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Research Article

The Impact of Bad Governance on Carbon Dioxide Emissions in African Countries with Population Density as an Intervening Factor

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ABSTRACT

The practice of corruption is particularly critical in most countries in Africa and policies aiming to reduce and/or curb the practice have failed, yet the rising carbon dioxide emissions are increasing according to World Bank data 2013. The empirical evidence on the misalignment between bad governance-induced corruption trends and corresponding carbon dioxide (CO_2) emissions is surprisingly consistently negative, inconclusive and subject to error control. The study examines the issue of the relationship between corruption perception index and CO_2 emissions (environmental impacts) using the rich augmented stirpat linked panel data for the period 1960-2012. The paper also provides evidence on the intervening role of population density, manufacturing sector value added as a component of GDP, services sector value added as a component of GDP and final consumption expenditure. The empirical findings suggest the existence of negative impacts in both Low Income Countries in Africa (LICA) and Low Middle Income Countries in Africa (LIMCA). These impacts, robust across both LICA and LIMCA, are found to have no significance in the case of Upper Income Countries in Africa (UICA). The estimated results indicate that the average effect of corruption perception index over CO_2 emissions, when the corruption perception index changes across time and between countries increases by 1%, CO_2 emission reduces by about 0.62% and 4.50% for LICA and LMICA respectively, holding all other predictors constant. Overall, the findings are inconclusive and suggest that further research is still required as the expected coefficient signs are not found.

Keywords: Corruption; Population density; Carbon dioxide emissions; Environmental impacts

INTRODUCTION

There is a dearth of empirical investigation of the magnitude impacts of the practice of corruption and carbon dioxide emissions relationship in African countries at different income levels in the global scientists' community of environmental studies, which potentially creates research gaps. The need to examine how the practice of corruption circumvents environmental control becomes a crucial research focus due to the widespread and increasing practice of corruption in most African countries. The dearth of empirical evidence has made the controversies even more pronounced. This study attempts to contribute to the literature by investigating the impacts of population dimensions on carbon dioxide emissions, taking into account the practice of corruption as a proxy for bad governance [1].

The practice of corruption has an impact on the success of Emissions Trading Schemes (ETS) by affecting the reliability and effectiveness of Greenhouse Gas (GHG) markets. The ETS was launched in 2005 to combat climate change and the scheme was designed for trading greenhouse gas emissions (European Union Emissions Trading Scheme (EUETS)). A cap on the aggregate emissions is set and allowances adding up to the cap are provided to the companies regulated by the scheme; companies are required to measure and report their carbon emissions and hand in one allowance for each tonne they release. Companies can also trade their allowances, providing an incentive for them to reduce their emissions (European Union Emissions Trading Scheme (EUETS)).

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According to the United Nations Environment Programme (UNEP), the implementation of cap-and-trade systems in most countries worldwide has been recurrently tainted by cases of fraud and bribery, abuses of power and other conventional forms of corruption. In addition, the corrupt practices also take the form of strategic exploitation of scientific uncertainty for profit, the manipulation of GHG market prices and so on. Corruption poses a serious challenge to climate finance and contributes to the debate about the effect of corruption in environmental governance. Corruption reduces the quality of environmental governance and the effectiveness of emissions trading by inducing socially sub-optimal environmental governance and decreases environmental regulatory stringency as well as undermining the effectiveness of management [2].

The increasing recognition of the impact of corruption on the quality of environmental governance leads to the emergence of domestic and international anti-corruption initiatives where the objective is to combat all forms of corruption, for example, Transparency International (TI), Corruption Perceptions Index (CPI), Political Risk Services Group (PRSG). The TI, IPCC and United Nations Framework Convention on Climate Change (UNFCCC) maintain that corruption circumvents environmental control. In addition, UNEP writes:

Corruption is an impediment to effective environmental stewardship and a serious obstacle to effective resource mobilization and allocation and diverts resources away from activities that are important for poverty eradication, the fight against hunger and sustainable development and we recognize the need to take urgent steps to combat corruption in all its manifestations [3].

This is crucial because it has brought the validity of the emissions trading schemes into question. Yet, proponents and supporters of emission trading schemes have responded by mainstreaming anti-corruption strategies into their frameworks.

The study addresses the question of what is the net effect of corruption perception index on carbon dioxide emissions in Africa. The central tenet of the paper is to critically assess the relationship between the practice of corruption and carbon dioxide emissions to identify the key driving forces in Africa [4].

