INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND ANALYSIS
ISSN(print): 2643-9840, ISSN(online): 2643-9875
Volume 06 Issue 03 March 2023
DOI: 10.47191/ijmra/v6-i3-51, Impact Factor: 7.022
Page No. 1318-1327

Corruption and Environmental Protection in Sub-Saharan African Countries

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ABSTRACT: Carbon dioxide (CO2) emissions are a growing concern for policy makers and environmental advocates. The objective of the article is to determine the role of governance in environmental decarbonization based on the environmental Kuznets curve from a panel of 21 SSA countries over the period from 1996 to 2019. The Driscoll-Kraay estimator is used to estimate the long-term relationship and the dynamic ordinary least squares (DOLS) estimator to test the robustness. The results show the non-existence of an environmental Kuznets curve and the negative influence of corruption on CO2 emissions. These results suggest strengthening the control of corruption to ensure effective environmental decarbonization policies.

KEYWORDS: Corruption, CO2 emissions, Economic growth, SSA
JEL Classifications : O13, O50, Q53, Q56, Q59

INTRODUCTION

Since a long time, from 1972 with the United Nations Conference on the Human Environment until the Paris Agreement in 2015, the environment has been a global concern. The Saguenay flood of 1996 and the ice storm of January 1998 greatly contributed to setting the record straight on the issue of the environment (Bourque, 2000). Thus, in recent decades, considerable efforts have been made on a global scale for the protection of the environment because of its importance on economic activity.

According to the FAO (2022), the forest sector contributes more than 1,520 billion USD to the world's gross domestic product and employs 33 million people. But the consequences on the preservation of the environment remain small because we are still witnessing a rapid destruction of the global environment. Indeed, deforestation, desertification and species extinction are progressing everywhere. The Global Forest Resources Assessment shows that 420 million hectares of forest have been deforested (allocated to other uses) between 1990 and 2020 (FAO, 2022).

For a long time, Africa seemed not to be concerned with environmental and pollution problems, that it was somehow isolated from these problems of the « rich », of the « developed », of the « industrialized ». But, this is not the case, Africa is completely concerned by environmental and pollution problems (Plauchu, 2021). It is concerned with global problems, starting with climate change, the consequences of which are the reduction of biodiversity, the depletion of fishery resources, deforestation, soil erosion and degradation, acidification of the seas, freshwater and soils, freshwater scarcity, desertification, floods, etc.

Africa, in particular Sub-Saharan Africa (SSA), is considered to be the one that causes the least environmental degradation and the most exposed to its consequences. Twenty countries, including the United States, are responsible for 80% of global emissions (of greenhouse gases) and 48 countries in sub-Saharan Africa account for 0.55% of these emissions (Kerry, 2022). At the same time, about 90% of people in sub-Saharan Africa are exposed to indoor air pollution and 500,000 square kilometers of land are degraded by soil erosion, salinization, pollution and deforestation (PNUD, 2019). Furthermore, The World Bank estimates that 100 million people worldwide, mainly in South Asia and sub-Saharan Africa, are at risk of falling back into poverty due to the effects of climate change (Baarsch et al., 2020; Hallegatte, 2016). However, poor countries are at the mercy of environmental degradation (Maertens, 2017). Rapid environmental degradation poses a threat to livelihoods and social well-being for the development of SSA countries especially when the quality of institutions is weak.

Governance is seen as a fundamental ingredient for driving development in harmony with environmental requirements. Whereas, bad governance is detrimental to the structural transformation of African economies. There is consensus in Africa that better governance is essential to promote growth and development and enable African countries to achieve the Millennium Development Goals (Commission économique pour l'Afrique, 2009). Furthermore, significant progress has been noted in terms of governance in Sub-Saharan Africa. Indeed, with an average score of 33 out of 100 on the Corruption Perception Index (CPI), sub-

Saharan Africa needs to make more progress. Indeed, compared to previous years, 44 countries out of 49 in 2021 obtained a score still below 50 (Transparency International, 2022).

Countries that adopt strategies to mitigate or fight against environmental degradation seem to be the least exposed to environmental damage. Thus, SSA countries have undertaken actions for community management of natural resources, species conservation, creation of multi-use marine protected areas, development of renewable energies, etc. Added to this is the policy of the African Development Bank Group on environmentally sustainable development in Africa. But, despite these actions, environmental degradation remains a real challenge and governance is proving to be an opportunity to better address this issue.

