it is important to empirically test these relationships

Figure 2: Governance vs economic growth



Next to the governance quality variables, we include five control variables, generally considered in the literature as determinants of economic growth: (i) Oil rents to GDP; (ii) Trade openness; (iii) Inflation rate; (iv) domestic investment and (v) financial development (M2). First, while natural resource measured by oil rents has been documented by Sachs and Warner (1995) to reduce economic growth in African countries, the effect is debatable when governance quality come into play. Second, the effect of financial development is also debatable. While Jedidia et al. (2014) and Ibrahim and Alagidede (2017) have proved that financial development is positively correlated to economic growth, others studies underline the negative or insignificant impact of financial markets on economic growth in developing countries (Menyah et al., 2014; Narayan and Narayan, 2013; Gries et al., 2009; Nili and Rastad, 2007). Third, several studies associated economic growth to demographic growth (Cruz and Ahmed, 2018). However, Prettner and Prskawetz (2010) have established that population growth could also impede economic growth. The positive relationship between trade openness and economic growth has been proved in the literature (Shahbaz, 2012; Dowrick and Golley, 2004), however others studies have reached to insignificant and somewhat negative effect of trade openness on economic growth (Musibah et al., 2015). however others studies have reached to insignificant and somewhat negative effect of trade openness on economic growth (Musila and Yiheyis, 2015; Eriș and Ulaşan, 2013). Definitions of variables are given in Table 7 (see Appendix), the summary statistics are provided in Table 1 and correlation matrix in Table 10 (see Appendix).

Table 1: Summary statistics

	Mean	S.D	Minimum	Maximum	Observations
Foreign direct investment	5,101	7,217	-4,265	52,398	304
GDP growth	2,109	3,726	-10,683	26,966	304
Voice and accountability	-0,627	0,704	-2,156	1,009	305
Political stability	-0,524	0,868	-2,786	1,088	306
Government effectiveness	-0,697	0,596	-1,967	0,992	306
Regulatory quality	-0,665	0,600	-2,261	1,053	306
Control of corruption	-0,580	0,572	-1,733	0,972	306
Rule of law	-0,663	0,622	-2,114	1,033	306
Political governance index	0,002	1,287	-3,079	2,757	305
Economic governance index	0,0005	1,336	-3,389	3,656	306
Institutional governance index	0,006	1,364	-3,033	3,403	306
General governance index	0,009	2,149	-5,453	5,412	305
Oil rents-to-GDP	12,772	12,634	0,001	65,754	303
Trade openness	78,033	43,528	20,763	425,997	287
Inflation	95,034	1423,583	-4,976	24411,030	294
Population Growth	2,448	0,908	0,178	6,914	305
Domestic investment	21,784	13,323	2,234	166,502	280
Financial development	36,258	26,871	2,978	148,706	296

Note: S.D: Standard Deviation

3.2 Methodology

3.2.1 Principal component analysis

We follow the approach proposed by Asongu and Nwachukwu (2016) to construct a synthetic index of governance quality. This index was based on Principal Component Analysis (PCA). This method helps to keep the multi-dimensionality of governance quality indicators and addresses the issue of high collinearity among individual indicators and reduce the highly correlated variables into a smaller set of uncorrelated variables (Principal components). The criterion for the retention of common factors is from Kaiser (1974) and Jolliffe (2002). The authors have recommended the retention of principal components with an eigenvalue higher than one. The principal component analysis of our four governance quality index is disclosed in Table 2.

Table 2: Principal component analysis (PCA) for composite governance indicators

	Component Matrix						Proportion	Cumulative proportion	Eigen value
	VA	PS	RQ	GE	RL	CC			
First PC(G,Gov)	0.387	0.367	0.388	0.433	0.451	0.415	0.757	0.757	4.542
Second	0.248	0.752	-0.536	-0.271	-0.008	-0.103	0.088	0.845	0.529
Third	0.775	-0.187	0.273	-0.157	-0.146	-0.493	0.063	0.909	0.382
First Pc(Polgov)	0.707	0.707					0.816	0.816	1.632
Second	0.707	-0.707					0.184	1,000	0.3682
First Pc(Ecogov)			0.707	0.707			0.885	0.884	1.539
Second			0.707	-0.707			0.115	1,000	0.23
First Pc(Instgov)					0.707	0.707	0.926	0.926	1.704
Second					0.707	-0.707	0.074	1,000	0.147

Note. P.C: Principal Component. VA: Voice and Accountability. RL: Rule of Law. R.Q: Regulation Quality.

