The Environmental Effect of Multinationals through FDI inflows in Africa: Does the Level of Natural Resource Extraction Matter?

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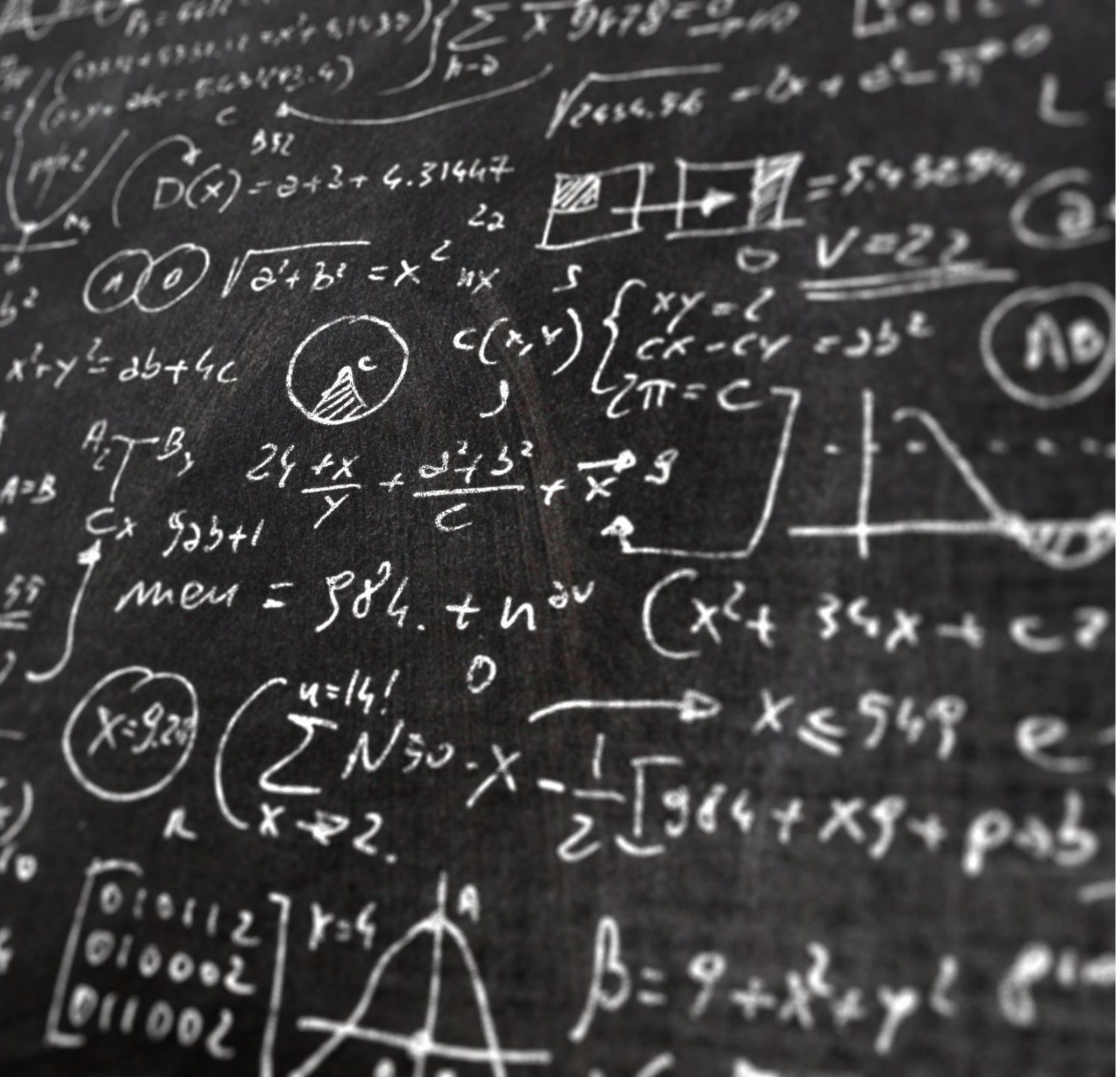