The theoretical anchoring of the question of environmental degradation on the economy finds its origin in the work of Simon Kuznets (1955). It relates inequality in the distribution of income and economic growth in the United States and the United Kingdom. Kuznets (1955) estimates the existence of a relationship described as « inverted U » between income inequality and GDP per capita. A few decades later, Grossman & Krueger (1991) tested this inverted U curve hypothesis for the relationship between environmental degradation and GDP per capita; this hypothesis will then be called the Environmental Kuznets Curve (CEK). Whereas, the process of emergence of the issue of institutions in economics has seen two opposing conceptions (orthodox and heterodox) of the relationship between economy and institution. From its foundation and up to the present day, orthodox liberal economics has sought to reduce the question of economic institutions to that of conformity between a good pure market economy without disruptive institutions and a concrete economy more or less perverted by institutions. existing. On the other hand, the various successive heterodox approaches in economics (Sismondi, Saint-Simon, historicists, Marx, Veblen) have, each in its own way, proposed a conception of the established economy.

Empirical results on the issue reveal that the relationship between governance and environment is not always virtuous. Some works have detected a CEK (H. Cho, 2021; Le & Ozturk, 2020) and others an increasing monotonic relationship between economic growth and pollutants (Kais & Ben Mbarek, 2017a; Uddin et al., 2017a). In addition, some studies have shown that governance has positive effects on the environment (Gani, 2012; Lahiri-Dutt, 2004a; Osabuohien et al., 2014a) while others show that this relationship is conditional on the characteristics of the countries as the nature of the economy (Dryzek, 1987; Fredriksson & Svensson, 2003a). Accordingly, this article focuses on the role of corruption in environmental protection in SSA African countries. The empirical approach used is that of Grossman & Krueger (1991b) et Stern (2004), i.e. that of an environmental Kuznets curve. Parametric estimators, in particular dynamic ordinary least squares (DOLS) and Driscoll and Kraay (DK), made it possible to estimate a panel of 21 SSA countries over the period from 1996 to 1999. The results show on the one hand the non-existence of a EKC in SSA countries and on the other hand the negative influence of corruption control on CO2 emissions.

An abundant literature shows that governance indicators affect environmental protection (H. Cho, 2021; Dryzek, 1987; Fredriksson & Svensson, 2003a; Gani, 2012; Kais & Ben Mbarek, 2017a; Lahiri-Dutt, 2004a; Le & Ozturk, 2020; Osabuohien et al., 2014a; Uddin et al., 2017a). Therefore, the relationship between environmental change and institution cannot be dissociated from economic policy and reform. Thus, the contribution of our research is to contribute to this abundant literature in the context of countries characterized by politico-institutional instability.

To contribute to this literature, we will, after the introduction, review the state of the art on environmental governance in SSA countries. Then present the methodology and the data used, then the estimation strategy and the results. Finally, we will end with the conclusion.

1- ENVIRONMENTAL GOVERNANCE IN SSA COUNTRIES: THEORY AND EMPIRICAL EVIDENCE

Environmental protection refers to environmental standards established with a view to protecting and preserving the natural heritage, such as emission, process, waste management standards, etc. (Beitone et al., 2013). It aims to institute sustainable development ensuring efficient use of natural resources while reducing the ecological footprint. Since the Stockholm conference in 1972, the United Nations Conference on Environment and Development has sought to have member states adopt conventions establishing environmental standards. Rich countries favor such standards. But the emerging countries and the poorest countries, globally less polluting, claim a right to pollute equal to that which the North has used its own development since the 18th century. Some economists like Pigou are in favor of eco-taxes rather than difficult-to-enforce environmental standards. But, in a context of globalization, environmental standards are controversial because some see them as a form of non-tariff protectionism. As a result, governance appears to be an alternative to counter the harmful consequences of greenhouse gas emissions, particularly in SSA countries.

1.1- The Kuznets environmental curve

The problem posed by greenhouse gas emissions (pollution) can be seen from the point of view of pollution-related externalities (SECK, 2020). The notion of externality is introduced by Sidgwick (1887) then clarified by (Viner, 1931). An external effect or

externality is a consequence (positive or negative) of an economic activity that is not taken into account by the market (Beitone et al., 2013). Pollution linked to atmospheric emissions is a negative external effect. Indeed, the discrepancy between the private cost and the overall cost for the community due to imperfections in the functioning of the market shows the difficulty of implementing environmental governance. However, several lessons can be drawn from work on the quality of the environment, the theoretical foundations of which are to be found in the hypothesis of the environmental Kuznets curve (Grossman & Krueger, 1991b, 1995).