3.2.2 Estimation specification

This paper investigates the effect of foreign direct investment and governance quality on economic growth. In particular, the study examines the moderation effect of governance quality on the relationship between foreign direct investment and economic growth. In other word, does governance quality enhances the effect of foreign direct investment on economic growth? According to the literature on FDI-growth relationship (Gui-Diby, 2014; Jude and Levieuge, 2017), we formulate the following model:

$$Growth_{it} = \alpha Growth_{i,t-1} + \beta_1 FDI_{i,t} + \beta_2 Gov_{i,t} + \beta_3 X_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t} \quad (1)$$

Were $Growth_{i,t}$ represents the GDP per capita growth in country i at time t. FDI is the key explanatory variable referring to foreign direct investment. Gov stands for governance quality indicators. $X_{i,t}$ is the vector of control variables. η_i captures countries specific effects and ν_t takes into account the relevant time effect. ϵ_{it} is a random error term that captures the effect of all omitted variables?

Our baseline model (Eq.1), does not include interaction term as we test only the direct effect of foreign direct investment and governance quality on economic growth. However, in the second set of regressions, we test the hypothesis that the effect of foreign direct investment on economic growth depends on the level of governance quality. For this purpose, we introduce in Equation (1) an interaction term between foreign direct investment and governance quality. This modified versions of Equation (1) that include the interactive term can be written as follow:

$$Growth_{it} = \alpha Growth_{i,t-1} + \beta_1 FDI_{i,t} + \beta_2 (FDI_{it} \times Gov_{it}) + \beta_2 Gov_{i,t} + \beta_3 X_{i,t} + \eta_i + \nu_t + \varepsilon_{i,t} \quad (2)$$

To test the hypothesis explained above, we are interested in β_1 and β_2, which provide information on the marginal effect of foreign direct investment on economic growth according to the level of governance quality. A positive interaction (β_2>0) would indicate that the governance quality enhances the positive effect of foreign direct investment on economic growth when (β_1>0) or reduce the negative effect of foreign direct investment on economic growth when (β_1<0). We estimate Equation (2) by using a System Generalized Method of Moments (GMM) proposed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998).This method enables us to control for unobserved country-specific factor. Moreover, the presence of a lag-dependent variable on the right hand of the equation and the reverse causality between foreign direct investment and economic growth will lead to simultaneity bias of the regression's coefficients. GMM estimation technique is developed to address such endogeneity problem. The GMM technique is declined in two versions: the difference GMM were the lagged levels of the explanatory are used as instruments and system GMM were the combination of the regression in differences and the regression in levels are used. However, Bond et al. (2001) have recommended that the system GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998) can dramatically improve efficiency and avoid the weak instruments problem in the first difference GMM estimator developed by Arellano and Bond (1991). The consistency of the System GMM estimator is verified by using two specification tests: the first test examines the hypothesis that the second-order error term is probably correlated with the first order, but not the second order. Then, the validity of all instruments is tested using the Hansen test of over-identifying restrictions.

4 Empirical results

This section presents the empirical findings using different measured of governance quality as discussed above. The empirical results are presented in Tables 3–6. Table 3 reports a preliminary analysis on the effects of foreign direct investment and governance quality on economic growth. Table 4 presents coefficients estimates obtained from the baseline specification, which used governance composite index constructed with PCA analysis. Table 5 reports the coefficients estimate from a specification that uses interaction term between foreign direct investment and the six individual governance indicators to examine the complementary effect of FDI and governance on

economic growth. Table 6 displays the estimated coefficient obtained from a specification that uses interaction terms between FDI and governance composite index, to confirm the result obtain in Table 5. Results present in Table 4 and 6 is to show whether the aggregate index of governance yields qualitatively similar results to that of individual governance indicators report in Table 3 and 5.

4.1 Baseline model

Our baseline model (Equation 1) investigates the direct effect of foreign direct investment and governance quality on economic growth. To provide the most data on our dependent variable (economic growth) and on governance quality, this paper use the largest possible sample of African countries by taking a cross section of 51 countries and five non overlapping three-year average intervals over the period 1998-2015.

