Doctoral Research Programme on Climate Change and Education, UTG WASCAL
Jonathan Haughton

CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT
ASSIGNMENT 2

Answers to this assignment are due back by Thursday, March 10, 2022. You may work on this assignment alone or in pairs.

1. Estimating the Environmental Kuznets Curve

The purpose of this exercise is to estimate environmental Kuznets curves for four countries, and for at least one measure of pollution or environmental degradation. Pick four countries: two should be in Africa, one should be a middle-income country, and the fourth should be a high-income country. For each country, download data from the World Bank's *World Development Indicators* (available at http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators), for as many years as possible, for the following economic and environmental variables:

Agricultural methane emissions (thousand metric tons of CO2 equivalent)
Capture fisheries production (metric tons)
CO2 emissions (kt)
CO2 emissions (metric tons per capita)
Fish species, threatened
Forest area (sq. km)
GDP (constant LCU)
GDP (current LCU)
GDP per capita (constant LCU)
GNI, PPP (constant 2017 international $)
HFC gas emissions (thousand metric tons of CO2 equivalent)
People using at least basic sanitation services (% of population)
People using at least basic drinking water services (% of population)
People using at least basic drinking water services, rural (% of rural population)
People using at least basic drinking water services, urban (% of urban population)
Incidence of malaria (per 1,000 population at risk)
Income share held by fourth 20%
Income share held by highest 20%
Income share held by lowest 20%
Income share held by second 20%
Income share held by third 20%
Methane emissions (kt of CO2 equivalent)
Methane emissions in energy sector (thousand metric tons of CO2 equivalent)
Nitrous oxide emissions (thousand metric tons of CO2 equivalent)
Nitrous oxide emissions (% change from 1990)
People practicing open defecation (% of population)
PFC gas emissions (thousand metric tons of CO2 equivalent)
PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)
Plant species (higher), threatened
Population, total
SF6 gas emissions (thousand metric tons of CO2 equivalent)
Total greenhouse gas emissions (kt of CO2 equivalent)
Total fisheries production (metric tons)
Urban population
Land area (sq. km)
Poverty headcount ratio at $1.90 a day (2011 PPP) (% of population)

a. For each country, run a regression that tests whether there is an Environmental Kuznets Curve. Note: You could do this in Excel, but it would be easier in Stata; or if you are ambitious, try R!
b. If there does seem to be an EKC, find the income associated with the "turning point".
c. Comment briefly on your results: are the effects as expected? Are they robust? Should other variables be included, and if so, what?

Notes:

For a succinct review of econometric issues for working with cross-sectional and survey data, see chapter 2 on "Regression" (from Dominique Haughton and Jonathan Haughton, *Living Standards Analytics: Development Through the Lens of Household Survey Data,* 2011, Springer). The chapter is available on my Web site.