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Abstract

In this paper, we revisit the relationship between governance and human development in Africa during the period 2010-2019 taking into account the existence of spatial dependence and controlling the endogeneity problem through a Generalized Spatial Two Stage Least Squares (2SLS). The exploratory spatial data analysis reveals the existence of spatial dependence of human development and governance quality. Our empirical findings support that in Africa, "good fences make good neighbours" or proximity matters in the distribution of human development. Implications are discussed.

Keywords: Governance, human development, Africa
JEL Classification: D31; I10; I32; K40; O55

1. Introduction

This study complements the extant literature by assessing the nexus between governance and economic development within the remit of human development in Africa by employing an estimation approach that accounts for spatial dependence in order to further examine the perspective of whether good fences make good neighbours. Accordingly, while there is a large bulk of literature on the relationship between economic development and institutions (Huynh & Jacho-Chávez, 2009; Kaufmann & Kraay, 2002; Fayissa & Nsiah, 2013; Setayesh & Daryaei, 2017; Adedokun, 2017; Al Mamun et al., 2017; Tchamyou, 2021; Asongu et al., 2021), the nexus between governance and human development has not been thoroughly explored in the literature, especially as it pertains to the employment of spatial dependence estimation approaches.

The extant literature on the nexus between good governance and human development can be discussed in three main strands (Tsegaw, 2020). The first strand pertains to connections among development indicators as well as determinants of human development. These include Bundala (2012) on the connection between economic growth and the human development index and Eren et al. (2014) who have investigated the relationships among constituents of human development indicators. Matekenya et al. (2020) and Asongu and Nting (2021) have examined the relationship between financial inclusion and human development while Asongu and Odhiambo (2021) have investigated how social media influences human development. Other studies within this strand include the nexus between foreign aid and human development (Staicu & Barbulescu, 2017) and the association between human development and environmental degradation (Asongu & Odhiambo, 2019).

The second strand focuses on studies which have been concerned with the nexus between economic issues and good governance. For instance, Kurtz and Schrank (2007) have established that the effectiveness of governance does not significantly affect economic growth while AlBassam (2013) posits that the underlying nexus is contingent on human development levels. Mijiyawa (2013) investigates factors that drive economic growth among which government effectiveness is a fundamental determinant. Fayissa and Nsiah (2013) conclude that the effect of governance on economic growth is contingent on income levels while AlBassam (2020) demonstrates that current public expenditure is not efficient in the light of the fact that such public spending has to be consolidated with other macroeconomic policy variables that influence economic growth.

The third strand focuses on the link between governance and human development. In this strand, Keser and Gökmen (2017) conclude that three main governance indicators

engender human development, notably, the rule of law, regulatory quality and government effectiveness. Davis (2017) shows that good governance is related to human development improvements. Danso (2020) has focused on the nexus between natural resource governance and human development and Asongu and Odhiambo (2020) have investigated linkages between governance, carbon dioxide emissions and inclusive human development. The present study is closest to this third strand of the literature. It contributes to the extant literature by examining the impact of governance on human development, taking into account the spatial patterns and endogeneity in Africa.

The contribution of this work is threefold. Firstly, it overcomes some limitations in previous literature concerning the econometric approach. In effect, in this paper, we use a methodology which allows us to deal with endogeneity in a spatial context. Secondly, we go beyond the existing literature by capturing both the impacts of economic development and governance quality of neighbouring countries in the model in order to test the hypothesis that "good fences make good neighbours". Thirdly, in comparison with previous studies in which economic growth or GDP per capita is used as dependent variable, we proxy for economic development by the Human Development Index (HDI).

The reminder of the paper is structured as follows. Section 2 presents data and describes the methodology used to test the relationship between human development and governance quality. Section 3 discusses the empirical findings and finally, section 4 focuses on the concluding implications and future research directions.

2. Data and methodology

In this section, we present the data being used and the methodology employed to assess the relationship between human development and governance, taking into account spatiality.

a. Data

We use annual data obtained from the World Bank's World Development Indicators (WDI) and World Governance Indicators (WGI), covering the period 2010-2019. In Table 1, we present the description of variables. The Human Development Index (HDI) is our dependent variable. In this work, the independent variable of interest is governance quality proxied by six indicators, notably: political stability, voice & accountability, government effectiveness, regulatory quality, corruption-control and the rule of law. The control variables include: gross capital formation, trade openness, education or schooling, natural resource rents and access to electricity. The choice of these control variables is consistent with contemporary inclusive human development literature (Asongu et al., 2015; Mlachila et al., 2017; Tchamyou, 2019;

