Does the Effect of Different Governance Channels Depend on the Level of Development of African Countries?

Abstract

The level of development of African States is consistent with the discussions surrounding the need for countries in the region to be fully immersed in practical philosophy. Decision-makers must adopt a coordinated strategy to stimulate the sustainable development of their economy; by incorporating various national plans aimed at encouraging well-being into national governance mechanisms. This paper studied the impact of governance on sustainable development.We use a dynamic panel estimation model, incorporating the PCA technique, to group the governance indicators of Kaufmann et al. (2010) into three main composite indicators: economic, institutional and political governance. The Pooled Mean Group (PMG) estimate shows that the development level of African countries is strongly influenced by established institutions. In the short- and long-term, various governance indicators (political, economic, and institutional) have a significant impact on human development and the ecological footprint of countries with high levels of development. On the other hand, they can only significantly stimulate development in countries with a medium level of development in the long term. Much more effort should be made in poorly developed countries to address the shortcomings that limit the implementation of laws and the fulfillment of the obligations of companies, the state, and citizens to ensure sustainable development.

Keywords: Governance, sustainable development, Human Development, Human Ecological Footprint

JEL Classification: *G28, O15*

1. INTRODUCTION

The issues of development, reduction of poverty and inequality, environmental protection, etc. have been a major concern of the African states since they acceded to independence. Despite this stated will, the sustainable development indicators of African countries remain low and much lower than those of other continents. UNDP (2019) noted that inequality in human development across the continent remains high, despite the efforts of some countries. This situation was incomprehensible given the many resources available underground until the advent of the institutional economy, which took place particularly in the last quarter of the 20th century and opened up new avenues. In this regard, the contribution of the quality of governance to achieving sustainable development becomes an issue of global concern (Güney, 2017). Several studies have rightly shown that poor governance is one of the major obstacles to development in Africa (Al Bassam, 2013). However, governance is seen as the "fourth pillar of sustainable development" alongside economic efficiency, social justice, and environmental protection (Pinson, 2006). and that this would constitute a policy of improved and effective protection of biodiversity (Bureaua et al., 2020).

While the quality of governance is a fundamental determinant of development, it is less clear how countries can achieve this goal. As noted by Acemoglu and James R. (2012), development

requires inclusive institutions that enable broad sections of society to participate in political and economic decisions. The consideration of forms of government increases the challenges for the authorities in African countries when formulating economic policy. Several states have rightly noted this, believing, like Hélène Combe (2016), that this is an imperative for sustainable development and a recognized tool for tackling the development agenda (Iyad, 2019). pointed outIn other words, it has an important and positive effect on sustainable development, and this strong effect applies to all industrialized and developing countries (Güney, 2016). This means that better governance performance for a country leads to better performance in human development (Keser, 2017),and it contributes to environmental protection (Nkenfack et al., 2020).It was furtherdefined by the United Nations World Commission on Environment and Development (WCED,1987) as development "that meets the needs of the present generation without compromising the ability of future generations to meet their own needs", sustainable development is seen as an essential means of realigning the world Movement recognized towards a more inclusive model that seeks to balance the economic, social and environmental conditions that are desirable for both current and future generations (Dhahri and Omri, 2018).

Several empirical studies have analyzed the impact of governance on sustainable development by Omria and Mabroukc (2020). (Güney, 2016); (Glass and Newig, 2016; Ramzy et al., 2019); and concerning its dimensions, in particular environmental quality (Nkenfack et al., 2020; Gani, 2012; Al-Mulali and Ozturk, 2015) and human development (Nandha et al., 2013; Ahmad, 2014; Keser 2017). In some previous studies, the relationship between governance and sustainable development has been individually analyzed in terms of voice and accountability, political stability, government effectiveness, regulatory quality, corruption, or bureaucratic quality. Previous empirical work has only examined the effects of governance on sustainable development as a whole or each of its three dimensions, but not all three in a single framework. However, governance quality is a complex phenomenon that includes various indicators Kaufmann et al.(2010) pointed outthat governance quality is a complex phenomenon that includes various indicators. Based on the current literature on the need to disclose governance measures to ensure robustness, we consider six measures of good governance in three categories: economic governance (government effectiveness and regulatory quality); political governance (political stability and voice and accountability); and institutional governance (corruption control and rule of law). A recent study on governance and sustainable development show the effectiveness of governance in realigning the economic, environmental, and social components of sustainable development (Omria and Mabroukc, 2020).

Unlike most previous empirical studies, in our work, we consider the level[1] (high, medium, and low) of human development in the analysis. Based on econometric modeling of panel data, we will assess the impact of different governance channels (political, economic, and institutional) on sustainable development indicators (human development and ecological footprint) in Africa.

[1] The HDI ranking of countries depends on fixed thresholds based on distribution quartiles: HDI below 0.550 for low human development; HDI between 0.550 and 0.699 for medium human development; HDI between 0.700 and 0.799 for high human development, and HDI of 0.800 or higher for very high human development.

The rest of the article is organized as follows: Section 2 provides a critical review of previous work. Section 3 presents the econometric methodology and the presentation of the variables. The basic results are presented in section 4. Section 5 concludes and proposes some policy recommendations.

2. LITERATURE REVIEW

It is rare today to find a study on a development strategy that does not emphasize the importance of governance. Since the 1990s, governance has been the subject of a great deal of work that provides both convergent and contradictory results, thus prompting reflection on the real impact that its improvement can have.

2.1. Relationship between Governance and Human Development

At the global level, the debate on governance and human development, although fragmented, has intensified. While governance refers to how power is exercised in the management of a nation's affairs and its relations with other nations (ADB, 1999), human development is the expansion of people's choices. Various studies on governance and human development suggest that human development is almost impossible without good governance.

Omria and Mabroukc (2020) extend the previous literature on sustainability by demonstrating the effectiveness of good governance in rebalancing the economic, environmental, and social components of sustainable development. Good economic, political, and institutional governance is considered as a conditional variable that rebalances these three components in the case of 20 MENA economies. Simultaneous equation modeling approach over the period 1996-2014, show that political and institutional governance contributes positively to the three components of sustainable development.

Keser (2017) studies the relationship between governance indicators and the level of human development. The analysis is conducted in time series on a panel of 33 European Union (EU) candidate countries over the period 2002 to 2012. Their analysis shows that at least three of the governance indicators such as government effectiveness, regulatory quality, and the rule of law have significant positive effects on human development. This means that better governance performance for a country translates into better human development performance.The empirical literature of this study was attributed from the following studies:

Sambou, S. (2023) examines the impact of good governance in the countries of the West AfricanEconomic and Monetary Union (WAEMU) on theireconomicdevelopment, based on regressionsusing panel data modelling and spatial econometricsmethodsdedicated to panel data, on a data sample of 136 observations of the World Bank's global governanceindicators, for the periodfrom 2002 to 2018. Takingintoaccountindividualfixedeffects, it shows thateconomic and institutionalgovernance have a significant impact on economicdevelopment.

Belkhatab, Z. (2022) uses global governanceindicatorsfrom the World GovernanceIndicators (WGI) database, to estimate in panel data the effect of governance on the quality of educationusing data from 27 developing countries (DCs) for the period 1995-2019. The randomeffects model isused to test the effect of governance on the quality of educationmeasured by the average score in mathematics and science in the TIMSS database. The results of the modellingreveal the positive and highlysignificant impact of a well-governed system on the quality of a country'seducation.

Asongu, S., & Diop, S. (2023) revisit the relationshipbetweengovernance and humandevelopment in Africaduring the period 2010-2019 takingintoaccount the existence of spatial dependence and controlling the endogeneityproblemthrough a Generalized Spatial Two Stage Least Squares (2SLS). The exploratory spatial data analysisreveals the existence of spatial dependence of humandevelopment and governancequality.

Banda (2023) examines the effect of governanceonhumandevelopment in Malawi. Using the Autoregressive Distributed Lag (ARDL) model and data from 1990 to 2020, empiricalresultsrevealed a significant positive long-run relationshipbetween good governance and humandevelopment. However, the resultsfoundthat good governanceworsenshumanwell-being in the short run. Consequently, thisstudysuggeststhat the implementation and strengthening of governance institutions shouldtake a holistic pace

Akinbode (2020). studyassessed the effects of corruption, governmenteffectiveness and their joint effect on humandevelopment in SSA. Data collected on thirty-seven (37) countries within the period of 2005 to 2018 wereanalyzedusing system Generalized Method of Moment whichwasmostsuitable for the dataset. Resultsindicatedthatlaggedhumandevelopment index (P<0.01), governmenteffectiveness (P<0.05), economicgrowth rate (P<0.1) and governmenthealthspending (P<0.1) hadsignificant positive effect on humandevelopmentwhile corruption and its interaction withgovernmenteffectivenessdid not.