Table 3 presents the results of the model estimations, which allow for a direct effect of foreign direct investment and governance quality on economic growth, without interaction term. Columns 1 to 6 disclose the effect of foreign direct investment and six governance quality indicators, namely: Voice and accountability, Political stability, Government effectiveness, Regulatory quality, Control of corruption and Rule of law respectively. The coefficients associated with foreign direct investment are positive and strongly significant in all columns. Meaning that foreign direct investment increases African economic growth. These findings are consistent with several past studies (Gui-Diby, 2014; Iamsiraroj and Ulubaşoğlu, 2015; Sunde, 2017). For these studies, FDI inflows may provide direct capital financing, generate positive externalities, and consequently stimulate economic growth through technology transfer, spillover effects, productivity gains, and the introduction of new processes and managerial skills. However, our results run counter to those who believe that FDI on its own does not promote economic growth (Jude and Levieuge, 2017; Agbloyor et al., 2016). Additionally, results show that all six governance quality indicator have a positive effect on economic growth (with four out of six being significant). Voice accountability, political stability, government effectiveness and regulatory quality have a positive and significant effect on economic growth while control of corruption and rule of law have a positive but non-significant effect on economic growth.

Table 3: FDI, governance quality indicators and economic growth

	Dependent variable: GDP per capita growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign direct investment	0.0494***	0.0664***	0.0415***	0.0671***	0.0731***	0.0667***
	(0.0120)	(0.0114)	(0.0126)	(0.0153)	(0.0119)	(0.0119)
Voice and accountability	1.336***					
	(0.417)					
Political stability		0.432*				
		(0.254)				
Government effectiveness			3.918***			
			(0.519)			
Regulatory quality				3.048***		
				(0.457)		
Control of corruption					0.194	
					(0.436)	
Rule of law						0.428
						(0.528)
Lag of GDP per capita growth	0.187***	0.185***	0.154***	0.231***	0.222***	0.206***
	(0.0162)	(0.0237)	(0.0202)	(0.0307)	(0.0267)	(0.0260)
Oil rents-to-GDP	0.0512***	0.0234	0.0892***	0.0325	0.00927	0.00690
	(0.0184)	(0.0215)	(0.0225)	(0.0250)	(0.0240)	(0.0233)
Trade openness	0.0266***	0.0262***	0.0323***	0.0430***	0.0340***	0.0367***
	(0.00411)	(0.00474)	(0.00536)	(0.00489)	(0.00440)	(0.00512)
Inflation	-0.00802***	-0.00894***	-0.00499**	0.000915	-0.00943***	-0.00550***
	(0.00219)	(0.00136)	(0.00215)	(0.00232)	(0.00171)	(0.00154)
Population Growth	0.159	0.334	0.814**	0.992***	0.506	0.825**
	(0.291)	(0.296)	(0.394)	(0.291)	(0.321)	(0.323)
Domestic investment	0.0210	0.0300	0.0412	0.0345	-0.00224	0.0369
	(0.0287)	(0.0290)	(0.0269)	(0.0345)	(0.0328)	(0.0254)
Financial development	-0.0477***	-0.0502***	-0.0439***	-0.0405***	-0.0395***	-0.0500***
	(0.0119)	(0.00858)	(0.0124)	(0.00715)	(0.0103)	(0.0111)
Constant	0.431	-0.455	-0.886	-2.531***	-1.004	-2.380**
	(0.895)	(1.111)	(1.295)	(0.822)	(1.122)	(1.021)
AR1	0.00144	0.00281	0.00151	0.00117	0.00113	0.00302
AR2	0.598	0.647	0.513	0.560	0.558	0.482
Hansen OIR	0.183	0.214	0.215	0.234	0.308	0.176
Fisher	2920***	1180***	2199***	2247***	4493***	5240***
Instruments	39	39	39	39	39	39
Countries	48	48	48	48	48	48
Observations	220	221	221	221	221	221

Note: *, **, ***: significance levels of 10%, 5% and 1% respectively.