Tchamyou et al., 2019a, 2019a; Asongu & Nnanna, 2020). In accordance with the attendant literature, all the selected control variables are expected to influence inclusive human development positively. First, gross capital formation or domestic investment and other forms of investment are broadly designed to improve both economic and human development standards in a domestic economy (Asongu & Nnanna, 2020). Second, trade openness has been established to be positively linked to human development (Mustafa et al., 2017). Third, education also has inclusive development benefits in Africa (Tchamyou et al., 2019a). Fourth, natural resources (Nchofoung et al., 2021) and availability of electricity have also been established to positively engender economic and human developments, contingent on initial levels of good governance (Njangang et al., 2021).

b. Methodology

We first calculate the Moran' I statistic to test whether the governance indicators are autocorrelated in space or not. Moran's I statistic for country i takes the following form in Equation (1):

$$I = \frac{\frac{\Sigma_{ij} w_{ij}(y_i-\bar{y})(y_j-\bar{y})}{\Sigma_{ij} w_{ij}}}{\frac{\Sigma_{ij}((y_i-\bar{y}))^2}{N}} \quad (1)$$

Where y_i represents the underlying variable for country i, $\bar{y}$ reflects the mean of the sample and w_{ij} denotes elements of a specified weight matrix W while N represents the number of countries. It is worthwhile to note that the weighted matrix W is adapted to the $N \times T$ panel dimension. It reflects the Kronecker product of an identity matrix of the form $T \times T$ and $N \times N$ denotes the spatial weighted matrix. It is important to recall that the null hypothesis pertaining to the test statistic is a position for the absence of spatial autocorrelation which is an indication that location does not matter. There is existence of spatial dependence when the value linked to one location is dependent on the corresponding values of other locations. The classical model to estimate the relation between governance and human development is defined in Equation (2) as:

$$hdi_{i,t} = \alpha + \beta gov_{i,t} + \gamma x_{i,t} + u_{i,t} \quad (2)$$

Where $hdi_{i,t}$ represents the Human Development Index for country i in year t, $gov_{i,t}$ is the governance indicator for country i in year t. $x_{i,t}$ denotes the control variables in the equation including gross capital formation, openness, the average number of years of education, total

natural resource rents and access to electricity,$u_{i,t}$ represents the random error term. In this paper, we consider the HDI as the socio-economic development indicator contrarily to previous studies where GDP growth was used. The choice of the HDI as an alternative of GDP can be justified by three arguments. First, GDP just measures productive capacity in a nation and not the well-being while in the definition of HDI, structural characteristics are taken into account (health, education and living standards). Secondly, since the paper depicts the role played by neighbours in economic development, it would be advisable to use the HDI which reflects the evolution of the country's development and the economic welfare. Finally, human development is more structural than economic growth. Spatial interdependence is generally carried by structural characteristics such as technological shocks, infrastructures or quality of life.

However, with this specification, as shown in Equation (3), the study assumes that the error term has a mean of zero and a variance that is the same for all observations:

$$E(uu') = \sigma^2 I \qquad (3)$$

This underpinning assumption is particularly relevant and restrictive contingent on observations being spatially organized. Accordingly, if boundaries of cross-country spatial spillovers are apparent and related to spatial autocorrelation evidence, the assumption that is formulated on the model being sampled would be violated. Within the premise of spatial dependence, an alternative specification is employed to reconsider the nexus between governance and human development from a spatial panel econometric analysis. It is worthwhile to emphasize that the spatial regression technique is a statistical model that takes into account spatial dependence or evidence of spatial incidences.

In order to examine whether the model specification is appropriate in estimating a specification on the nexus between human development and governance, the family of spatial panel regression models is first presented, notably, the: SAR(Spatial Autoregressive Model), SEM (Spatial Error Model), SDM (Spatial Durbin Model) and SAC (Spatial Lag/ Error model or Spatial AutoCorrelation Model). Accordingly, the SAR discloses insights into a starting point given that it is the most basic spatial model. Within the context of this study, the SAR model in Equation (4) is estimated in the form:

$$hdi_{i,t} = \alpha + \beta gov_{i,t} + \gamma x_{i,t} + \rho \sum_{i=1}^{n} w_{ij} hdi_{i,t} + u_{i,t} \qquad (4)$$