Shafa (2023) evaluated the impact of good governance on healthoutcomeamongselectedAfrican countries using panel data from 2000 to 2020. The Panel unit root tests indicatedthat real grossdomesticproduct, healthoutcome, and indicators of good governance are stationary at levelwhilehealthexpenditure and foreignaid are stationary at first difference. The Generalized Method of Moment (GMM) results show thatindicators of good governance have positive and statisticallysignificanteffects on healthoutcome in the selectedAfrican Countries.

Aloui, Zouhaier (2019) attempts to explore the relationshipbetweengovernance and povertyreduction. Using a static model applied to available data on sub-SaharanAfrican countries between 1996-2016, Theirresults show thatgovernanceindicators have a positive and negativeeffect on povertyreduction in sub-SaharanAfrican countries.

Ouedraogo. (2022) investigates the role of institutionalquality in human capital developmentusing a panel of 49 African countries over the period 1996–2018. The studyemploys a dynamic model based on a two-step system generalizedmethod of moments. The results show thatimprovinginstitutionalqualitypromotesaccess to primary, secondary, and tertiaryeducationoverall

and for females. In particular, governmenteffectiveness, control of corruption and politicalstability, and the absence of violence, includingterrorism, are the most important dimensions thatfosterhuman capital development. The resultssuggestthatfosteringtheseparticularinstitutionalquality dimensions iscritical to improvinghuman capital development in Africa.

Ahmad and Saleem (2014) conducted a study to determine governance indicators that significantly affect human development. By comparing the Performance Indices, the correlation coefficient between predicted values, Values Account For (VAF), Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE), multiple regression, and the Multilayer Perception Model obtained from Kaynar and Yilmaz (2011), for a panel of 168 countries, they show that the effectiveness of government, the control of corruption and political stability are the indicators of governance that have a greater impact on the human development of the countries.

Nandha and Russell. (2013) examine the link between governance quality and human development over the period 1995-2011 for a sample of 186 countries. They consider Kaufman's six indicators as a measure of the quality of governance, and the HDI as a human development index. The results suggest: Firstly, the quality of governance and human development are mutually reinforcing in that the quality of governance has a significant impact on human development and vice versa. Secondly, the magnitude of the impact of human development on the quality of governance is much larger than the impact of governance on human development. Thirdly, the magnitude of the impact of the quality of governance on human development has declined over time; while the impact of human development on the quality of governance has been relatively stable.

Charron et al (2014) map the variation in the quality of governance, for 27 European countries, at the national and regional levels. The governance quality dimension is defined by the level of corruption; government effectiveness, accountability, and protection of the rule of law. There is a strong significant relationship between the quality of the governance index and important socio-economic variables such as Internet availability, GDP per capita, long-term unemployment, or infant mortality rate. Overall, there is significant variation between the quality of governance within countries and between regions within countries. This suggests that a joint and targeted effort to improve the quality of governance in these regions could significantly improve their economic prospects and the lives of their residents.

Aidt (2011) examines the relationship between different indicators of corruption and sustainable development as measured by real investment. He concludes that corruption has a negative effect on sustainable development.

Pradhan and Sanyal (2011) studied the effect of governance on development. Using secondary data. Their sample is divided into two sub-samples, namely high-performing and low-performing states based on the Human Development Index (HDI). Based on empirical evidence, they deduce that governance is the latent factor by which sustained economic growth and high human development are achieved. Their work also proposes that less performing countries can stimulate their development processes in the higher range of human development with a better mechanism of good governance.

Haq and Zia (2009) conducted a study to examine the relationship between pro-poor economic growth and governance in Pakistan for the period 1996-2005. All six of the governance indicators formulated by Kaufmann are included. The empirical evidence shows that good governance in Pakistan can reduce poverty and income inequality. Also, Pakistan needs to implement sound and effective governance to achieve higher growth and the Millennium Development Goals.

Uddin and Joya (2007) focused on the importance of good governance for development. They mentioned that it is not easy to achieve rapid per capita income or improve social indicators without improving good governance. They also conclude that strong, accountable, and effective political institutions are required and that aid agencies need a strong and unique long-term commitment to provide the resources and expertise to support governance reform.

2.2. Relationship between Governance and Environmental Quality

Nkenfack et al. (2020) in their work re-examineds the effects of governance and institutions on environmental quality. The latter is captured successively by carbon dioxide emissions (CO_2), methane (CH_4), and nitrous oxide (N_2O) in the countries of the Economic Community of Central African States (ECCAS), and the quality of governance and institutions is measured by Kaufman's six governance indicators. Under the Kuznets environmental curve hypothesis (CEK), the econometric model is inspired by the work of Grossman and Krueger (1991, 1995) and is estimated successively by generalized least squares (GCM) and double least squares with instrumental variables (DMC-IV). Two major results emerge from their work. Firstly, there is a "Pseudo CEK" like an "N" between economic growth and the different types of pollutants. Greenhouse gas (GHG) emissions would then follow a sinusoidal or cyclical trend in ECCAS. Secondly, improved governance would significantly mitigate pollutant emissions in the countries under consideration. Therefore, strengthening governance and improving the quality of institutions will contribute globally to reducing greenhouse gas (GHG) emission levels in ECCAS countries.

Gani (2012), Al-Mulali, and Ozturk (2015) found that political instability damages the environment. Osabuohienet al. (2014) analyze the CEK for a panel of 50 African countries grouped into oil-producing and non-oil-producing countries over the period 1995-2010, including variables such as average values of rule of law, quality of regulation, and governance effectiveness in the analysis. In the sample of oil-producing countries, institutions have a positive impact on the emissions of CO_2, but an opposite effect on non-producing countries. As we can see, the link is therefore not always virtuous between the quality of institutions and the quality of the environment. In this context, Dryzek(1987) states that democracy is assimilated into a market economy that proposes group interests, and which do not necessarily go in the direction of the search for a better environment.

In the same vein, Desai and Shelley (1998) found in a study of ten developing countries, that corruption is a major source of environmental degradation. Following him, Lahiri-Dutt(2004) and Biswas et al. (2012) show that through the informal sector favored by corruption, polluting firms evade environmental regulations and thus induce environmental degradation; and Ozturk and Al-Mulali(2015)

obtain similar results. In fact, they have also shown that controlling corruption leads to a reduction in emissions ofCO_2.

In the literature, the relationship between governance and sustainability has been examined empirically in terms of rule of law, bureaucratic quality, and corruption. According to the results of the estimates obtained in the study, governance has an important and positive effect on sustainable development. This powerful effect applies to all developed and developing countries (Güney, 2016).

3. DATA AND METHODOLOGY

3.1. *Data*

The empirical study focuses on African countries, grouped into three groups[2] according to the level of human development. The data mobilized in this study are from secondary sources and cover the period 1996 - 2018. We can explain this relatively short study period because data on governance indicators have only been available in the database (WGI) since 1996. The choice of countries selected by group depends on the level of human development as distributed by the UNDP (2019), and the availability of data on certain variables. These data, of a quantitative nature and from secondary sources, are collected in three macroeconomic databases like : Network, G. F. (2019),for the indicator of the ecological footprint variable; WGI (2019) for the indicators of the governance variable; UNDP (2019) for the Human Development Index and WDI (2019) for the indicators of control variables such as gross domestic product, foreign direct investment, infrastructure, population density, value-added in agriculture and value-added in industry.