Table 4: FDI, governance quality composite and economic growth

	Dependent variable: GDP per capita growth			
	(1)	(2)	(3)	(4)
Foreign direct investment	0.0536***	0.0625***	0.0652***	0.0661***
	(0.0113)	(0.0126)	(0.0119)	(0.0112)
Political governance	0.724***			
	(0.202)			
Economic governance		2.476***		
		(0.168)		
Institutional governance			0.347	
			(0.219)	
General governance				0.706***
				(0.139)
Lag of GDP per capita growth	0.166***	0.198***	0.206***	0.188***
	(0.0192)	(0.0276)	(0.0257)	(0.0223)
Oil rents-to-GDP	0.0613***	0.0820***	0.0146	0.0407*
	(0.0188)	(0.0208)	(0.0238)	(0.0212)
Trade openness	0.0216***	0.0473***	0.0352***	0.0354***
	(0.00446)	(0.00470)	(0.00463)	(0.00422)
Inflation	-0.00935***	0.00573***	-0.00773***	-0.00277*
	(0.00172)	(0.00142)	(0.00188)	(0.00140)
Population Growth	-0.0907	1.619***	0.694**	1.123***
	(0.343)	(0.340)	(0.326)	(0.271)
Domestic investment	0.0151	0.0370	0.00646	0.000792
	(0.0258)	(0.0315)	(0.0294)	(0.0272)
Financial development	-0.0516***	-0.0450***	-0.0396***	-0.0548***
	(0.00987)	(0.00790)	(0.0106)	(0.0105)
Constant	0.873	-7.001***	-1.953	-2.869***
	(1.310)	(0.979)	(1.175)	(0.995)
AR1	0.00213	0.513	0.523	0.562
AR2	0.763	0.000860	0.00171	0.00162
Hansen OIR	0.211	0.245	0.180	0.157
Fisher	879.1***	2019***	5519***	4204***
Instruments	39	39	39	39
Countries	48	48	48	48
Observations	220	221	221	220

Note: *, **, ***: significance levels of 10%, 5% and 1% respectively.

These results can be explained by the fact that in several African countries corruption was, some years ago, widespread in all sectors (police, justice), with the consequent loss of confidence of the agents towards the government. However, during the past decades, several African countries have implemented anti-corruption measures, although much remains to be done. This result suggests that good governance increases economic growth in Africa. These findings remain robust even after grouping governance indicators into four composite indicators. We can see in Table 4 that foreign direct investment has a direct positive and significant effect on economic growth. Furthermore, among the built governance indicators, only the institutional governance index has no significant effect on economic growth. This index was compiled from two indicators of the quality of governance, namely: the control of corruption and the rule of law. Which can justify the positive and insignificant sign of institutional governance. However, column (6) provides a strong evidence that the general governance quality index is positively correlated with

economic growth in African countries.

4.2 Accounting for interaction

Equation (2) takes into account the interaction terms between foreign direct investment and governance quality indicators. The regressions results are presented in Table 5 and 6. Table 5 presents the results of interaction term when governance quality indicators are unbundled and Table 6 presents the results of interaction terms when governance quality indicators are bundled into four different governance composites. In Table 5 all the interactions terms between foreign direct investment and individual governance quality indicators are positive and significant. Meaning that, the positive effect of foreign direct investment on economic growth is enhanced by governance quality. Thus, African countries implementing good governance benefit more from foreign direct investment. Our findings are confirmed in Table 6 were the same model is estimated with bundled governance quality indicators. We can see that political governance index, economic governance index and institutional governance index have a positive and significant signs. Meaning that, governance quality complements foreign direct investment in enhancing economic growth. Column 4 confirms that in general, governance quality in Africa enhanced the benefit effect of foreign direct investment