Outlines

- Introduction/Arguments in the literature
- Data Description
- Methodology
- Results and Discussion
- Conclusion

Introduction/arguments in the literature

- Environmental challenges are among the most pressing global problems in recent times.
- There have been growing calls for drastic measures to curb these challenges in order to make a better life for the present generation and future generations.
- One of the recent calls is the United Nations' Sustainable Development Goals (SDGs), which has 17 goals, 169 targets, and 304 indicators.
- The SDGs were proposed by the United Nations General Assembly in January 2016 and to be achieved by 2030. Specifically, goals 7 and 13 emphasized the affordability of clean energy and climate actions to combat climate change and its impacts.

Conts….

- While environmental conditions are getting better in advanced countries, environmental degradation is still widespread across developing countries.
- Two main arguments emerge in the existing literature:
- The first argument is by the advocates of Pollution haven hypothesis. These scholars believe that multinational enterprises play a central role in fueling environmental problems in developing countries.
- The second argument is that of the pollution halo hypothesis, which states that multinationals play a central role in solving environmental problems in developing countries.

Conts….

- Given that in Africa, FDI is predominantly resource-seeking, this study introduces natural resource extraction as a conditioning variable, implying that the FDI-environment nexus may be context-dependent.
- This study has a dual objective. First, it investigates the unconditional effect of MNEs through Foreign Direct Investment (FDI) on environmental sustainability in Africa. Second, it also explores how operational behaviours of MNCs interacts with natural resource extraction to influence environmental sustainable in Africa over the period of 1990 to 2017.

Data Description

- Our estimations are based on balanced panel data drawn from different data sources for thirty-four (34) African countries over the period of 1990 to 2017. The choice of data was based on their availability.
- The dependent variable used include environmental sustainability, which is captured by the level of CO_2 emissions (metric tons per capita). The explanatory variables include the operational behaviours of multinational corporations (MNCs). This corresponds to the direct investment equity flows into the African economies. It is measured in current US Dollars per-capita. We select African countries for which natural resource rents and foreign direct investment cover a considerable length of time.

Data Description Conts….

- Other variables include the renewable energy consumption measured as a percentage of total final energy consumption(REC), total natural resource rents as a percentage of GDP (NRR), GDP per capita (constant 2015 US Dollars), and government stability (GVS) computed by the International Country Risk Guide (ICRG) PRS Group.

Empirical Models

- This study develops baseline and interaction models as follows:
- $CO_{2it} = f(OBM_{it}, NRR_{it}, GDP_{it}, REN_{it}, GVS_{it})$ (1)
- $lnCO_{2it} = \theta_0 + \theta_1 lnOBM_{it} + \theta_2 NRR_{it} + \theta_3 lnGDP_{it} + \theta_4 REN_{it} + \theta_5 GVS_{it} + \varepsilon_{it}$ (2)
- $lnCO_{2it} = \theta_0 + \theta_1 lnOBM_{it} + \theta_2 NRR_{it} + \theta_3 lnOBM_{it} \times NRR_{it} + \theta_4 lnGDP_{it} + \theta_5 REN_{it} + \theta_6 GVS_{it} + \varepsilon_{it}$ (3)

$$\frac{\partial lnCO2_{it}}{\partial lnOBM_{it}} = \theta_1 + \theta_3 NRR_{it} \quad (4)$$

Empirical Models Cont….

- To estimate these models, we apply a battery of estimation techniques such as Fixed-effects OLS and Random-Effects GLS with Driscoll and Kraay Standard Errors. We also used system GMM and Method of Moments Quantile regression.