MATERIALS AND METHODS

Corruption and CO_2 emissions: Evidence of relationship

Gani investigates the linkages between carbon dioxide emissions and good governance, that is, political stability, government effectiveness, regulatory quality, rule of law and low levels of corruption in a cross-section of 99 third world countries for years 1998, 2000, 2002, 2003, 2004, 2005, 2006 and 2007. The findings suggest that political stability, the rule of law and control of corruption have a significantly negative impact on emissions. Gardiner asserts that the peculiar characteristics of the climate change problem pose serious barrier to our ability to address environmental problems.

The study suggests that climate change involves the convergence of a set of global problems which is called a perfect moral storm. The key point here is that other difficult ethical questions surrounding environmental change might be answered, but action can be hampered due to the storm that makes us vulnerable to moral corruption. Lopez and Galinato investigate deforestation and forest-induced carbon dioxide emissions in tropical countries and how governance and trade openness influence the forest-income relationship. The estimated results show evidence of an Environmental Kuznets Curve (EKC) determined by corruption and openness of the economy [5]. In addition, further evidence indicates that a more democratic country has a turning point in total CO_2 emissions than countries that are less democratic. However, the findings indicate that whether EKC shifts downward or upward is country-specific. Cole used data for 94 countries which covered the period 1987-2000 and drew a distinction between the direct effect of corruption on pollution and the indirect impact which operates through corruption's effect on per capita income and the resultant effect of income on pollution. The findings indicate that corruption has a positive direct effect on emissions. Thus, the overall effect of corruption on both carbon dioxide and sulphur dioxide emissions is negative for the different income groups except in high income countries [6].

The study by Welsh also examines a cross-country analysis of the impacts of corruption and growth on the environment. The findings support the study of cole, in the sense that the results show a two-way effect of corruption on emissions or direct and indirect impacts. The results suggest that corruption directly impacts by raising pollution at given income levels and indirectly by decreasing per capita income. But the direct impacts dominate the indirect impacts and the overall findings show that the outcome variable (pollution) is monotonically increasing in corruption. The results further suggest that the interaction between pollution and corruption is particularly strong at low income levels, suggesting that less developing countries can considerably improve economic and environmental performance by reducing the practice of corruption. In Franzen and Meyer, the research employed the theoretical approaches of Inglehart's theory of post-materialism, Dunlap and Mertig's globalization explanation and the prosperity hypothesis perspectives to try to explain individual and cross-national differences in environmental attitudes. The study is based on a multilevel analysis is used whenever data is grouped (or nested) in more than one category such states, countries, etc) to the International Social Survey Programme (ISSP) sample data from the period of 1993 to 2000. The findings support the prosperity hypothesis (the relationship between environmentalism and economic prosperity). In addition, the evidence indicates that an individual with a better quality of life shows higher levels of environmental concern than their compatriots. Similarly, richer countries also show more concern about environmental quality than poor countries [7].

The findings further suggest that concern regarding environmental quality is closely associated with post-materialistic attitudes and other socio-demographic factors.

As in the studies of Victor, the research argues that it is possible to combine economic growth, protecting natural resources and ensuring social justice as complementary objectives only if the poor can be assisted to live healthier lives on their own terms. Nordhaus analyses the relationship to ultimate targets, performance under conditions of uncertainty, volatility of carbon prices, the inefficiencies of taxation and regulation, potential for corruption and accounting finagling and ease of implementation of carbon tax. He advocates price-type approaches such as carbon taxes to curb the practice of corruption in the mitigation of global warming. The study by Zhang assesses the decision makers' recognition that the conventional path of achieving economic growth at the expense of the environment had to change by targeting the practice of corruption that hinders the mitigation of environmental impacts [8]. The Transparency International (TI) argued that the practice of corruption circumvents environmental quality policies. It states that vast sums of money are being invested to thwart climate change. Furthermore, the TI study maintains that:

Data sources

The data on the response variable (per carbon dioxide emissions) and the predictors (corruption perception index, population density, manufacturing sector value added as a percentage of GDP, services sector value added as a percentage of GDP, final consumption expenditure (annual growth) are all collected from the World Bank 2013 online bank data. The data on corruption perception index was gathered from transparency international which applied Transparency International's Corruption Perception Index (TI-CPI) [9].

The data for all the driving forces and response variables are yearly observations. The study constructs an unbalanced cross-section time series data (TSCS) set of 51 sovereign African countries. Model specification determines the actual sample size. The sample data yield good coverage of African countries carbon dioxide (CO_2) emissions per capita, accounting for 51 countries of the total 54 sovereign countries listed by the world bank. Among the 54 sovereign African countries, equatorial Guinea is the only high income country; data on Sao Tome and Principe and South Sudan are unavailable for our response variable (CO_2 emissions). Thus, we exclude these three countries from the data analysed".