Table 5: FDI, governance quality indicators and economic growth

	Dependent variable : GDP per capita growth					
	(1)	(2)	(3)	(4)	(5)	(6)
FDI	0.0322	0.106***	0.189***	0.181***	0.114***	0.272***
	(0.0240)	(0.0142)	(0.0252)	(0.0258)	(0.0218)	(0.0310)
FDI*Voice and accountability	0.0980***					
	(0.0299)					
FDI*Political stability		0.205***				
		(0.0160)				
FDI*Government effectiveness			0.213***			
			(0.0240)			
FDI*Regulatory quality				0.170***		
				(0.0227)		
FDI*Control of corruption					0.170***	
					(0.0259)	
FDI*Rule of law						0.308***
						(0.0269)
Voice and accountability	1.410***					
	(0.423)					
Political stability		-0.452**				
		(0.196)				
Government effectiveness			2.721***			
			(0.493)			
Regulatory quality				1.017***		
				(0.321)		
Control of corruption					-0.0438	
					(0.239)	
Rule of law						-0.448
						(0.495)
Lag of GDP per capita growth	0.120***	0.163***	0.103***	0.174***	0.175***	0.184***
	(0.0222)	(0.0197)	(0.0201)	(0.0192)	(0.0172)	(0.0209)
Oil rents-to-GDP	0.0700***	0.0467***	0.127***	0.0803***	0.0406**	0.0415**
	(0.0137)	(0.0171)	(0.0178)	(0.0125)	(0.0170)	(0.0180)
Trade openness	0.0120***	0.00405	0.00107	0.0172***	0.0101***	0.00486*
	(0.00274)	(0.00354)	(0.00303)	(0.00158)	(0.00245)	(0.00266)
Inflation	-0.0158***	-0.0136***	-0.0139***	-0.0116***	-0.0164***	-0.0140***
	(0.00233)	(0.00105)	(0.00164)	(0.00106)	(0.00137)	(0.00135)
Population Growth	-0.943***	-0.0198	-0.311*	-0.158	-0.614**	-0.367
	(0.276)	(0.274)	(0.173)	(0.211)	(0.233)	(0.248)
Domestic investment	0.0476	0.0440***	0.00265	-0.0254	0.0210	0.0406**
	(0.0307)	(0.0134)	(0.0210)	(0.0201)	(0.0260)	(0.0173)
Financial development	-0.0459***	-0.0395***	-0.0286***	-0.0306***	-0.0352***	-0.0415***
	(0.00961)	(0.00945)	(0.00891)	(0.00812)	(0.00564)	(0.00870)
Constant	3.868***	1.013	3.558***	1.803**	2.795***	1.726*
	(1.098)	(0.939)	(0.424)	(0.772)	(0.869)	(0.905)
AR1	0.00219	0.000960	0.00213	0.00299	0.000862	0.00171
AR2	0.699	0.693	0.716	0.748	0.835	0.651
Hansen OIR	0.246	0.209	0.321	0.415	0.512	0.353
Fisher	438.3***	25472***	357.4***	1738***	558.3***	900.4***
Instruments	43	43	43	43	43	43
Countries	48	48	48	48	48	48
Observations	220	221	221	221	221	221

Note: *, **, ***: significance levels of 10%, 5% and 1% respectively.

Table 6: FDI, governance quality composite and economic growth

	Dependent variable : GDP per capita growth			
	(1)	(2)	(3)	(4)
Foreign direct investment (FDI)	0.0304***	0.0698***	0.0297*	0.0442**
	(0.0103)	(0.0125)	(0.0150)	(0.0172)
FDI*Political governance	0.107***			
	(0.0118)			
FDI*Economic governance		0.0903***		
		(0.0115)		
FDI*Institutional governance			0.115***	
			(0.0124)	
FDI*General governance				0.0781***
				(0.00907)
Political governance	0.261			
	(0.178)			
Economic governance		1.092***		
		(0.141)		
Institutional governance			0.219	
			(0.169)	
General governance				0.0910
				(0.132)
Lag of GDP per capita growth	0.143***	0.132***	0.157***	0.166***
	(0.0186)	(0.0118)	(0.0155)	(0.0194)
Oil rents-to-GDP	0.0745***	0.124***	0.0430**	0.0730***
	(0.0178)	(0.0124)	(0.0179)	(0.0217)
Trade openness	0.000453	0.0108***	0.00642**	0.00403
	(0.00283)	(0.00187)	(0.00265)	(0.00268)
Inflation	-0.0156***	-0.00928***	-0.0130***	-0.0147***
	(0.00182)	(0.000942)	(0.00105)	(0.00135)
Population Growth	-0.752**	0.0533	-0.258	-0.474*
	(0.285)	(0.128)	(0.232)	(0.248)
Domestic investment	0.0767***	-0.0431**	0.0448**	-0.00600
	(0.0200)	(0.0178)	(0.0192)	(0.0232)
Financial development	-0.0453***	-0.0252***	-0.0411***	-0.0376***
	(0.00899)	(0.00590)	(0.00629)	(0.00894)
Constant	2.658***	0.796**	1.760**	3.078***
	(0.978)	(0.354)	(0.732)	(0.972)
AR1	0.00176	0.00220	0.00156	0.000469
AR2	0.961	0.841	0.708	0.960
Hansen OIR	0.220	0.420	0.262	0.374
Fisher	975.7***	349.7***	642.6***	1521***
Instruments	43	43	43	43
Countries	48	48	48	48
Observations	220	221	221	220

Note: *, **, ***: significance levels of 10%, 5% and 1% respectively.