Empirical Results

Regression Results with CO_2 Emissions as Dependent Variable

Dep. Variable: CO_2 Emissions	**Fixed-Effects OLS**		**Random-Effect GLS**		**SYS-GMM**	
Variables	Baseline Model	Interaction Model	Baseline Model	Interaction Model	Baseline Model	Interaction Model
$CO_2(-1)$	—	—	—	—	0.7480***	0.7233***
LnOBM	0.0172***	0.0397***	0.0123**	0.0358***	0.0025	0.0094***
NRR	0.0018	0.0396***	0.0029**	0.0418***	0.0016***	0.0138***
lnOBM × NRR		-0.0019***		-0.0019***	—	-0.0006***
LnGDP	0.1059***	0.1209***	0.1315***	0.1444***	0.0613***	0.0546***
REN	-0.0289***	-0.0279***	-0.0302***	-0.0295***	-0.0095***	-0.0112***
GVS	-0.0005	-0.0017	-0.0007	-0.0019	-0.0017***	-0.0034***
Constant	-0.1195	-0.7374**	-0.7413***	-0.7413***	-0.0942	-0.1293
Observation	952	952	952	952	918	918
No. of Countries	34	34	34	34	34	34
Instrument					383	384
Wald Statistic	100.96	280.82	790.89	2113.58	37221.67	46878.21
Wald *p*-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.5290	0.5449	0.7417	0.7500		
Sargan [*p*-value]	—	—	—	—	24.8397 [1.0000]	24.0206 [1.0000]
AR(1) [*p*-value]	—	—	—	—	-2.4978 [0.0125]	-2.582 [0.0098]
AR(2) [*p*-value]	—	—	—	—	0.5739 [0.5661]	0.5477 [0.5839]

Note: *** and ** denote significance levels at 1% and 5% respectively. The Driscoll & Kraay standard errors are used

Empirical Results Cont…..

Table 6: Baseline Model for MMQR with CO_2 Emissions as Dependent Variable

			Lower Quantiles			Mid Quantiles			Upper Quantiles		
	Location Parameters	Scale Parameters	$Q_{0.1}$	$Q_{0.2}$	$Q_{0.3}$	$Q_{0.4}$	$Q_{0.5}$	$Q_{0.6}$	$Q_{0.7}$	$Q_{0.8}$	$Q_{0.9}$
LnOBM	0.0172*	-0.0016	0.0195	0.0189	0.0185	0.0179*	0.0172**	0.0166**	0.0160*	0.0154	0.0146
	(0.0091)	(0.0036)	(0.0174)	(0.0147)	(0.0127)	(0.0104)	(0.0085)	(0.0080)	(0.0087)	(0.0106)	(0.0135)
NRR	0.0018	-0.0013	0.0036	0.0032	0.0028	0.0023	0.0018	0.0013	0.0009***	0.00034	-0.0002
	(0.0018)	(0.0012)	(0.0045)	(0.0039)	(0.0034)	(0.0028)	(0.0022)	(0.0021)	(0.0023)	(0.0028)	(0.0036)
REN	-0.0289***	0.0013	-0.0308***	-0.0303***	-0.0299***	-0.0294***	-0.0288***	-0.0283***	-0.0279***	-0.0274***	-0.0267***
	(0.0042)	(0.0013)	(0.0051)	(0.0043)	(0.0037)	(0.0030)	(0.0025)	(0.0023)	(0.0026)	(0.0031)	(0.0039)
LnGDP	0.1059**	0.0098	0.0919	0.0953*	0.0981**	0.1017**	0.1062***	0.1099***	0.1133***	0.1172***	0.1216***
	(0.0481)	(0.0124)	(0.0677)	(0.0574)	(0.0495)	(0.0407)	(0.0329)	(0.0313)	(0.0340)	(0.0412)	(0.0526)
GVS	-0.0005	0.0123***	-0.0181	-0.0138	10.0102	-0.0057	-0.0001	0.0045	0.0088	0.0136*	0.0192*
	(0.0056)	(0.0034)	(0.0135)	(0.0115)	(0.0099)	(0.0082)	(0.0067)	(0.0063)	(0.0069)	(0.0083)	(0.0105)
Constant	-0.1195	0.1316									
	(0.4819)	(0.1174)									

Note: *, ** and *** denote significance levels at 10%, 5% and 1% respectively. The values in the parentheses are the robust standard error of the estimated parameters