3.2.Methodology

Drawing on the work of Nkengfack et al. (2020) and Nandha et al. (2013), the linear model to be estimated is written as follows:

$$y_{it} = \phi_i(y_{it-j} - \theta_i^{'} X_{it}) \sum_{j=1}^{p-1} \lambda_{ij}^{*} \Delta y_{it-1} + \sum_{j=0}^{q-1} \delta_{ij}^{*} X_{it-j} + u_i + d_t + \varepsilon_{it} \qquad (1)$$

Where is ϕ_i the adjustment coefficient (assumed to be negative), $\theta_i^{'}$ the vector of long-term coefficients, and Δ the variation between two given dates and y_{it} sustainable development. The latter is measured according to Avom and Fankem (2012) and WWF and Global Footprint Network (2008) by human development which considers the socio-economic dimension of sustainable development and, the ecological footprint considering the environmental dimension. The models to be estimated are written considering the two measures for sustainable development:

[2]*Group1*: High HDI (09 countries); *Group2:* Medium HDI (13 countries) and *Group3*: Low HDI (30 countries)

Model 1: Sustainabledevelopmentismeasured by the Human Development Index (HDI)

$$\Delta idh_{it} = \phi_i^* (idh_{it-1} - \theta_1^{'} Gov_{it} - \theta_2^{'} Pibhts_{it} - \theta_3^{'} ide_{it} - \theta_4^{'} \ln \inf r_{it}) + \lambda_1^{'} \Delta idh_{it-1} + \lambda_2^{'} \Delta Gov_{it} + \lambda_3^{'} \Delta Pibhts_{it} + \lambda_4^{'} \Delta ide_{it} + \lambda_5^{'} \Delta \inf r_{it} + \varepsilon_{it} \quad (2)$$

Model 2: Sustainabledevelopmentismeasured by the ecologicalfootprint

$$\Delta Empréco_{it} = \phi_i (Empréco_{it-1} - \theta_1 Gov_{it} - \theta_2 Pibhts_{it} - \theta_3 \ln Ouvcom_{it} - \theta_4 \ln dpop_{it} - \theta_5 VaAgri_{it} - \theta_6 VaInd_{it}) + \lambda_1 \Delta Empréco_{it-1} + \lambda_2 \Delta Gov_{it} + \lambda_3 \Delta Pibhts_{it} + \lambda_4 \Delta \ln Ouvcom_{it} + \lambda_5 \Delta \ln dpop_{it} + \lambda_6 \Delta VaAgri_{it} + \lambda_7 \Delta \ln VaInd_{it} + \mu_{it} \quad (3)$$

Where The Human Development Index (*idh*), which is the composite indicators of the level of human potential and quality of life, is a combination of three dimensions (RepublickiZavod za razvoj, 2007): life expectancy at birth, the middle number of years education and the expected number of years of schooling combined into a single education index and economic benefits expressed by production, or Gross Domestic Product (GDP) according to purchasing power:

- General quality of life, expressed by the expected duration of life;
- Literacy, measured by a combination of two indicators: the literacy rate of the adult population (weighted by 2/3 significance) and the total enrollment rate in primary, secondary, and higher education (weighted by 1/3 of the character)
- The standard of living that is economic benefits expressed by production that is Gross Domestic Product (GDP) in terms of purchasing power. The analysis of purchasing power parity allows seeing the differentiation in purchasing power between countries by eliminating differences in the price level. It is most commonly used in international comparisons of GDP and its components.

According to the World Wide Fund for Nature (2008), the ecological footprint (*Empréco*) measures the biologically productive area of land and water required to produce the resources that an individual, population or activity consumes and to absorb the waste generated, taking into account current technology and resource management. This area is expressed in global hectares (hag), i.e. hectares with a productivity equal to the global average biological productivity.

- Carbon footprint: The partial carbon footprint is the result of combining a footprint that takes into account carbon dioxide emissions related to the country's productive activities and a footprint that estimates carbon dioxide emissions caused by trade flows of manufactured goods (CO2 emissions from the manufacture and transport of these goods). CO2 is the only waste product in the Ecological Footprint.
- Pasture footprint: The partial footprint for pasture land uses the consumption of fodder for the production of the country's livestock, and the estimated quantities of fodder used for the production of e.g. imported or exported live animals or dairy products. The calculation of the footprint for the country's livestock production distinguishes between the quantities of animals produced in tons of meat or heads of livestock, and the crops grown for livestock.

- Partial Forest Footprint: This footprint for forests is the result of aggregating a footprint that takes into account the production of forest products (timber, pulpwood, lumber and fuelwood) consumed by a country each year and a footprint of trade flows of forest products.
- Partial footprint of fisheries areas: This is the result of aggregating a footprint that takes into account the country's fish and shellfish production and a footprint of trade flows of fisheries products.
- Partial footprint of cultivated land: This footprint is the result of combining a footprint of the country's production of agricultural products (food, feed, fibre, oilseeds and rubber) with a footprint of trade flows in agricultural products.
- Partial built-up land footprint: The built-up land footprint reflects the area occupied by human infrastructure, including transport, housing, industrial structures and reservoirs for hydropower

Gov measures the quality of institutions. Asongu and Odhiambo (2019) used three composite indicators for precise quantification: political (*Govpol)*, economic (*Govéco),* and institutional (*Govinst*) governance. These three measures are obtained by principal component analysis of Kaufman's six indicators.

This study uses the PCA to aggregate the governance indicators obtained from Kaufmann et al. (2010) into three major composite indicators, namely economic, institutional and political governance. Such an approach to governance aggregation is consistent with recent literature on African governance (Asongu and Nwachukwu 2016a). The technique involves reducing a set of highly correlated variables into an uncorrelated set of small indicators known as principal components (PCs). The PCs reflect a substantial variation in information from the original data set.

In the PCA empirical framework, the six governance indicators are reduced to institutional governance, economic governance, and political governance. (i) Political governance (which comprises voice, accountability, and political stability) is the election and replacement of political leaders. (ii) Economic governance (a composition of regulatory quality and government effectiveness) is the formulation and implementation of policies that provide public goods. (iii) Institutional governance (including the rule of law and the fight against corruption) is the respect by citizens and the state of the institutions that govern the interactions between them.

The criteria for selecting PCs are taken from Kaiser (1974) and Jolliffe (2002). According to the authors, only common factors reflecting eigenvalues greater than one or the average should be retained. The results of the PCA are presented in Tables 1, 2, and 3.

Table 1: Group of countries with a high level of human development

Component Main (CP)	Matrix component						proportions	Proportions Cumulative	Own values
	VA	PS	GE	RQ	RL	CC			
First CP (*GovPol*)	0.7071	0.7071	-	-	-	-	0.7721	0.7721	1.54423
Second CP	-0.7071	0.7071	-	-	-	-	0.2279	1.0000	0.455773
First CP (*GovEco*)	-	-	0.7071	0.7071	-	-	0.9122	0.9122	1.8243
Second CP	-	-	-0.7071	0.7071	-	-	0.0878	1.0000	0.175698

First CP (*GovInst*)	-	-	-	-	0.7071	0.7071	0.9210	0.9210	1.84199
Second CP	-	-	-	-	-0.7071	0.7071	0.0790	1.0000	0.158014

Source: Authors, from Stata

Table 2: Group of countries with average human development level

Component Main (CP)	Matrix component						proportions	Proportions Cumulative	Own values
	VA	PS	GE	RQ	RL	CC			
First CP (*GovPol*)	0.7071	0.7071	-	-	-	-	0.8025	0.8025	1.6049
Second CP	-0.7071	0.7071	-	-	-	-	0.1975	1.0000	0.395098
First CP (*GovEco*)	-	-	0.7071	0.7071	-	-	0.9290	0.9290	1.85792
Second CP	-	-	-0.7071	0.7071	-	-	0.0710	1.0000	0.14208
First CP (*GovInst*)	-	-	-	-	0.7071	0.7071	0.9631	0.9631	1.9262
Second CP	-	-	-	-	-0.7071	0.7071	0.0369	1.0000	.00738042

Source: Authors, from Stata

Table 3: Group of countries with a low level of human development

Component Main (CP)	Matrix component (loadings)						proportions	Proportions Cumulative	Own values
	VA	PS	GE	RQ	RL	CC			
First CP (*GovPol*)	0.7071	0.7071	-	-	-	-	0.7980	0.7980	1.59601
Second CP	-0.7071	0.7071	-	-	-	-	0.2020	1.0000	0.403991
First CP (*GovEco*)	-	-	0.7071	0.7071	-	-	0.8743	0.8743	1.7487
Second CP	-	-	-0.7071	0.7071	-	-	0.1257	1.0000	0.251301
First CP (*GovInst*)	-	-	-	-	0.7071	0.7071	0.8823	0.8823	1.76465
Second CP	-	-	-	-	-0.7071	0.7071	0.1177	1.0000	0.235348

CP composante principale, *VA* voix et accountability, *RL règle de droit*, *R.Q* qualitéregulationquality, *GE* governmenteffectiveness, *PS*

political stability, *CC* control of corruption, *G.Gov (General Governance)* first PC of VA, PS, RQ, GE, RL and CC, *Polgov (*

Political Governance) the first PC of VA and PS, *Ecogov (Economic Governance)* first PC of RQ and GE, *Instgov (Institutional Governance)*

first PC of RL and CC

Source: Authors, from Stata

The following elements can be retained in the light of the information criterion:

Political governance (*GovPol*) reflects about 77.21% of the information from political stability and "voice and accountability" with an eigenvalue of 1.54423 in high development countries, 80.25% of the information from the quality of regulation and government effectiveness with an eigenvalue of

1.6049 in medium development countries and 79.80% of the information from changes in the rule of law and corruption-control with an eigenvalue of 1.59601 in low development countries;

Economic governance (*GovEco*) reflects about 91.22% of the information coming from political stability and "voice and accountability" with an eigenvalue of 1.8243 in countries with a high level of development, 92.90% of the information coming from the quality of regulation and government efficiency with an eigenvalue of 1.85792 in countries with a medium level of development and 87.43% of the information coming from changes in the rule of law and corruption-control with an eigenvalue of 1.7487 in countries with a low level of development;

Institutional governance (*GovInst*) reflects about 92.10% of the information from political stability and "voice and accountability" with an eigenvalue of 1.84199 in high development countries, 96.31% of the information from the quality of regulation and government effectiveness with an eigenvalue of 1.9262 in medium development countries and 88.23% of the information from changes in the rule of law and corruption-control with an eigenvalue of 1.76465 in low development countries.