5 Conclusion

This paper provides an empirical analysis of the interaction between foreign direct investments, governance quality and economic growth in 51 African countries over the period 1998-2015. It investigates the role of governance quality in the relation between foreign direct investment and economic growth. Four composite governance indicators and six individuals' governance quality indicators are used. They comprised political governance indicator (encompassing Voice and accountability and Political stability), economic governance (involving Government effectiveness and Regulatory quality), institutional governance (consisting of Control of corruption and Rule of law respectively) and general governance. We use Generalized Method of Moments for the empirical evidence. The following key findings are established. First, there is an unconditional positive effect of foreign direct investment on economic growth in African countries. We also find a positive and significant relationship between governance quality and economic growth. Second, these findings are still robust when we use the governance quality index. Three, when regards interaction term between governance quality and foreign direct investment, we find a convincing evidence that governance quality alter favorably the effect of FDI on economic growth. Overall this study has established net direct positive and significant effect of foreign direct investment on economic growth and that this effect is enhanced by good governance.

The major policy implication from our study is that African countries should improve their governance quality to benefit more from FDI in terms of achieving better growth outcomes. Moreover, African countries must go beyond improving their overall governance in order to benefit from the positive spinoffs of FDI, strengthen the fight against corruption and establish a true rule of law by making their judicial system reliable in the eyes of their citizens.

Appendix

Table 7: List of Countries (51 African Countries)

Algeria	Ivory Coast	Liberia	Senegal
Angola	Djibouti	Madagascar	Seychelles
Benin	Egypt, Arab Rep,	Malawi	Sierra Leone
Botswana	Equatorial Guinea	Mali	South Africa
Burkina Faso	Eritrea	Mauritania	Sudan
Burundi	Ethiopia	Mauritius	Swaziland
Cabo Verde	Gabon	Morocco	Tanzania
Cameroon	Gambia, The	Mozambique	Togo
Central African Republic	Ghana	Namibia	Tunisia
Chad	Guinea	Niger	Uganda
Comoros	Guinea-Bissau	Nigeria	Zambia
Congo, Dem, Rep,	Kenya	Rwanda	Zimbabwe
Congo, Rep,	Lesotho	Sao Tome and Principe	

Table 8: Definitions of variables

Variables	Signs	Variable definitions (measurement)	Sources
GDP per capita growth	GDP	GDP per capita is gross domestic product divided by midyear population.	WDI
inflation rate	inflation	Measured by the Consumer Price Index (CPI) reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services.	WDI
Domestic investment	invest	Government's Final Consumption Expenditure (% of GDP).	WDI
Population growth	PopG	Population growth (annual %) Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage.	WDI
Trade openness	Trade	The sum of exports and imports of goods and services (% of GDP)	WDI
Financial development	M2	Money and quasi money (% of GDP)	WDI
Oil rent	Oil rent	Oil rents are the difference between the value of crude oil production at regional prices and total costs of production.	WDI

Table 8: (Continued)

Variables	Signs	Variable definitions (measurement)	Sources
Political Stability	PS	Political stability/no violence (estimate): measured as the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional and violent means, including domestic violence and terrorism".	World Bank (WGI)
Voice and accountability	VA	(estimate) measures the extent to which a country's citizens are able to participate in selecting their government and to enjoy freedom of expression, freedom of association and a free media.	World Bank (WGI)
Political Governance	Polgov	First Principal Component of Political Stability (PS) and Voice & Accountability (VA). The process by which those in authority are selected and replaced.	PCA)
Government Effectiveness	GE	Government effectiveness (estimate): measures the quality of public services, the quality and degree of independence from political pressures of the civil service, the quality of policy formulation and implementation, and the credibility of governments' commitments to such policies".	World Bank (WGI)
Regulation Quality	RQ	Regulation quality (estimate): measured as the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development".	World Bank (WGI)
Economic Governance	Ecogov	First Principal Component of Government Effectiveness (GE) and Regulation Quality (RQ). The capacity of government to formulate & implement policies, and to deliver services".	PCA)
Rule of Law	RL	Rule of law (estimate): captures perceptions of the extent to which agents have confidence in and abide by the rules of society and in particular the quality of contract enforcement, property rights, the police, the courts, as well as the likelihood of crime and violence".	World Bank (WGI)
Corruption-Control	CC	Control of corruption (estimate): captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as capture of the state by elites and private interests".	World Bank (WGI)
Institutional Governance	Instgov	First Principal Component of Rule of Law (RL) and Corruption-Control (CC). The respect for citizens and the state of institutions that govern the interactions among them.	PCA
General Governance	G.gov	First Principal Component of Political, Economic and Institutional Governances.	PCA