In 1955, Simon Kuznets detected a bell-shaped relationship (inverted U) between the level of per capita income and social inequalities. Following several works, it appears possible that the evolutions of certain pollutants compared to the level of wealth of a country follow a similar path, hence the name of « Kuznets environmental curve ». Indeed, according to Beckerman (1992) : « There is clear evidence that, although economic growth normally causes environmental degradation in the early stages of development, in the end the best - and probably the only - path to regaining decent environment in most countries is to get rich ». This assertion also reflects this apparent relationship called the Environmental Kuznets Curve (ECC).

The EKC postulates the existence of an inverted U-shaped relationship between economic growth and environmental quality. Consequently, the quality of the environment deteriorates during the first phases of economic growth; but from a certain level called the turning point, an improvement in the quality of the environment improves with the level of economic growth. Moreover, the environmental Kuznets curve suggests the existence of a non-linear relationship between economic growth and the quality of the environment in the long term. However, while the theoretical predictions seem to be clear, the conclusions of the empirical literature on CEK seem to be mixed.

A first part of the literature found the existence of a CEK (Apergis & Ozturk, 2015; C.-H. Cho et al., 2014; Jebli et al., 2016; Panayotou, 1993; Saboori et al., 2012; Shafik & Bandyopadhyay, 1992), then a second finds an increasing monotonic relationship between growth and various types of pollutants (Kais & Ben Mbarek, 2017b; Ozturk & Acaravci, 2013; Uddin et al., 2017b) and finally a third pan finds the existence of a complex relationship between growth and the environment (Boyce et al., 1999; Dasgupta et al., 2002; De Bruyn et al., 1998; Fujii & Managi, 2016; Meunié, 2004; Stern, 2004).

The hypothesis of an environmental Kuznets curve has been demonstrated by a number of empirical works. Thus, Apergis & Ozturk (2015) analyze the hypothesis of an environmental Kuznet curve on a sample of 14 Asian countries covering the period 1990-2011. They use the GMM methodology looking at CO2 emissions, GDP per capita, population density, share of industry in GDP and quality of institutions. They find the existence of an inverted U-shaped association between CO2 emissions and per capita income, i.e. validation of the environmental Kuznets curve hypothesis.

To investigate the existence of a KEC in the countries of the Organization for Economic Co-operation and Development, Cho et al. (2014) use the ordinary least squares (OLS) method on a panel of 22 countries over the period 1971-2000. The results show that energy consumption plays an important role in explaining greenhouse gas emissions in OECD countries. Similarly, Jebli et al. (2016) apply a panel of 25 countries the dynamic ordinary least squares method and find the existence of an environmental Kuznets curve in the shape of an inverted U. On the other hand, increased trade reduces CO2 emissions. In the same way, Saboori et al. (2012) suggest the existence of a long-term relationship between CO2 emissions per capita and real gross domestic product (GDP) per capita. However, other works show the existence of an increasing monotonic relationship between economic growth and various types of pollutants.

To examine the existence of a CEK in selected African countries, Kais & Ben Mbarek, (2017) examine the causal relationship between energy consumption (EC), carbon dioxide (CO2) emissions and growth economy in three North African countries. They use panel cointegration analysis using data for the period 1980-2012. The results show in the short term the existence of a unidirectional relationship between economic growth and energy consumption. Similarly, a similar result is found by Ozturk & Acaravci (2013) in Turkey, Uddin et al. (2017) on a panel of the main global contributors to the ecological footprint, Dasgupta et al. (2002) and Stern (2004) in developing countries as well as Fujii & Managi (2016) in eight countries emitting environmental air pollutants. However, despite the identification of a CEK, recent literature emphasizes the role of governance in environmental protection.

1.2- Corruption and CO2 emissions in the literature

The word governance was updated in the 1990s by Anglo-Saxon economists and political scientists and by certain international institutions (UN, World Bank and IMF). In a general sense, governance can be defined as the set of methods by which individuals and institutions manage their common affairs (Beitone et al., 2013). Whereas, Perez (2010) considers that governance is “a device involving both institutions, relationships, rules and behaviors”. Thus, it marks on the one hand, the distinction with the government as an institution and on the other hand takes into account the participation of civil society at all levels (Paye, 2005). Governance refers to the institutional and traditional mechanisms that allow individuals to respect supreme power (Kaufmann et

al., 2011). The fundamental institutional and traditional mechanisms of governance are made up of certain procedures including the quality of the bodies that govern the socio-economic relations between citizens and the government and finally respect for the rights of citizens (Agyeman et al., 2022).