*Pibhbts*is the growth rate per capita of the gross domestic product per capita. It represents the national production as a percentage of the total population, FDI represents a foreign direct investment. They correspond to total FDI inflows as a percentage of GDP, Infrastructure (*lnInfr*) is captured by the number of telephone lines per 100 inhabitants, Trade openness (*lnOuvcom)* is captured by the volume of trade (exports + imports) as a percentage of GDP, *Eprécois* the ecological footprint. It measures the weight of human activities on our natural environment, *lndpop*is the population density, *Va_Agri is* the added value of agriculture and *lnVa_Indus is the* added value of the industry. «ln"placed before certain variables is the Nerian logarithm. i is the individual dimension and the temporal dimension of the panel

The completelist of countries isgiven in Annex 1. In accordance with the data, the descriptive statistics of the different quantitative variables are summarized in Table 1 and 2, respectively for model 1 and 2; while Tables 3 and 4 list the differentcorrelationsbetween the variables. The correlation matrices of the variables of the twomodelssuggest a strongcorrelationbetweensome variables.

Table 4: Descriptive statistics for variables in model 1

	Variable	Mean	Std.Dev.	Min	Max	Observations		
Idh	overall	0.490	0.121	0.236	0.801	N	=	1196
	between		0.111	0.301	0.727	n	=	52
	within		0.0507	0.0674	0.666	T	=	23
Gov_pol	overall	-0.00911	1	-2.687	2.041	N	=	1196
	between		0.853	-2.060	1.638	n	=	52
	within		0.535	-2.023	2.267	T	=	23
Gov_éco	overall	0.00575	1	-2.687	3.866	N	=	1196
	between		0.850	-1.718	2.065	n	=	52
	within		0.540	-3.302	4.686	T	=	23
Gov_inst	overall	0.00176	1	-2.130	3.063	N	=	1196
	between		0.926	-1.651	2.403	n	=	52
	within		0.398	-1.464	2.309	T	=	23
PIB_hbts	overall	2.191	7.661	-62.38	140.4	N	=	1196
	between		2.266	-0.925	14.66	n	=	52
	within		7.325	-63.99	127.9	T	=	23
Ide	overall	4.337	9.209	-8.703	161.8	N	=	1196
	between		4.426	0.478	21.71	n	=	52
	within		8.098	-20.44	145.4	T	=	23
lnInfr	overall	2.281	2.544	-6.946	5.217	N	=	1137

	between	0.862	0.693	4.063	n	=	52
	within	2.396	-5.934	5.544	T-bar	=	21.87

Source : Authors, from Stata

Table 5: Descriptive statistics for variables in model 2

	Variable	Mean	Std.Dev.	Min	Max	Observations		
Empr_éco	overall	1.498	0.690	0.501	4.442	N	=	1104
	between		0.652	0.755	3.368	n	=	48
	within		0.246	-0.912	2.730	T	=	23
Gov_pol	overall	-0,00104	1	-2.749	2.050	N	=	1104
	between		0.841	-2.077	1.709	n	=	48
	within		0.553	-2.099	2.218	T	=	23
Gov_éco	overall	-0,00164	1	-2.679	3.815	N	=	1104
	between		0.838	-1.543	2.031	n	=	48
	within		0.558	-3.259	4.597	T	=	23
Gov_inst	overall	-0,00280	1	-2.124	3.131	N	=	1104
	between		0.910	-1.564	2.453	n	=	48
	within		0.433	-2.128	2.978	T	=	23
PIB_hbts	overall	2.149	7.925	-62.38	140.4	N	=	1104
	between		2.346	-0.925	14.66	n	=	48
	within		7.577	-63.57	127.9	T	=	23
Lnouv	overall	4.159	0.438	3.031	5.741	N	=	1104
	between		0.373	3.481	4.941	n	=	48
	within		0.235	3.063	5.184	T	=	23
Lndpop	overall	3.587	1.431	-0.788	6.435	N	=	1104
	between		1.435	-0.644	6.402	n	=	48
	within		0.170	3.118	4.050	T	=	23
Va_agri	overall	22.04	14.40	0.893	79.04	N	=	1104
	between		13.54	2.520	52.95	n	=	48
	within		5.271	-3.398	61.74	T	=	23
lnVa_indus	overall	3.159	0.512	1.177	4.475	N	=	1104
	between		0.471	2.109	4.164	n	=	48
	within		0.210	1.210	4.527	T	=	23

Source :Authors, from Stata

Table 6 : Correlation table between the variables of model 1

Variables	idh	Gov_pol	Gov_éco	Gov_inst	PIB_hbts	ide	lnInfr
Idh	1						
Gov_pol	0.3574*	1					
	0.0000						
Gov_éco	0.2632*	0.5506*	1				
	0.0000	0.0000					
Gov_inst	0.3597*	0.6337*	0.6809*	1			
	0.0000	0.0000	0.0000				
PIB_hbts	0.0671*	0.0411	0.0113	0.0238	1		
	0.0204	0.156	0.697	0.410			
Ide	0.0294	0.0839*	-0.0661*	-0.00790	0.2054*	1	
	0.309	0.00370	0.0223	0.785	0.0000		
lnInfr	0.5257*	0.1262*	0.0924*	0.1503*	-0.0389	0.0512	1
	0.0000	0.0000	0.00180	0.0000	0.190	0.0841	

Source : Authors, from Stata

Table 7: Correlation table between the variables of model 2

Variables	empréc	Gov_pol	Gov_éco	Gov_ins	PIB_hbt	lnouv	lndpop	Va_agri	lnVa_indu
Empréc	1								
Gov_pol	0.3415*	1							
	0.0000								
Gov_éco	0.3588*	0.5567*	1						
	0.0000	0.0000							
Gov_inst	0.3421*	0.5916*	0.6945*	1					

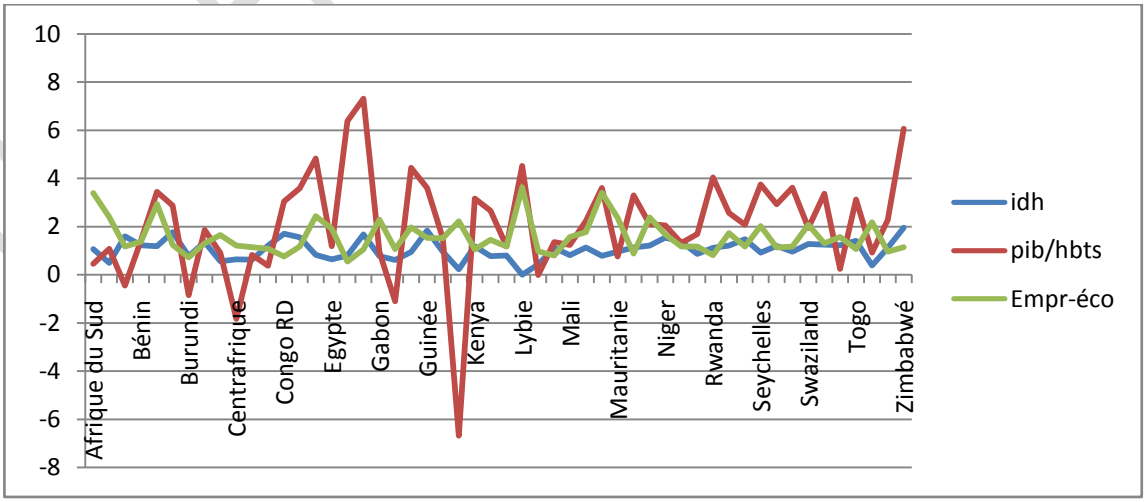
	0.0000	0.0000	0.0000						
PIB_hbts	0.0156	0.0359	0.0365	0.0258	1				
	0.6060	0.2340	0.2260	0.3910					
Lnouv	0.3221*	0.2802*	0.0855*	0.1659*	0.0836*	1			
	0.0000	0.0000	0.00450	0.0000	0.00550				
Lndpop	-0.314*	0.00310	0.0830*	0.1003*	0.0119	-0.1728*	1		
	0.0000	0.9170	0.00580	0.00080	0.694	0.000			
Va_agri	-0.456*	-0.3824*	-0.2624*	-0.3343*	-0.0491	-0.4225*	0.2254*	1	
	0.0000	0.0000	0.0000	0.0000	0.1030	0.0000	0.0000		
lnVa_indu	0.3780*	0.0485	-0.0269	-0.0559	0.0820*	0.3793*	-0.4241*	-0.7599*	1
	0.0000	0.1080	0.3720	0.0632	0.00640	0.0000	0.0000	0.0000	