Where ρ represents the scalar spatial autoregressive parameter. The other corresponding parameters have been clarified in the previous equations. In essence, the SAR model can be understood as a spatially weighted HDI average of all the neighbours of country *i*. Hence, ρ denotes how sensitive the endogenous variable is to the spatially lagged variable. Moreover, in the presence of a residual tendency linked to the error component, SEM is presented as follows:

$$hdi_{i,t} = \alpha + \beta gov_{i,t} + \gamma x_{i,t} + u_{i,t} \quad (5)$$

With,

$$u_{i,t} = \lambda \sum_{i=1}^{n} w_{ij}\, u_{i,t} + \varepsilon_{i,t}$$

And

$$\varepsilon_{i,t} \sim i.i.d.(0, \sigma_{\varepsilon}^2)$$

Where λ denotes the error parameter that is spatial. When these two equations are combined, they yield the SEM model in Equation (6) that is characterised by a data generating process:

$$hdi_{i,t} = \alpha + \beta gov_{i,t} + \gamma x_{i,t} + \left(I_n - \lambda \textstyle\sum_{i=1}^{n} w_{ij}\right)^{-1} \varepsilon_{i,t} \quad (6)$$

A more general perspective is provided by the SDM of the regression model that is a spatial regression given that the spatial lag of the human development indicator is integrated to the SAR specification:

$$hdi_{i,t} = \alpha + \beta \textstyle\sum_{i=1}^{n} w_{ij} gov_{i,t} + \gamma \sum_{i=1}^{n} w_{ij} x_{i,t} + \rho \sum_{i=1}^{n} w_{ij} hdi_{i,t} + u_{i,t} \quad (7)$$

Where γ is the spatial regressive parameter.

Finally, the general spatial model is employed to address both categories of spatial dependence, namely, spatial error dependence and spatial lag dependence[1]:

$$hdi_{i,t} = \alpha + \beta gov_{i,t} + \gamma x_{i,t} + \rho \textstyle\sum_{i=1}^{n} w_{ij} hdi_{i,t} + \left(I_n - \lambda \sum_{i=1}^{n} w_{ij}\right)^{-1} \varepsilon_{i,t} \quad (8)$$

Nonetheless, even if the problem of misspecification related to spatial dependence is resolved, there is still a concern related to the presence of endogeneity. In effect, in this paper, while the impact of governance on human development is being analysed, it is also worthwhile to note that human development could also affect governance (Wilson, 2016; Ward & Dorussen, 2015; Kaufmann & Kraay, 2002; Seldadyo et al., 2010). Moreover the two variables could

[1]In the Generalized Spatial Autoregressive 2SLS, we introduce spatial governance as an exogenous variable in order to depict to role played by the neighbour's governance in the model.

interact with each other and may cause an endogenous problem and therefore engender biased and inconsistent estimators.

Instrumental variable (IV) methods have been substantially employed to tackle concerns of endogeneity in the classical growth models. However, a specific type of endogeneity-spatial interdependence has often been ignored (Betz et al., 2020). According to these authors, when spatial interdependence is not taken into account, asymptotically-biased estimates are apparent, with such a bias increasing in the presence of randomly assigned instruments. This is usually the case for many instruments that are widely employed, notably, rainfall, economic shocks, natural disasters, and regionally- or globally-weighted averages. Recently, some authors have generalized the models in order to allow for endogenous predictors in spatial specifications (Kelejian & Prucha, 2004; Anselin & Lozano-Gracia, 2008; Drukker et al., 2013; Liu & Lee, 2013; Franzese & Hays, 2007).

In this paper, we use a Generalized Spatial Autoregressive 2SLS model to estimate the relationship between human development and governance and specifically, the role played by neighbours. Considering the general spatial model presented previously, Kelejian and Prucha (1998) proposed a procedure in three steps. In the first step, the two stage least squares (2SLS) using instruments is employed to estimate the model.[2] The autoregressive parameter, ρ, in the second step, is estimated with the help of the residuals derived from the first step and the proposed procedure for generalized moments suggested in Kelejian and Prucha (1995). In the third and final step, after accounting for spatial correlation through a Cochrane-Orcutt transformation type, the regression model is re-estimated by 2SLS after transforming the model. The estimation procedure is known as a generalized spatial two stages least squares (GS2SLS) procedure which as an analogy to the generalized least squares estimator.

3. Empirical findings

We first present the results for the exploratory spatial data analysis of governance indicators and human development. Table 3 presents the global spatial autocorrelation (Moran's index) during the period 2010-2019 for 44 African countries. The results indicate a significant and positive global spatial autocorrelation for the six governance indicators and human development. This result suggests that in Africa, with respect to governance and human development, "like attracts like". This result is consistent with the findings of Diop (2018).

[2]Both variables and their spatialized values are used as instruments.

Using the GDP per capita of African countries, the author detects strong spatial dependence and a cluster of high per capita income in northern, central and southern Africa.