Population growth

According to the United Nations Population Fund, the population growth (annual%) is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population growth rate is the change in human numbers over time. It can be measured as the number of individuals of the human species in a population per unit of time for measurement [10].

Technology: Manufacturing and services sector

This study does not enter into the controversy surrounding technology, but represents a technology with two structural indicators: Manufacturing as a percentage of GDP and services as a percentage of GDP (this is consistent with many studies of ecology and modernization economic).

This also finds support with recent studies. Manufacturing as a percentage of GDP is the manufacturing sector of value added expressed as a percentage of GDP. The services are the value added expressed as a percentage of GDP [11].

Consumption

We derived data on Final Consumption Expenditure (annual% Growth) (FCEG) from the world bank development indicator data files and the catalogue sources of world development indicators consist of world bank national accounts data and OECD national accounts data files. The FCEG is the average annual growth of final consumption expenditure based on constant local currency. Aggregates are based on constant 2005 US dollars. Final consumption expenditure (formerly total consumption) is the sum of household final consumption expenditure (formerly private consumption).

Corruption

Our data source for corruption as an indicator of bad governance was gathered from transparency international which applied Transparency International's Corruption Perception Index (TI-CPI), an aggregate indicator that ranks countries in terms of the degree to which corruption is perceived to exist among public officials. The argument in favour of an aggregated index of individual sources is that a combination of sources measuring the same phenomenon is more reliable than each source taken separately.

RESULTS AND DISCUSSION

Our findings are presented from fixed effects, random effects and FGLS (this is due largely to the autocorrelation errors, AES). We carried out diagnostic testing using the Hausman test to determine the appropriate estimator. The test found support with previous literature which checked for the robustness between emission-population nexus by testing for a higher order of the autocorrelation of the error terms. Our test indicates mixed results, but favours the fixed effects. Hence, we employed the techniques of regression with correlated disturbances and regression with PCSE to correct for SCE and CCE. The unit heterogeneity problem was solved by including the country-specific and year-specific dummies in our models and applying the fixed effects regression [12].

The study excludes HICA, since equatorial Guinea is the only country classified as high income in Africa, according to the world bank classification. Thus, a panel data analysis cannot be applied.

Impacts of corruption and population density on CO_2 emissions

LICA: The CPI has a negative impact on CO_2 emission. The estimated results indicate that the average effect of corruption perception index over CO_2 emissions, when the corruption perception index changes across time and between countries increases by 1%, CO_2 emission reduces by about 0.62%, for LICA. The estimated results indicate that the average effect of

population density over CO_2 emissions, when the population density changes across time and between countries increases by 1%, CO_2 emission reduces by about 0.25% for LICA.

The estimated results indicate that the average effect of corruption perception index over CO_2 emissions, when the corruption perception index changes across time and between countries increases by 1%, CO_2 emission reduces by about 4.50% LMICA, holding all other predictors constant. The estimated results indicate that the average effect of population density over CO_2 emissions, when the population density changes across time and between countries increases by 1%, CO_2 emission reduces by about 0.91% LMICA, whereas emissions increases by about 0.19% for UICA, holding all other predictors constant. A 1 percentage point increase in manufacturing sector value added as a percentage of GDP, when the manufacturing sector changes across time and between countries, increases CO_2 emissions by about 1.36% for LMICA, whereas CO_2 emissions reduces by about 0.56% for UICA, when all the other predictors are constant. A 1 percentage point of an increase in services sector value added as a percentage of GDP, when the service sector changes across time and between countries, decreases CO_2 emissions by about 1.11% and 1.02% for LMICA and UICA respectively, when all the other predictors are constant. The results indicate that population density and services sector is statistically significant at 5% and 1% significant levels respectively, for LMICA. The population density, manufacturing sector and services sector are statistically significant at 1%, 10% and 1% significant levels respectively, for UICA. The corruption perception index (CPI) is statistically significant at 5% significance level, for LICA (Table 1).

Table 1: The impacts of corruption and population density on CO_2 emissions.