The importance given to the quality of human relations, that is to say the fight against corruption, stems from the observation that citizens informed of ecological issues can express their environmental needs by demanding more transparency (Payne, 1995). Work in the field uses several indicators including the control of corruption (Hadj & Ghodbane, 2022; Kaufmann et al., 2011). The fight against corruption is reputed to be favorable to the quality of the environment. Thus, empirical studies have shown that the fight against corruption leads to the reduction of greenhouse gas emissions (Al-Mulali & Ozturk, 2015; Biswas et al., 2012; Ederington & Minier, 2003; Lahiri-Dutt, 2004a; Osabuohien et al., 2014b; Panayotou, 1993).

Panayotou (1993) uses cross-sectional data from a sample of developed (27 countries) and developing (41 countries) countries and shows by ordinary least squares regression that a 10% improvement in the quality of institutions reduces emissions. sulfur dioxide (SO2). Similarly, Ederington & Minier (2003) using panel data from 374 industrial sectors over the period 1978 to 1992 show that institutional development, accelerating compliance with laws and reducing corruption can reduce the risk of a country's CO2 emissions.

To analyze the effect of pollution on the environment, Biswas et al. (2012) look at the informal sector in over 100 countries. They analyze using a panel covering the period 1999-2005 to show how the informal economy affects pollution through corruption in public administration. Indeed, production in the underground economy allows companies to avoid environmental regulatory policies. The results show that the relationship between the informal economy and pollution levels depends on corruption levels. Similarly, Lahiri-Dutt (2004) using a literature review shows that informal mining activities in mineral-rich developing countries negatively affect the environment through corruption. Indeed, in the informal sector, polluting industries escape environmental regulations and lead to environmental degradation.

To analyze the effect of institutions on pollution in developing countries, Osabuohien et al. (2014) analyze 50 African countries over the period from 1995 to 2010. They show that in oil-producing countries, institutions have a positive impact on CO2 emissions, while the opposite effect is observed in non-producing countries. Thus, the link between governance and the quality of institutions is not always virtuous but depends on the characteristics of the countries. Moreover, Fredriksson & Svensson (2003) postulates that democracy alone cannot lead to the improvement of the quality of the environment given that investors will operate the choices of their methods of production and use resources exclusively on the basis of their private interests.

The explanation behind the effect of the fight against corruption on environmental protection is that governance ensures that a country's resources are used efficiently by framing productive activities and supporting sustainability. as well as environmental quality (Agyeman et al., 2022). However, the literature on the issue shows that researchers have not paid particular attention to the role of governance in the successful implementation of decarbonization policies. Therefore, we hypothesize that the fight against corruption can play an important role in reducing CO2 emissions.

2- METHODOLOGY AND DATA

In this part we will first present the econometric model and the data used, then the estimation strategy and the interpretation of the results.

2.1- The econometric model and data

We assume that the fight against corruption plays an essential role in the quality of the environment. Therefore, behaviors such as endemic corruption in governance systems are not environmentally friendly (Liu et al., 2021; Ulucak, 2020). To highlight the empirical link between corruption and environmental quality, following the example of Agyeman et al., (2022), we will adopt a classic CEK model with panel governance of 21 countries (Table 2) over the period from 1996 to 2019 due to data availability. The econometric specification of the model is as follows:

$$lco2_{it} = \alpha_{0it} + \alpha_1 lgdp_{it} + \alpha_2 lgdp_{it}^2 + \alpha_3 cc_{it} + \alpha_4 comop_{it} + \alpha_5 consenerg_{it} + \alpha_6 FDI_{it} + \alpha_7 va\_ind_{it} + \varepsilon_{it} \quad (1)$$

In the equation « l » represents the natural logarithm (ln), the parameters α the value of the coefficients of the variables of the model and ε an error term. The model variables are defined in Table 1. The databases used are those of the World Bank, namely the World Development Indicators (WDI) and the World Governance Indicators (WGI).