Table 4 reports the results of different models. Every column corresponds to a different governance indicator with its spatial interaction (voice and accountability for Column 1, political stability/no violence for Column 2, government effectiveness for Column 3, regulatory quality for Column 4, the rule of law for Column 5 and control of corruption for Column 6). All models are estimated for 44 African countries during the period 2010-2019. For the spatial diagnostics (OLS vs spatial models), we use the LM test statistics and their robust versions. The results show that overall, spatial models are better than OLS. Then, if the spatial effects are not modelled, the OLS estimates suffer from a substantial misspecification. In the spatial model's family, the LM SAC test (LM Lag+LM Error) indicates that the most appropriate model is the general spatial model which deals with both types of spatial dependence, namely spatial lag dependence and spatial error dependence.

In order to address the concern of endogeneity, we perform the Hausman specification test for the inconsistency problem. The null hypothesis is rejected for all models indicating a problem of endogeneity. Table 4 also represents the results for the Sargan test of overidentification. The statistic shows that the instruments are valid. We also include some model selection diagnostic criteria based on the log likelihood, Akaike information criterion and the adjusted R-square. We find that all six models are approximately equal due to the fact that their statistics are very close.

The estimated coefficient of ρ is around 0.007. It measures the degree of HDI interdependence among African countries. It is positive and strongly significant suggesting that in Africa, proximity matters in the distribution of human development. This result confirms those founded in the exploratory spatial data analysis. Regarding the control variables, gross fixed capital formation is marginally significant. Openness is positive even though not significant. The level of education proxied by the average number of years of schooling received by people aged 25 years and older, is positive and strongly significant. This result supports the perspective that schooling has been beneficial to economic development in Africa. Regarding natural resource's rents (in % of GDP), and the percentage of the population with access to electricity, we find positive and strongly significant relationships with human development. The positive and significant effect between natural

resources and human development suggests that in Africa, the Dutch disease is not apparent in the models that control for governance quality, spatial patterns and endogeneity. In summary, the signs of all the control variables are consistent with the narrative of the data section justifying their expected signs in the light of attendant literature.

It is also established in the estimations that governance quality is positive and significant, with the exception of voice and accountability. These findings indicate that good governance ameliorates human development in African countries. Finally, the spatiality of governance patterns is explored in our models and the corresponding results show that for all governance indicators, the spatiality characteristics matter. More precisely, the coefficients associated with the interaction of the spatial weight matrix and the governance, are positive and significant at the 1% level. It follows that, both the governance of a country as well as the governance of neighbouring countries are important to improve human development. This finding suggests that in Africa, "good fences make good neighbours" contingent on governance quality. In other words, proximity matters in the distribution of human development and governance plays a fundamental role in such proximity.

The findings are consistent with a strand of literature supporting the perspective that cross-country convergence in development outcomes should not be exclusively limited to income per capita but should be extended to other development outcomes such as human development. For instance, Asongu (2014) has concluded that Africa's human development convergence is also worthwhile in economic development debates because economic development is beyond income convergence. This is consistent with prior studies on the HDI convergence from Sutcliffe (2004) on the one hand and on the other, Konya and Guisan (2008), contingent on some dimensions of the HDI.

4. Concluding implications and future research directions

In this paper, we re-examined the relationship between governance and human development in Africa during the period 2010-2019. Our empirical strategy was based on a spatial econometric approach through which we control the problem of endogeneity. This empirical strategy allows us to analyse the impact of the regional interaction between countries and correct the misspecification caused by the omitted spatial dependence in the nexus between governance and human development.

The findings can be summarised as follows. Firstly, the exploratory spatial data analysis reveals the existence of spatial dependence between human development and the governance quality indicating that in Africa, with respect to governance and human development, "like attracts like". Secondly, our empirical findings support the perspective that in Africa, "good fences make good neighbours" or proximity matters in the distribution of human development. As a direct policy implication, sampled countries should improve on their government quality levels in order to benefit from enhanced cross-country human development. Moreover, focusing on improving governance can provide a concrete agenda for economic development involving some fundamental aspects of economic and social life such as improved life expectancy, income level and education (i.e. constituents of the human development index). On the theoretical contribution of the study, common factors such as ameliorations in governance standards can improve cross-country human development, which is an extension of the neoclassical growth theory from its hitherto focus on income convergence to other socio-economic development outcomes.

This study leaves room for future research especially as it pertains to assessing how the findings withstand empirical scrutiny in other developing countries. Moreover, considering other relevant dimensions beyond governance could also be worthwhile with the employment of spatial dependence and accounting for the endogeneity problem.