Source : Authors, from Stata

An analysis of the coefficient of variation shows an overalllow dispersion of the variables. The correlationbetween the differentgovernance channels and sustainabledevelopment in Africais positive. In Table 6, itis 0.3574 for politicalgovernance, 0.2632 for economicgovernance and 0.3597 for institutionalgovernance; while in Table 7, itis 0.3415 for politicalgovernance, 0.3588 for economicgovernance and 0.3421 for institutionalgovernance. This correlation coefficient in itselfonlyexplains the dependencebetweentwo variables. The coefficient of determination, on the other hand, measures the proportion of variability in Y (respectively X) thatislinearlyexplained by X (respectively Y). In thisway, in Table 6, 12.77% of the variability of sustainabledevelopmentisexplained by politicalgovernance, 6.92% by economicgovernance and 12.93% by institutionalgovernance. However, in Table 7, 11.66% of the variability in governanceisexplained by politicalgovernance, 12.87% by economicgovernance and 11.70% by institutionalgovernance.

In the figure 1 below, the HDI rank is lower than the GDP per capita (PPP US $) rank, it means that the allocation of resources in the best possible way; that is, their policy of development is not in the function of the entire population, but favors the ruling classes (oil-exporting countries and similar economies based on the exploitation of natural resources and the mono-cultural economy based on them).

Figure 1: Averageevolution by country of HDI, GDP per capita and ecologicalfootprint



Source : Authors

GDP and ecologicalfootprint are indicators of well-being. In otherwords, the higher the GDP per capita, the higher the consumption and thus the ecologicalfootprint. A high ecologicalfootprintwouldthereforebe a sign of development, of well-being, of "happiness". The graph

abovealso shows the evolution of GDP and ecologicalfootprint on a sample of 52 African countries. We can seethattheseindicators are evolving in the same direction, but the ecologicalfootprintisbelow the GDP, becauseitis an exclusivelymonetaryindicator. Itsequivalentis the sum of monetaryincomedistributed to individuals in return for production. Moreover, the GDP cannotbe an ecologicalmeasure of production. On the other hand, the ecologicalfootprintmeasures the ecological impact of this production. The ecologicalfootprintallows us to indicatewhether the GDP issustainable or not.

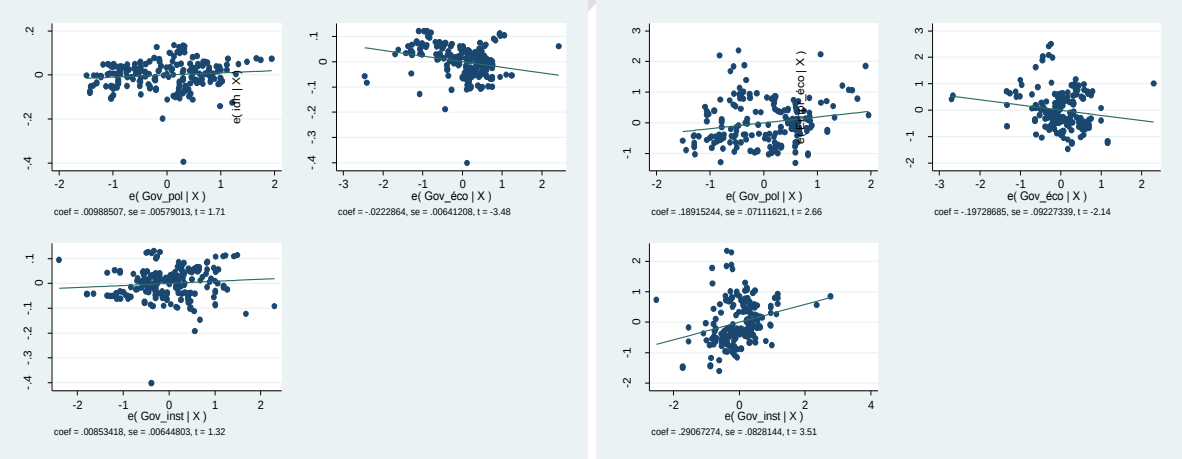
We use the Pooled Mean Group (PMG) analysis method proposed by Pesaran et al. (1999) and Pesaran and Smith (1995). This method has the advantage of being used and the variables are I(0), I(1), or both I(1) and I(0).

4. RESULTS AND DISCUSSION

4.1. Analysis of the relationship between the variables

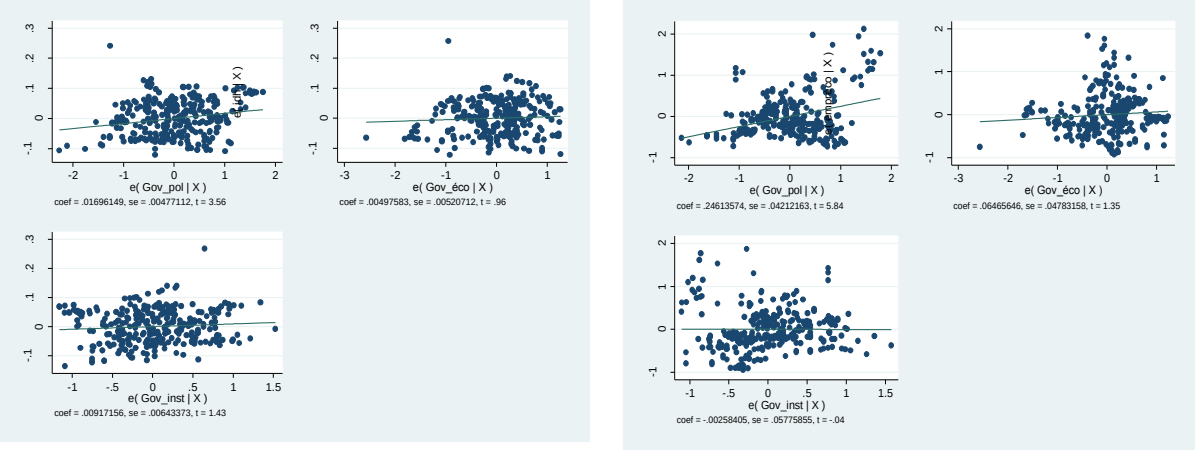
There is a positive correlation between different governance channels, human development, and environmental quality at all levels of development (see figures 2, 3, and 4). This correlation is much more significant in group 1 countries than in group 2 and 3 countries. The figures below show the linear intensity of the relationship between the different modes of governance, human development, and the ecological footprint through the cloud points and the linear adjustment line.

Figure 2: Relationship between governance and sustainable development in Group 1



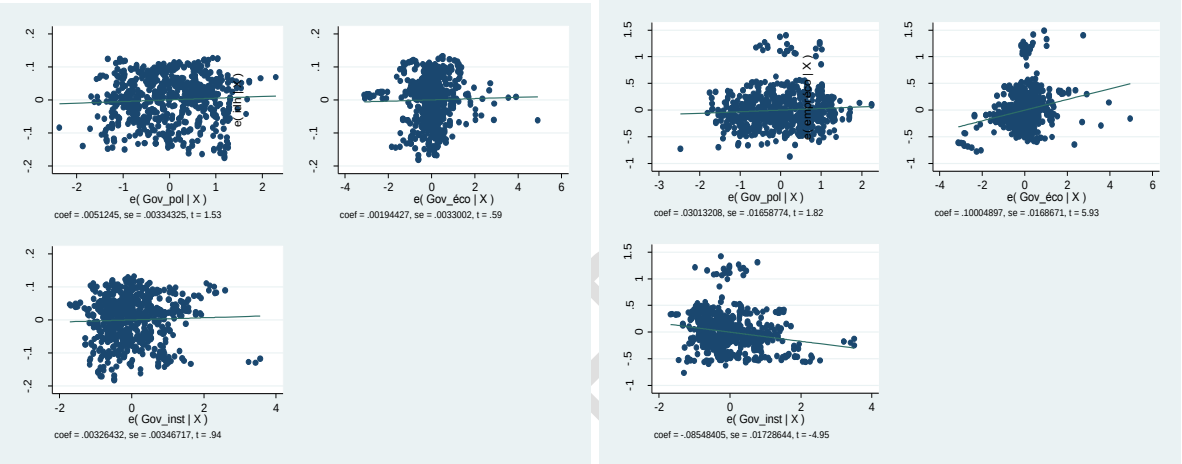
Source: Authors, from STATA

Figure 3: Relationship between governance and sustainable development in Group 2



Source: Authors, from STATA

Figure 4: Relationship between governance and sustainable development in Group 3



Source: Authors, from STATA

4.2. Effect of different modes of governance on sustainable development

This paper determines the effect of different governance channels on human development and environmental quality using a macroeconomic approach. The results obtained from the estimation of equations (2) and (3) are presented in tables 8, 9, and 10, which represent the results of groups 1, 2, and 3 respectively. In each table, the first three columns correspond to estimates of the relationship between governance and human development and the last three columns correspond to estimates of the relationship between governance and environmental quality. After controlling the other variables, our results show that: The level of development is a determinant of the link between the quality of governance and sustainable development.