Tableau 1 : Description of model variables

Variables	Symbols	Definition and measurement	Data source
Pollution	lCO2	A measure of environmental quality World captured by carbon dioxide (CO2) emissions Development from fossil fuel combustion and Indicators cement manufacturing. It is measured 9WDI) in metric tons per head.	WDI
Gross Domestic Product	dgp	Gross domestic product per capita, is gross domestic product divided by mid-year population. Data are in constant 2015 US dollars..	WDI
Corruption Control	CC	It captures perceptions of the extent World to which public power is exercised Governance for private gain. It is between 2.5 and -2.5. Indicators Commercial opening comop represents the degree of trade openness Energy consumption consenergy Represents primary energy use before transformation into other end-use fuels; It is measured in Kg per head	WDI
Foreign Direct Investment.	FDI	Représents Foreign Direct Investmen. They are expressed as a percentage of GDP	WDI

Source: Author based on WDI and WGI

Our field of analysis concerns the countries of sub-Saharan Africa. For a rigorous analysis of corruption on the environment, we will retain the countries of Sub-Saharan Africa whose score on the corruption perception index in 2021 exceeds the average for the region which is 33 out of 100. It is These are the 21 countries in Table 2:

Table 2: Corruption perception index score of SSA countries above or equal to the average for the region in 2021

Countries	Score
Seychelles	70
Cape Verde	58
Botswana	55
Maurice	54
Rwanda	53
Namibia	49
São Tomé-et-Principe	45
South Africa	44
Ghana	43
Senegal	43
Benin	42
Burkina Faso	42
Ethiopia	39
Maroco	39
Tanzania	39
Lesotho	38
Gambia	37
Ivory coast	36
Malawi	35
Sierra Leone	34
Zambia	33
Source: Author based on Corruption Perceptions Index Report 2021	

2.2- Estimation strategy and interpretation of results

The estimation strategy first goes through the cross-sectional dependency test to determine the appropriate unit root test category for the data being used. Next, we will proceed to the stationarity test. Finally, we test the cointegration before determining the most relevant estimators for the estimation of the empirical model.

The cross-sectional test of independence (Table 3) makes it possible to determine the most appropriate unit root test for our series. For this, we will use the test of (Pesaran, 2021) and (Born & Breitung, 2016).

Table 3: Cross-sectional independence test

Pesaran Test	Born and Breitung Test (2016)			
Variables	CD test	P VALUE	Q(p)-test	P VALUE
lco2_hbt	42.74	0.000	33.28	0.000
lgdp_hbt	52.21	0.000	23.67	0.000
lgdp_hbt2	52.21	0.000	23.67	0.000
lconsenergyhbt	45.08	0.000	55.50	0.000
contcorrup	2.22	0.026	28.89	0.000
FDI_gdp	6.304	0.000	4.69	0.096
va_ind	-.932	0.351	22.64	0.000
comop	6.195	0.000	ND	ND

Source: Author based on WDI and WGI data

the results show that the null hypothesis can be rejected by at least one of the tests for the different variables. Therefore, there is a cross-sectional dependency relationship for the whole series. Therefore, it is more appropriate to use second-generation Panel unit root tests such as the Pesaran (2007) and Westerlund et al. (2016) which allow efficient testing of stationarity by taking into account heterogeneity and cross-sectional dependence.

The stationarity test (Table 4) shows that the series of CO2 emissions, gross domestic product and coverage rate are not stationary while those of energy use, corruption control, FDI and industrial value added are stationary at least in first difference. Then, there is at least one stationary series in the presence of cross-sectional dependence so we can apply a cointegration test of Westerlund et al. (2016).

Table 4: Series stationarity test

	CADF		CIPS	
Variables	Level	first difference	Level	first difference
lco2_hbt	34.1465	38.1330	-1.953	-1.888
lgdp_hbt	23.1486	17.8472	-1.559	-1.806
lgdp_hbt2	23.1486	17.8472	-1.559	-1.806
lconsenergyhbt	30.9787	85.9137***	-1.631	-1.885
contcorrup	385.7466***	35.7900	-3.517***	-1.926
FDI_gdp	197.4742***	80.2330***	-3.517***	-2.374***
vab_ind	74.2800***	62.3865**	-1.794	-1.315
comop	34.7835	38.4023	-1.315	-1.406

Source: Author based on WDI and WGI data

The cointegration test (Table 5) shows that for all the variables the Gt is statistically significant at the 1% level.

Table 5: Cointegration test on Westerlund Panel

	Gt	Ga	Pt	Pa
lgdp_hbt	-3.574***	-10.007***	-8.207*	-7.508***
lgdp_hbt2	-3.574***	-10.007***	-8.207*	-7.508***
lconsenergyhbt	-5.848***	-7.243	-9.612	-8.099
contcorrup	-4.513 ***	-13.289	-8.128	-14.143***
FDI_PIB	-3.252***	-12.007	-16.587***	-23.235***
vab_ind	-5.578***	-15.492***	-9.662	-16.252***
opcom	-4.909***	-20.545***	-13.163***	-21.634***

Source: Author based on WDI and WGI data

The result shows a longitudinal cointegration between the explanatory variables (GDP, energy use, foreign direct investment, control of corruption, added value of the industrial sector) and the explained variable (CO2 emissions). Therefore, it is possible to move on to estimating the long-term elasticity.