Variable	LICA		LMICA		UICA	
Intercept					11.683***	-0.948
ℓn(PD)	-0.253***	-0.059	-0.910***	-0.236	0.193***	-0.026
ℓn(M)	0.123	-0.108	1.360**	-0.483	-0.564**	-0.216
ℓn(S)	-0.132	-0.104	-1.119**	-0.42	1.023***	-0.224
ℓn(FCEG)	0.015	-0.015	-0.031	-0.069	-0.059	-0.039
ℓn (C)	-0.624*	-0.287	-4.502***	-1.014	0.985	-0.534
Sample		115		44		55
Wald chi^2		4378.76		171.14		

Note: ***P<0.001; **P<0.01; *P<0.05

- The coefficients are asterisk according to their levels of significance (coefficient not asterisk are not significant) and the standard errors are in parenthesis.
- Our dependent variable and all the explanatory variables are in logarithmic forms.
- The GLS/FGLS indicates generalized least squares/feasible generalized least squares.
- We used cross-sectional time-series FGLS for LICA and LMICA (no constants).

CONCLUSION

The findings from our baseline specification model do not show the existence of positive impacts of the corruption perception index on carbon dioxide emissions in African countries at different income levels and does not support the opinion of the transparent international that the practice of corruption circumvents environmental quality. On the one hand, they corroborate the fact that the practice of corruption abates (CO_2 emissions) environmental impacts in Africa. On the other, they do not confirm the hypothesis that corruption-driven by 1 per cent increase are well aligned with rising carbon dioxide emissions in the continent. As they are consistently negative in both Low Income Countries in Africa (LICA) and Low Middle Income Countries in Africa (LMICA). Our results also do not reinforce the positive impacts theory-linked corruption-CO_2 emissions relationship. The empirical estimates are also not compatible with the literature that the practice of corruption is a driver-trigger of environmental impacts. However, the available data on the corruption perception index are very limited, and this limitation could have been the key reason for the negative CO_2 emissions impacts. Thus, for thorough empirical analysis of corruption-CO_2 emissions linkages, further research is still required with a large sample size of data on the practice of corruption in Africa, to be able to determine the magnitude impacts on CO_2 emissions.

Finally, the findings indicate that the practice of corruption is an important variable to consider in the future analysis of the driver-triggers of environmental impacts.

REFERENCES

1. Zhang N, Yu K, Chen Z. How does urbanization affect carbon dioxide emissions? A cross-country panel data analysis. Energy Policy. 2017;107:678-687.
2. Cosmas NC, Chitedze I, Mourad KA. An econometric analysis of the macroeconomic determinants of carbon dioxide emissions in Nigeria. Sci Total Environ. 2019;675:313-324.
3. Zaman K, Abd-el Moemen M. Energy consumption, carbon dioxide emissions and economic development: Evaluating alternative and plausible environmental hypothesis for sustainable growth. Renew Sust Energ Rev. 2017;74:1119-1130.
4. Shandra JM, London B, Whooley OP, Williamson JB. International nongovernmental organizations and carbon dioxide emissions in the developing world: A quantitative, cross-national analysis. Soc Inq. 2004;74(4):520-455.
5. Chen Z, Hao X, Zhou M. Does institutional quality affect air pollution? Environ Sci Pollut Res Int. 2022;29(19):28317-28338.
6. Ajanaku BA, Collins AR. Economic growth and deforestation in African countries: Is the environmental Kuznets curve hypothesis applicable? Fros Policy Econ. 2021;129:102488.
7. Sulaiman C, Abdul-Rahim AS. Relationship between wood fuel energy consumption and forest degradation at regional and sub-regional levels of sub-Saharan Africa: The role of control of corruption and government effectiveness. Environ Sci Pollut Res Int. 2022;29(49):74512-7425.
8. Mohsin M, Abbas Q, Zhang J, Ikram M, Iqbal N. Integrated effect of energy consumption, economic development and population growth on CO2 based environmental degradation: A case of transport sector. Environ Sci Pollut Res Int. 2019;26(32):32824-3235.
9. Khan HU, Nassani AA, Aldakhil AM, Abro MM, Islam T, Zaman K. Pro-poor growth and sustainable development framework: Evidence from two step GMM estimator. J CleanProd. 2019;206:767-784.
10. He Q, Deng X, Li C, Yan Z, Kong F, Qi Y. The green paradox puzzle: Fiscal decentralisation, environmental regulation and agricultural carbon intensity in China. Environ Sci Pollut Res Int. 2022;29(51):78009-7828.
11. Yang Y, Yang X, Tang D. Environmental regulations, Chinese-style fiscal decentralization and carbon emissions: From the perspective of moderating effect. Stoch Environ Res Risk Assess. 2021;35(10): 1985-1998. 2020;27(3):995-1007.
12. Song W, Han X. Heterogeneous two-sided effects of different types of environmental regulations on carbon productivity in China. Sci Total Environ. 2022;841:156769.