Generally, in countries with a high level of development, all governance indicators (political, economic, and institutional) have significant effects on sustainable development in the short and long term, measured in terms of human development and the ecological footprint. Contrarily, in countries with medium and low development levels. Indeed, governance indicators only have a significant impact on their sustainable development in the long term.

Specifically, a 1% increase in political governance increases the level of long-term human development by **0.055% in** Group 1 countries. However, economic and institutional governance significantly boosts human development (columns 5 and 6) and the ecological footprint. Moreover, all governance channels have positive and significant effects on the ecological footprint in the same period.

In the long term, the trends are reversed, as the effects of political governance become positive and significant for human development, while those of economic and institutional governance are negative and significant. On the other hand, all these indicators have positive and significant effects on the ecological footprint in the long term. There are, however, some similarities among African countries concerning the foreign direct investment and infrastructure variables. In fact, these two variables have positive and significant effects on long-term human development. But the magnitude of its coefficients is higher in countries at high levels of development than in the other two groups of countries (medium and low level of development).

Further analysis shows us that political governance has a positive effect in countries with a low level of human development, and a significant effect on human development in the group of countries with a high and medium level of human development. In fact, an improvement in the political governance of one unit leads to an increase in the level of human development of **0.0557 units in** group 1, 0.**0423 units in group** 2, and **0.0366 units in** group 3.

Economic governance has a negative effect on *human development* in group 1 and a positive effect in groups 2 and 3. We find that an improvement in the economic governance of one unit leads to a decrease in the level of human development of **0.971** units in group 1, but an increase of 0.**0383 and 0.0341** units respectively in group 2 and group 3. But the effect is not significant whatever the sign. At the same time, it has a negative effect on the Ecological Footprint in Group 1 and a positive sign in Groups 2 and 3.

Institutional governance has a negative effect on *human development* in groups 1 and 3, but a positive effect in group 2. We find that an increase in institutional governance of one unit leads to a deterioration in the level of human development of **0.117 units in group** 1, 0.**0108 units in group** 3, and an improvement of 0.**0211 units in** group 2. It affects the ecological footprint positively and significantly in groups 1 and 3, but negatively in group 2.

As for the effect of different governance channels on the ecological footprint, the results show a positive effect in groups 2 and 3, but a negative effect in group 3. In contrast to political governance, economic governance has a negative effect on the ecological footprint in groups 2 and 3, but a positive effect in group 1. The ecological footprint is positively and significantly influenced by institutional governance in groups 1 and 3, and negatively in group 2. The sixth column in Tables 8, 9, and 10 show that when institutional governance increases by one unit, the Ecological Footprint increases by **0.0744** in Group 1, **0.107** in Group 3. However, it decreases by 0.218 in group 2.

Governance channels significantly and positively explain the level of development (human development and environmental quality) in the groups of countries under consideration. The negative effect of certain governance indicators allows us to understand that government has not yet reached an acceptable level that could positively influence the development of some African countries.

The effect of this variable is not significant on the Ecological Footprint although we have a positive sign in Group 1, negative in Groups 2 and 3 (see results in column 6 of Tables 8, 9, and 10). The results of our various analyses are summarized in Tables 8, 9, and 10 below:

Table 8: Analysis of the impact of different modes of governance on human development and the ecological footprint

Variables	Group 1					
	D.idh	D.idh	D.idh	D.Epréco	D.Epréco	D.Epréco
	(1)	(2)	(3)	(4)	(5)	(6)
Long-termdynamics						
Govpol	**0.0557*** **			**0.267*** **		
	(7.06)			(-3.52)		
PIBhbts	-0.392	0.633	0.178	0.128	0.158*	-0.480
	(-0.99)	(1.06)	(0.29)	(1.11)	(2.22)	(-0.79)
Ide	0.108***	0.116***	0.106**			
	(5.30)	(3.33)	(3.11)			
LnInfr	0.0786***	0.0789***	0.0793***			
	(3.942)	(5.502)	(4.1423)			
Govéco		**-0.971***			**0.172***	
		(-1.984)			(2.031)	
Govinst			**-0.117***			**0.0744***
			(-2.001)			(1.982)
lnOuvcom				0.699***	-0.202*	0.509***
				(3.79)	(-2.00)	(3.84)
Lndpop				-1.087	3.256***	1.782***
				(-1.24)	(7.65)	(6.57)
Va_agri				-0.0884**	-0.0188*	-0.0220*
				(-3.01)	(-1.985)	(-2.20)
lnVa_indus				-0.683*	0.369	-0.241
				(-2.24)	(1.71)	(-1.43)
Short-termdynamics						
ECT	**-0.1972****	**-0.1975*****	**-0.186*****	**-0.335****	**-0.317****	**-0.326*****
	(-3.20)	(-4.20)	(-3.894)	(-2.733)	(-2.98)	(-3.736)
D.Gov_pol	**-0.485***			**0.790***		
	(-2.06)			(2.07)		
D.GDP_hbts	0.137	-0.144	-0.659	-0.276	-0.791	-0.270
	(0.06)	(-0.50)	(-0.34)	(-0.61)	(-0.12)	(-0.72)
D.ide	0.941	0.161	0.230			
	(0.41)	(0.52)	(0.85)			
D.lnInfr	-0.0130	-0.0165	-0.0138			
	(-0.76)	(-0.85)	(-0.81)			
D.Govéco		**0.0223***			**0.0440***	
		(2.029)			(2.0146)	
D.Govinst			**0.0439***			**0.0178***
			(2.081)			(1.9753)
D.lnOuvcom				-0.0815	-0.0314	-0.0718
				(-0.46)	(-0.21)	(-0.34)
D.lndpop				-4.134	-1.065	-0.315
				(-0.56)	(-1.37)	(-0.03)
D.Va_agri				0.0646**	-0.0359*	0.0119*
				(2.55)	(-2.04)	(2.002)
D.lnVa_indus				0.254	0.245	0.164
				(0.70)	(0.52)	(0.28)
Cons	0.0728*	0.0821**	0.0767*	2.049*	-3.562*	-2.161*
	(2.23)	(3.02)	(1.968)	(2.06)	(-1.99)	(-2.06)

***, ** and * indicates significance at 1%, 5% and 10% respectively. Values in parentheses are the student "t".

Source: Authors, from STATA

Table 9**:** Analysis of the impact of different modes of governance on human development and the ecological footprint

Variables	Group 2					
	D.idh	D.idh	D.idh	D.Epréco	D.Epréco	D.Epréco
	(1)	(2)	(3)	(4)	(5)	(6)
	long-termdynamics					
Govpol	0.0423***			0.134***		
	(4.74)			(4.29)		
PIBhbts	0.0589***	0.0706***	0.0859***	0.0124***	0.0256***	0.0101
	(6.93)	(3.55)	(4.94)	(6.30)	(5.28)	(1.63)
Ide	0.0434*	0.0954*	0.0349***			
	(2.18)	(2.44)	(4.11)			
LnInfr	0.0270***	0.0365***	0.0411***			
	(9.18)	(9.26)	(9.16)			
Govéco		**0.0383***			-0.0177*	
		(2.172)			(-2.51)	
Govinst			0.0211*			-0.218***
			(2.248)			(-3.79)
lnOuvcom				0.121	-0.221	0.263*
				(1.63)	(-0.02)	(2.33)
Lndpop				-0.0726	0.266*	0.231*
				(-0.57)	(2.28)	(2.16)
Va_agri				0.0928*	-0.0123*	0.0233**
				(2.06)	(-2.27)	(2.80)
lnva_indus				-0.0430	-0.218*	0.409**
				(-0.58)	(-2.50)	(2.84)
	short-termdynamics					
ECT	**-0.0451*** **	**-0.0316****	**-0.0544*** **	**-0.385*** **	**-0.383*** **	**-0.332*** **
	(-3.86)	(-2.82)	(-6.58)	(-4.26)	(-4.15)	(-3.61)
D.Govpol	0.0356			-0.0813		
	(0.01)			(-1.42)		
D.pibhbts	0.0617*	-0.0689	-0.0218	0.0407	0.0284	0.0486
	(2.03)	(-0.33)	(-0.81)	(0.58)	(0.58)	(0.73)
D.ide	-0.0295	-0.0466	-0.0101			
	(-0.57)	(-0.09)	(-0.70)			
D.lnInfr	-0.0351	-0.0875	0.0412			
	(-1.59)	(-0.39)	(0.19)			
D.Govéco		0.0123			-0.0952	
		(1.74)			(-0.23)	
D.Govinst			0.0108			-0.0484
			(1.55)			(-0.50)
D.lnOuvcom				-0.166*	-0.200*	-0.308*
				(-2.079)	(-2.134)	(-2.150)
D.lndpop				-4.213	0.388	6.259
				(-0.78)	(0.08)	(1.05)
D.Va_agri				0.0185*	0.0140*	0.0285*
				(2.08)	(2.405)	(2.134)
D.lnVa_indus				-0.0211	0.0362	-0.169
				(-0.11)	(0.19)	(-0.54)
_cons	0.0259***	0.0175***	0.0273***	0.452*	0.559*	-0.881***
	(5.21)	(3.92)	(8.06)	(2.13)	(2.26)	(-3.88)