Empirical Results Cont…

Table 8: Alternative Model for MMQR with CO_2 Emissions as Dependent Variable

			Lower Quantiles			Mid Quantiles			Upper Quantiles		
	Location Parameters	Scale Parameters	$Q_{0.1}$	$Q_{0.2}$	$Q_{0.3}$	$Q_{0.4}$	$Q_{0.5}$	$Q_{0.6}$	$Q_{0.7}$	$Q_{0.8}$	$Q_{0.9}$
LnOBM	0.0397**	-0.0032	0.0445***	0.0433***	0.0422***	0.0410***	0.0396***	0.0385***	0.0373***	0.0361***	0.0344**
	(0.0132)	(0.0044)	(0.0132)	(0.0111)	(0.0093)	(0.0080)	(0.0074)	(0.0078)	(0.0091)	(0.0110)	(0.0140)
NRR	0.0396*	-0.0035	0.0448**	0.0435***	0.0423***	0.0410***	0.0395***	0.0383***	0.0370***	0.0357**	0.0338**
	(0.0227)	(0.0043)	(0.0161)	(0.0136)	(0.0115)	(0.0098)	(0.0090)	(0.0096)	(0.0112)	(0.0134)	(0.0172)
lnOBM × NRR	-0.0019*	0.0001	-0.0020**	-0.0020***	-0.0020***	-0.0019***	-0.0019***	-0.0018***	-0.0018***	-0.0018**	-0.0017**
	(0.0011)	(0.0002)	(0.0008)	(0.0007)	(0.0006)	(0.0005)	(0.0004)	(0.0005)	(0.0005)	(0.0006)	(0.0008)
REN	-0.0280***	0.0008	-0.0292***	-0.0289***	-0.0286***	-0.0283***	-0.0279***	-0.0277***	-0.0274***	-0.0271***	-0.0266***
	(0.0043)	(0.0012)	(0.0028)	(0.0023)	(0.0020)	(0.0016)	(0.0016)	(0.0017)	(0.0019)	(0.0023)	(0.0030)
LnGDP	0.1209**	0.0023	0.1176***	0.1184***	0.1192***	0.1199***	0.1210***	0.1217***	0.1226***	0.1234***	0.1246***
	(0.0510)	(0.0133)	(0.0376)	(0.0317)	(0.0267)	(0.0228)	(0.0211)	(0.0223)	(0.0260)	(0.0313)	(0.0399)
GVS	-0.0017	0.0118***	-0.0190**	-0.0148**	-0.0107**	-0.0065	-0.0014	0.0025	0.0070	0.0114*	0.0175**
	(0.0058)	(0.0033)	(0.0074)	(0.0062)	(0.0053)	(0.0046)	(0.0043)	(0.0045)	(0.0052)	(0.0062)	(0.0079)
Constant	-0.7373	0.2432*									
	(0.6599)	(0.1391)									

Note: *, ** and *** denote significance levels at 10%, 5% and 1% respectively. The values in the parentheses are the robust standard error of the estimated parameters

Empirical Results

- Results from the mean-based estimators show that the operational behaviour of MNCs, natural resource dependence, and economic growth impede environmental sustainability by increasing the level of carbon emissions.
- However, renewable energy consumption and government stability promote environmental sustainability by reducing the level of carbon emissions.
- The interaction of the operational behavours of MNCs and natural resource endowment enhances environmental sustainability. In other words, the marginal effect of the operational behaviours of MNCs on CO2 emissions decreases as natural resources extraction increases.
- This suggests that resource-rich countries may have more advanced extraction technologies and better energy infrastructure, enabling them to shift the operational behaviours of MNEs toward less carbon-intensive processes.

Conclusion

- Operational behaviours of MNCs, Natural resource endowments, and economic growth are the major channels of environmental degradation in Africa.
- To achieve environmental sustainability, African continent needs to promote renewable energy transition and build a stronger institutional quality.
- The economic benefits of natural resource extraction could be used to improve environmental sustainability (environmental technologies, eco-innovations, energy efficiency, R&D funding).

- Thank you for listening!