Table 9: Correlation matrix

VA	PS	Polgov	GE	RQ	Ecogov	CC	RL	Instgov	G.gov	FDI	GDPPg	TotalRENT	Trade	Inflation	PopG	GFCF	M2	
1.0000	0.6552*	0.9097*	0.7026*	0.6386*	0.7096*	0.6479*	0.7591*	0.7296*	0.8344*	0.0028	0.0839	-0.4149*	0.0671	-0.0860	-0.2845*	0.0562	0.2139*	VA
	1.0000	0.9097*	0.6315*	0.5343*	0.6168*	0.6483*	0.7580*	0.7291*	0.7981*	0.0549	0.1094	-0.3630*	0.3046*	-0.0476	-0.2369*	0.2352*	0.3012*	PS
		1.0000	0.7331*	0.6444*	0.7289*	0.7123*	0.8337*	0.8017*	0.8973*	0.0321	0.1064	-0.4266*	0.2051*	-0.0727	-0.2868*	0.1612*	0.2832*	Polgov
			1.0000	0.7861*	0.9450*	0.8276*	0.9006*	0.8960*	0.9272*	-0.1181*	0.1264*	-0.5185*	0.0735	-0.0800	-0.4829*	0.1486*	0.4564*	GE
				1.0000	0.9450*	0.6776*	0.7698*	0.7505*	0.8382*	-0.1531*	0.0954	-0.4443*	-0.0421	-0.1590*	-0.2896*	0.1118	0.2263*	RQ
					1.0000	0.7964*	0.8838*	0.8711*	0.9342*	-0.1435*	0.1174*	-0.5098*	0.0168	-0.1258*	-0.4092*	0.1376*	0.3617*	Ecogov
						1.0000	0.8600*	0.9644*	0.8905*	-0.0431	0.0435	-0.5296*	0.1245*	-0.0818	-0.5026*	0.1244*	0.5136*	CC
							1.0000	0.9644*	0.9633*	-0.0810	0.1067	-0.5166*	0.1129	-0.1134	-0.4358*	0.1824*	0.4902*	RL
								1.0000	0.9613*	-0.0643	0.0778	-0.5426*	0.1231*	-0.1010	-0.4866*	0.1589*	0.5206*	Instgov
									1.0000	-0.0660	0.1077	-0.5316*	0.1189*	-0.1070	-0.4318*	0.1622*	0.4245*	Ggov
										1.0000	0.3106*	0.3219*	0.5399*	-0.0314	0.1803*	0.4765*	-0.0272	FDI
											1.0000	0.1069	0.3109*	-0.1176*	0.1579*	0.4512*	-0.0488	GDPPg
												1.0000	0.3315*	0.0111	0.4565*	0.2310*	-0.3716*	Oil rent
													1.0000	0.0124	-0.0914	0.6298*	0.1138	Trade
														1.0000	-0.0505	-0.0743	-0.0386	Inflation
															1.0000	0.0984	-0.5310*	PopG
																1.0000	0.0848	GFCF
																	1.0000	M2

Note:Political Stability. VA: Voice and Accountability. Polgov: Political Governance. GE: Government Effectiveness. RQ: Regulation Quality. Ecogov: Economic Governance. CC: Corruption-Control. RL: Rule of Law. Instgov: Institutional. Governance. G.Gov: General Governance. Educ: Secondary School enrollment. FDI: Foreign Direct Investment. GDPPg: Gross Domestic Product per capita Growth. Trade:Trade openness.PopG: Population growth rate. rate. M2: Financial development

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