***, ** and * indicates significance at 1%, 5% and 10% respectively. Values in parentheses are the student "t".

Source: Authors, from STATA

Table 10 :Analysis of the impact of the different modes of governance on human development and the ecological footprint

Variables	Group 3					
	D.idh	D.idh	D.idh	D.Epréco	D.Epréco	D.Epréco
	(1)	(2)	(3)	(4)	(5)	(6)
	Long-termdynamics					

Govpol	**0.0366**				**0.0511*** **	
	(1.44)				(4.14)	
PIBhbt	0.0583***	0.0602***	0.0644***	0.0464**	0.0785***	0.0732***
	(11.98)	(12.47)	(13.04)	(3.07)	(4.81)	(3.91)
Ide	0.0160***	0.0189***	0.0185***			
	(3.90)	(4.50)	(4.36)			
lnInfr	0.0161***	0.0160***	0.0159***			
	(9.52)	(3.74)	(3.79)			
Govéco		**0.0341**			**-0.0819**	
		(1.73)			(-0.95)	
Govinst			**-0.0108**			**0.107*** **
			(-0.04)			(8.6612)
lnOuvcom				0.0136	0.0451*	0.0206
				(0.62)	(2.24)	(0.51)
Lndpop				0.0289	0.0182	-0.490***
				(0.76)	(0.49)	(-7.90)
Va_agri				0.0129	-0.0103	0.0490***
				(1.02)	(-0.88)	(3.46)
lnVa_indus				-0.0842**	-0.127***	-0.271***
				(-2.69)	(-3.79)	(-5.11)
	Short-termdynamics					
ECT	**-0.153*** **	**-0.168*** **	**-0.155*** **	**-0.391*** **	**-0.404*** **	**-0.308*** **
	(-4.32)	(-4.26)	(-3.71)	(-7.11)	(-8.13)	(-4.86)
D.Govpol	**-0.0181**			**-0.0169**		
	(-0.50)			(-1.48)		
D.PIBht	-0.0155*	-0.0146	-0.0452	0.0380**	0.0265*	0.0448***
	(-2.00)	(-1.09)	(-0.22)	(3.26)	(2.07)	(3.84)
D.ide	0.0261	-0.0549	-0.0578			
	(1.03)	(-1.25)	(-1.41)			
D.lnInfr	-0.0427**	-0.0358**	-0.0338**			
	(-2.76)	(-2.70)	(-2.63)			
D.Govéco		**0.0210**			**0.0200***	
		(1.70)			(2.46)	
D.Govinst			**-0.0357**			**-0.0525**
			(-1.26)			(-0.46)
D.lnOuvcom				-0.0289	-0.0542	-0.0992
				(-0.71)	(-1.59)	(-0.30)
D.lndpo				0.813	2.145	5.824
				(0.17)	(0.41)	(0.99)
D.Va_agri				0.0125*	0.0124	0.0136
				(2.03)	(1.92)	(1.95)
D.lnVa_indus				0.0886	0.0403	0.0900
				(1.39)	(0.67)	(1.61)
Cons	0.0661***	0.0712***	0.0674***	0.431**	0.456**	1.005***
	(4.18)	(4.14)	(3.65)	(2.74)	(2.92)	(3.59)

Note: ***, ** and * indicates significance at 1%, 5% and 10% respectively. Values in parentheses are the student's "t".

Source: Authors, from STATA

5. CONCLUSION

Ultimately, this paper assesses the impact of governance on sustainable development for three samples of African countries according to their level of development for the period 1996 - 2018. We use two indicators of sustainable development: human development and the ecological footprint. Also, we use three governance channels: political, economic, and institutional governance. The result of the econometric analysis based on the Pooled Mean Group is that in highly developed countries all governance indicators (political, economic, and institutional) have an overall significant impact on

sustainable development, measured in terms of human development, short- and long-term ecological footprint. Contrary to countries with medium and low development levels. In Group 1 countries, economic and institutional governance significantly stimulates human development (columns 2 and 3) and the ecological footprint. On the other hand, political governance has a negative and significant impact on human development and the ecological footprint. In the long term, however, the trends are reversed as political governance becomes positive and meaningful for human development. Economic and institutional governance is negative and significant for this indicator. But the same indicators have positive and significant long-term effects on the ecological footprint. However, the impact of economic and institutional governance remains minimal or weak. This weakness may be because (Acemoglu et al., 2012) have a large impact on political governance. The negative effects of certain variables show that the level of governance has not yet reached an acceptable level to significantly influence sustainable development in all African countries. Since political institutions have a strong influence on the economic and institutional governance that leads to development and environmental protection, their establishment is crucial to address the shortcomings that affect the implementation of laws and compliance with the commitments of companies, governments, and citizens for sustainable development in their countries.

REFERENCES

Acemoglu, D, James R (2012) *Why Nations Fail: The Origins of Power, Prosperity, and Poverty* (1st). 1st ed. New York: Crown, 529.

ADB (1999) World Bank Group Policy on Governance, Central Operations Department, November 1999 21-en politique_gb_ bonne_ gouvernance.pdf.

Ahmad Z, Saleem A (2014)Impact of Governance on Human Development *Pakistan Journal of Commerce and Social Sciences*, 8 (3), 612-628. https://www.researchgate.net /publication/ 270590133.

Aidt T S (2011) Corruption and sustainable development. Int. Handb. Econ. Econ. Corrupt., 2, 3-51.

Akinbode, S. O., Olabisi, J., Adegbite, R. R., Aderemi, T. A., &Alawode, A. M. (2020). Corruption, governmenteffectiveness and humandevelopment in Sub-SaharanAfrica.

AlBassam A B (2013) The relationship between governance and economic growth during times of crisis, *European Journal of Sustainable Development*, 2, 4, 1-18.

Al-Mulali U, Ozturk I (2015) The effect of energy consumption, urbanization, trade openness, industrial output, and political stability on the environmental degradation in the MENA (the Middle East and North African) region. *Energy*, n° 84, 382-389.

Aloui, Zouhaier (2019) Online at https://mpra.ub.uni-muenchen.de/94716/ MPRA Paper No. 94716, posted 27 Jun 2019 09:34 UTC.

Asongu S A, Nwachukwu JC (2016b) The mobile phone in the diffusion of knowledge for institutional quality in sub-Saharan Africa. World Dev 86(October):133-147

Asongu S A, Odhiambo N, M (2019) Governance, capital flight, and industrialization in Africa, https://doi.org/10.1186/s40008-019-0170-2

Asongu, S., & Diop, S. (2023). Human development and governance in Africa: do good fencesmake good neighbours?. *World Affairs*, *186*(1), 169-189.

Avom D, FankemG G S (2012) Does sustainable development constitute an element of territorial attractiveness? Application to Central African countries, *Market and organizations,* 2012/2 (No. 16), 77-102. DOI: 10.3917/maorg.016.0077. URL: https://www.cairn.info/revue-marche-et-organisations-2012-2-page-77.htm

Banda, L. G. (2023). Good Governance and Human WelfareDevelopment in Malawi. *Malawi Journal of Social Sciences (MJSS)*, *22*, 88-119.

BELKHATAB, Z. (2022). Gouvernance et qualité de l'éducation dans les pays en voie de développement: évidences empiriques. *Revue Française d'Economie et de Gestion*, *3*(5).

Biswas S K et al (2012) Macrophage polarization and plasticity in health and disease; doi:10.1007/s12026-012-8291-9.