To estimate the relationship between corruption control and environmental protection, we will use the Driscoll–Kraay (DK) estimator. On the other hand, to test the robustness of the results, we will use the dynamic ordinary least squares (DOLS) estimator.

Table 6: Estimation of the relationship between corruption control and environmental protection

Dependant Variable	CO2 emission			
	Estimateur DK		Estimateur DOLS	
Indépendant Variable	Coefficients	t	Coefficients	z
lgdp_hbt	1.038 ***	6.61	1.184***	25.47
lgdp_hbt2	0.519 ***	16.17	0.592***	25.47
lconsenergy_hbt	-0.025	-0.88	0.011	0.357
contcorrup	-1.200 ***	-5.38	-1.533***	-17.58
FDI_gdp	-0.099 ***	-3.92	-.135***	-21.56
Va_ind	0.070 ***	5.30	0.074***	10.75
opcom	-.033***	-4.96	-.031***	-8.69
	R2 = 0.954		R2 Ajusté = -24.585	
Nombre d'observation	504		420	

Note: * (10%), ** (5%) and *** (1%) represent the threshold for rejecting the null hypothesis or for the significance of the variables.
Source: Author based on WDI and WGI data

The results (Table 6) show that economic growth measured by GDP per capita and its square positively and significantly affect CO2 emissions. Indeed, the 1% increase in growth leads to a more than proportional increase, i.e. 1.038%, of CO2 emissions in the 21 countries of Sub-Saharan Africa. Therefore, there is no inverted U-shaped relationship between income and environmental pollution in other words the absence of an environmental Kuznets curve (EKC) in the 21 countries of Sub-Saharan Africa. This evidence can be explained by the fact that most countries in Sub-Saharan Africa are in the process of structural transformation and industrial development to achieve sufficient economic growth (Agyeman et al., 2022). This result reveals that policies for decarbonizing CO2 emissions are not focused on economic growth. Thus, there is a decoupling between environmental policies and economic growth in sub-Saharan African countries.

The link between pollution and growth varies with changing fundamental conditions of economic systems and technological advances. So, as income increases its impact on environment increases. Therefore, environmental governance regulations are needed to reduce pollution in the environment (Olubusoye & Musa, 2020; Simionescu et al., 2021).

The results show the existence of a link between corruption and CO2 emissions. An improvement in corruption control of 1 point leads to a 1.2 point reduction in CO2 emissions. Indeed, controlling corruption can significantly reduce the waste of resources. This result is corroborated by Chirenje et al., (2013) et Wu & Pagell, (2011). In addition, the reliability of the results is reinforced by the robustness test, the application of the DK and DOLS estimators give substantially the same result.

The preponderant role of corruption control on environmental protection would however be reinforced if the countries of sub-Saharan Africa are more careful with regard to foreign direct investment and trade openness. Indeed, the results show that FDI and trade openness are negatively and significantly related to CO2 emissions. This result can be explained by the fact that FDI in sub-Saharan African countries is directed towards polluting sectors such as mining. Similarly, the international trade of these countries essentially involves polluting products such as oil.

CONCLUSION

The role of governance, in particular the fight against corruption, in the protection of the environment still remains a subject of interest for the actors in charge of environmental policy. The objective of the article was to show whether corruption is an important instrument in the control of CO2 emissions in Sub-Saharan Africa. For this, we used a panel data approach on 21 SSA countries covering the period 1996 to 1999. Second generation unit root tests, notably CADF and CIPS, were used to examine the stationarity of the series. In addition, the parametric estimation approach such as the DOLS and Driscoll and Kraay estimators on panel data made it possible to estimate the econometric model.

The results show that in the twenty-one SSA countries, corruption negatively and significantly influences carbon dioxide emissions. Also, the EKC is not valid in the SSA countries studied. The robustness test of the results is validated by using the DK and DOLS

estimators. In addition, governments of SSA countries should further tackle corruption in projects and contracts with high environmental impact to improve decarbonization systems. They should also implement environmental policies taking into account the role of economic growth in CO2 emissions.

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