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Table 1: Definitions of variables

Variables	Definitions	Sources
Va	"Voice and accountability (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"	WGI
Psn	"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"	WGI
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".	WGI
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".	WGI
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"	WGI
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".	WGI
Hdi	Human Development Index	UNDP
Gcf	Gross capital formation (% of GDP)	WDI
Openness	Merchandise trade as a share of GDP is the sum of merchandise exports and imports divided by the value of GDP, all in current U.S. dollars.	WDI
Schooling	Average number of years of education received by people ages 25 and older, converted from education attainment levels using official durations of each level	UNDP
Na	Total natural resources rents (% of GDP)	WDI
Elect	Access to electricity (% of population)	WDI

Table 2: Summary statistics

Variables	Mean	Std.Dev	Min	Max
Va	-0.639	0.655	-2.226	0.670
Psn	-0.664	0.761	-2.699	1.104
Ge	-0.772	0.530	-1.922	0.530
Rq	-0.700	0.560	-2.347	0.611
Rl	-0.698	0.537	-1.848	0.675
Cc	-0.671	0.545	-1.627	1.027
Hdi	0.529	0.101	0.331	0.798
Gcf	22.779	9.153	-0.098	56.874
Openness	56.810	28.826	17.011	244.888
Schooling	5.073	2.070	1.4	10.2
Natural	14.154	11.674	0.263	62.225
Electricity	45.391	27.491	4.100	100

Table 3: Moran's Index for HDI and Governance indicators

Indicators	Moran's I	Sd(I)	p-value
Human Development Index	0.225	0.029	0.000
Voice and accountability	0.372	0.029	0.000
Political Stability and absence of Violence/Terrorism	0.221	0.029	0.000
Governance effectiveness	0.278	0.029	0.000
Regulator Quality	0.233	0.029	0.000
Rule of Law	0.247	0.029	0.000
Control of Corruption	0.266	0.029	0.000

Table 4: Estimation results

	(1)	(2)	(3)	(4)	(5)	(6)
W#hdi	0.007***	0.004	0.007***	0.008***	0.007***	0.007***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Gcf	0.018	0.043**	0.008	0.037*	0.022	0.035*
	(0.019)	(0.019)	(0.019)	0.019	(0.019)	(0.020)
Openess	0.009	0.005	0.008	0.008	0.005	0.006
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.006)
Schooling	2.141***	1.985***	1.992***	2.060***	1.989***	2.078***
	(0.116)	(0.116)	(0.109)	(0.113)	(0.111)	(0.113)
Nat_ressources	0.08***	0.053***	0.110***	0.064***	0.092***	0.059***
	(0.016)	(0.016)	(0.019)	(0.018)	(0.018)	(0.019)
Electricity	0.209***	0.212***	0.196***	0.211***	0.205***	0.208***
	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Va	0.383					
	(0.311)					
W#Va	0.464***					
	(0.105)					
Psn		0.690**				
		(0.271)				
W#Psn		0.301***				
		(0.092)				
Ge			3.018***			
			(0.465)			
W#Ge			0.464***			
			(0.110)			
Rq				1.110***		
				(0.377)		

W#Rq				0.488*** (0.124)		
Rl					2.170*** (0.426)	
W#rl					0.507*** (0.114)	
Cc						0.904** (0.433)
W#Cc						0.408*** (0.120)
_Cons	30.720*** (0.825)	31.572*** (0.881)	33.888*** (0.920)	31.195*** (0.842)	32.808*** (0.893)	31.349*** (0.889)
Spatial diagnostics						
Moran's I (residuals)	1.536	1.945*	1.569	2.103**	1.697*	1.762*
LM Error (Burridge)	22.694***	40.243***	24.474***	48.069***	29.542***	31.835***
LM Error (Robust)	30.884***	22.948***	0.929	122.204***	0.310	40.623***
LM Lag (Anselin)	0.828	17.310***	42.316***	6.434**	60.780***	1.442
LM Lag (Robust)	9.018***	0.016	18.772***	80.560***	31.548***	10.234***
LM SAC (LMLag+LMErr_R)	31.712***	40.258***	43.246***	128.640***	61.09***	42.069***
Hausman (OLS vs IV-2SLS)	85.428***	57.900***	10.631***	56.371***	47.760***	35.913***
Sargan	10.340	13.600*	11.000	7.970	9.242	9.098
Model selection diagnostic criteria						
Log likelihood	-1186.766	-1194.207	-1165.890	-1193.652	-1176.331	-1189.311
Akaike information criterion	13.430	13.891	12.214	13.856	12.807	13.585
Adjusted R-Squared	0.872	0.867	0.883	0.867	0.877	0.870
Number of Observations	440	440	440	440	440	440