Bureaua D, et al (2020) *Biodiversity at risk: what economic response?*Les notes du conseil d'analyse économique, n° 59, September 20200.

Charron N, et al(2014) *Regional Governance Matters: Quality of Government within European Union Member States*;*RegionalStudies*48(1) doi: 10.1080/00343404.2013.770141.

Combe H (2016) Governance, an imperative need for sustainable developmen, Sustainable development and territories, 6(2), URL: http://developpementdurable.revues.org/10852; doi: 10.4000/developpementdurable.10852.

Desai U, Shelley M (1998) *Development through good governance: lessons for developing countries Mohammad Jasim Uddin Laila Ashrafun Joya*https://doi.org/10.1111/j.1541-0072.1998.tb01921.x .

Dhahri S, Omri A (2018) The contribution of entrepreneurship to the three pillars of sustainable development: what do the facts say?, World Dev., 106, 64-77.

DryzekJ S (1987), Complexity and Rationality in Public Life, https://doi.org/10.1111/ j.1467-9248.1987.tb00198.x

Gani A (2012) The Relationship Between Good Governance And Carbon Dioxide Emissions: Evidence From Developing Economies, Journal of Economic Development, Chung-Ang University, Department of Economics, 37(1), 77-93.

Gani, A. (2012). The relationshipbetween good governance and carbondioxideemissions: evidencefromdevelopingeconomies. *Journal of EconomicDevelopment*, *37*(1), 77.

Glass L-M, Newig J (2016) Good Governance as a Tool of Sustainable Development, *European Journal of Sustainable Development,* doi: 10.14207/ejsd.2016.v5n4p558.

Global Footprint Network: base foot print.xlsx (2019).

Güney T (2016) Governance and sustainable development: How effective is governance? https://doi.org/10.1080/09638199.2016.1249391.

Güney T (2017) Governance and sustainable development: how effective is governance?'', J. Int. Trade Econ. Dev., 26, 316-335.

Haq R, Zia U (2009) Governance and Pro-poor Growth: Evidence from Pakistan, doi:10.30541/v45i4IIpp.761-776 https://doi.org/10.1111/j.1477-8947.2004.00079.x

Haq, Z. U. (2009). E-mail advertising: A study of consumer attitude toward e-mail advertisingamongIndianusers. *Journal of Retail& Leisure Property*, *8*(3), 207-223.

Iyad D (2019) https://mpra.ub.uni-muenchen.de/92544/ MPRA Paper No. 92544 *European Journal of Sustainable Development (2016)*, 5, 4, 558-573 ISSN: 2239-5938doi: 10.14207/ejsd.2016.v5n4p558.

Jolliffe IT (2002) *Principal component analysis*, 2nd edn. Springer, New York.

Kaiser HF (1974), An index of factorial simplicity. Psychometrika 39:31-36.

Kaufmann D, Kraay A, Mastruzzi M (2010) The worldwide governance indicators: methodology and analytical issues. World Bank Policy Research, *Working Paper No 5430*, Washington.

Kaynar I Y O (2010) Multiple regression, ANN (RBF, MLP) and ANFIS models for prediction of the swell potential of clayey soils,Expert Systems with Applications 38(5):5958-5966 DOI: 10.1016/j.eswa.2010.11.027

Kaynar O, Yilmaz I (2011) Multiple Regression, ANN (RBF, MLP) and ANFIS models for prediction of the swell potential of clayey soils'', *Expert System with an application,* 38, 5958-5966.

Keser H. (2017) Governance and Human Development: The Impact of Governance Indicators on Human Development, *Journal of Public Administration and Governance,* ISSN 2161-71042017, Vol. 8, No. 126 http://jpag.macrothink.org doi:10.5296/jpag.v 8i1.12336 URL: https://doi.org/10.5296/jpag.v8i1.12336

Lahiri-Dutt K (2004) Informality in mineral resource management in Asia: Raising questions relating to community economies and sustainable development''.

Mbaku, J. M. (2020). Good and inclusive governanceisimperative for Africa's future.

Nandha M, Smyth R (2013) https://www.researchgate.net/publication/ 265050847 doi: 10.2139/ssrn.2360898.

Network, G. F. (2019). Global footprint network. *Obtenido de Global Footprint Network: http://www. footprintnetwork. org online. Accessed*, 1-10.

Nkengfack H, and al (2020) Governance, Institutions, and Environmental Protection in ECCAS Countries, *Rural Economy,* 371 | URL: http:// journals.openition.org/ economierurale/7384 DOI: https://doi.org/10.4000/economierurale 7383

Omria A, Mabroukc B N (2020) Good governance for sustainable development goals: Getting ahead of the pack or falling behind? *Environmental Impact Assessment Review 83 (2020) 106388* 0195-9255/ © 2020 Elsevier Inc. https://doi.org/10.1016/j.eiar.20 20.106388

Osabuohienet al. (2014) Beyond the Environmental Kuznets Curve in Africa, Evidence from Panel Cointegration, https://www.researchgate.net/publication/267396982; doi :10.1080/15239 08X.2013.867802

Ouedraogo, I., Tabi, H. N., Ondoa, H. A., &Jiya, A. N. (2022). Institutionalquality and human capital development in Africa. *EconomicSystems*, *46*(1), 100937.

Ozturk I, Al-Mulali U (2015) Investigating the validity of the environmental Kuznets curve hypothesis in Cambodia. *Ecological Indicators*, 57, 324-330.

Pesaran M H, and al (1999) pooled Mean Group estimation for estimation of dynamic heterogeneous panels, *Journal of the American Statistical Association*, 94, 621-634.

Pesaran, M H and Smith R P (1995) estimating long-run relationships from dynamic heterogeneous panels, *Journal of Econometrics*, 68, 79-113.

Pinson, G. (2006). Projets de ville et gouvernance urbaine: pluralisation des espaces politiques et recomposition d'une capacité d'action collective dans les villes européennes. *Revue française de science politique*, *56*(4), 619-651.

Pinson, P. (2006). *Estimation of the uncertainty in wind power forecasting* (Doctoral dissertation, École Nationale Supérieure des Mines de Paris).

Pradhan R P, Sanyal G S (2011) Good governance and human development: Evidence from the Indian States; February 2011 *Journal of Social and Development Sciences* 1(1):1-8 doi: 10.22610/jsds.v1i1.622.

Ramzy O et al (2019) Sustainable Development & Good Governance,*European Journal of Sustainable Development,*8, 2, 125-138 ISSN: 2239-5938, doi: 10.14207/ejsd. 2019.v8n2p125.

Sambou, S. (2023). Bonne gouvernance et le développement économique dans les pays de l'Union Economique Monétaire Ouest Africain (UEMOA): Approche spatiale et Approche non spatiale.

Shafa , M. I., Haladu , A. I., &Salisu , A. (2023). An assessment of the Impact of Good Governance on HealthOutcomeamongSelectedAfrican Countries. *Asian Journal of Economics, Business and Accounting*, *23*(19), 24–35. https://doi.org/10.9734 /ajeba/2023/v23i191070

Uddin M J, Joya L A (2007) Development through Good Governance: Lessons for Developing Countries, *Asian Affairs,* 29(3), 1-28.

UNDP (2019) Human Development Report 2019 Beyond Incomes, Averages and the Present: Inequalities in Human Development in the 21st Century. Hdr_2019_ overview_english.pdf.

UNDP (2019) Human development reports: Human development, index. http://hdr.undp.org/en/indicators/137506

UNDP, P. D. (2019). United Nations Development Programme. Retrieved on, 18.

WCED, S. W. S. (1987). World commission on environment and development. *Our common future*, *17*(1), 1-91.

WDI (2019) World Development Indicators Database. Washington, DC. http://data.worldbank. org.

WGI (2019), https://datacatalog.worldbank.org/dataset/worldwide-governance-indicators

WWF (World Wide Fund for Nature), & WWF. Worldwide Fund for Nature. (2008). Living planet report 2008.

Appendix

List 1 : Distribution of African countries according to their level of development

Level of development	Socio-economic and environmental dimension
Countries with a high level of development (Group 1)	Algeria, Botswana, Egypt, Gabon, Libya, Mauritius, Seychelles, South Africa, Tunisia, Botswana
countries with a medium level of development (Group 2)	Angola, Cameroon, Cape Verde, Congo, Equatorial Guinea, Ghana, Kenya, Morocco, Namibia, Sao Tome, Swaziland, Zambia, Zimbabwe.
countries with a low level of development (Group 3)	Benin, Burkina Fasso, Burundi, Central African Republic, Chad, Comoros, DR Congo, Côte d'Ivoire, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Togo, Uganda.

Source: Distribution according to UNDP (2019)