EFFECTS OF ECONOMIC GREENHOUSE GASES EMISSIONS ON ECONOMIC GROWTH: EVIDENCE FROM NIGERIA AND SOUTH AFRICA

[1]Asogwa Ikechukwu Sebastine,Department of Economics,Michael Okpara University of Agriculture,Umudike,Nigeria,Phone+2348037472802,Email: is.asogwa@mouau.edu.ng
[2]Anumudu Charles Nnamdi , Department of Economics,Michael Okpara University of Agriculture,Umudike,Nigeria,Phone+234903641555,Email: anumudu.charles@mouau.edu.ng
[3]Alugbuo Justin,Chiweizu, Department of Economics, Michael Okpara Univeristy Agriculture, Umudike,Nigeria, Phone+23480375411828,Email: justinalugbuo@gmail.com

Overview

Greenhouse Gases (GHG) emissions pose a high threat to our climate system as argued in various literatures. The global warming of 2.5^{o}C as obtainable is said to be caused by Greenhouse Gases Emissions sourced from economic activities geared towards economic growth. Greenhouse gases emissions cost could be referred to as the actual cost and effects of the negative externality on the economy. Externality is the cost or benefit that affects an agent who did not choose to incur that cost or benefit. Therefore, when the action of one agent directly affects the economy or environment of another agent, it is said to be an externality (Varian 1992). Externalities in its two sides of a coin can be "negative or positive" and virtually, a resultant from economic activity just as externalities from Greenhouse gases emissions cause varieties of social ill with substantial cost on the economy measured in health, productivity and potential cost incurred by global climate change.

Among selected Africa countries, Co2 emission in South Africa and Nigeria is higher than other Africa countries with 462.60 and 296.68 respectively. This is the emission in MT Co2 (excluding Land use Change and forestry) as reported by (CAIT 2015). And majorly, this study will proffer answer to the research question "*Is the Effects of Emission caused by economic activities on African Economy Significant"?*

Methods

To model the economic impact of greenhouse gases emission on economic growth, we apply the theoretical model of Solow growth model to explain for the various interactions of factors of production given economic activities that lead to economic growth using a panel econometric approach as in Olarinde, Martin and Abdulsalam (2014).

The functional form of Solow Growth model is specified as below

Y(t) = F(k(t),A(t)L(t)) …, (1)

We will also adopt the Cobb Douglas production function as formulated by (Debasish 2013) as specify below:

$$Y(t) = K(t)^{\alpha} H(t)^{\beta} (A(t)L(t))^{1-\alpha-\beta}, ...(III) \qquad 0<\alpha+\beta<1$$

Here, H is defined as stock of human capital, β is the share of human capital in total output. The assumption of $0<\alpha+\beta<1$ indicates decreasing return to scale.

DP(t)/ LABOUR = F(Technological Progress, Capital-Labour ratio, Industries-GHG, Agricultural-GHG ,Waste-GHG, Energy-GHG) ……(2)

$$\Pr oductivity = Log\left[\frac{gdp(t)}{labour}\right] = \alpha_{it} + \beta_{1it} Log(industries) + \beta_{2it}\log(waste) + \beta_{3it}\log(energy)$$

$$+\beta_{4it}\log(\frac{Capital}{Labour}) + \beta_{5it}\log(agriculture) + \beta_{6it}A + z_{it} + \mu_{it} \ldots\ldots\ldots(VI)$$

Results

The result reveals that the various greenhouse gases emission sourced from the various economic activities across the countries (Nigeria and South Africa) has a negative effect or poses negative externality on the effective labour productivity in the countries except waste emission and emission from energy sector. The negative effects posed by the emission suggest that a unit increase in the megatonne externalities from the industrial greenhouse emission and agricultural sector will lead to decrease in the effective output productivity in the countries by -0.077860 magnitude (industrial process) and 0.3112370 magnitude (agricultural sector)respectively. The decrease suggest an incurring of social cost by other agent in the economy. Waste and energy sector emission with positive externality on the effective productivity in Africa by 2.033103 magnitude and 0.82996 magnitude imply that of a unit increase in the megatonne in the waste and energy sector emission respectively creates a positive contribution of the economics activities on Labour productivity. The Labour effective capital defined as capital-labour ratio suggest the convergence assumption of the Solow growth model and the possibility of balanced growth path in the region supported with the negative sign on the effective output productivity 4.86%(-0.048589). The convergence speed is also slow against the desired perfect (-1) convergence magnitude or close to one convergence magnitude for perfect speed

Conclusions

From the result of the study, the growth balanced path speed at 4.85% is very low compared to the perfect convergence speed 1. Therefore, it suggest capital will leave South Africa to Nigeria but at a slow speed. The reliance on the capital movement from South Africa is anti-economics progressive. Countries should inject their capital their economy for a speedy convergence. Also, the technological progress is also not enough for the aggressive economic drive desired.(Romer 1996).

The knowledge of the damages associated with CO_2 would serve as a useful clue in assessing the benefits of damages reduction (Darmstadter 2001). The emission from the industrial and agricultural economic activities pose a negative externality or incurs a social cost bore by another agent and in turn distract from the efficiency of the productivity although not significant. The implication of the correlate is that the negative externality from the industrial and agriculture pose the economy with some ill effects like unhealthy atmospherics space and climate change effects caused by the anthropogenic activities like deforestation. Clean and renewable energy usage should be advocated for and piguovian(1929) tax regime employed with other environmental prohibition.

References

Daarmstadter,Joel(2001). The Energy-CO2 connection: A Review of Trends and Challenges. Climate Change Economics and Policy. Resource for the future, Washington

Romer,D(1996).Advanced Macroeconomics. McGraw Hill.Library of Congress Cataloging Publication Data.

IPCC, (2007). Sectoral Economic Cost and Benefits of GHG Mitigation. International Panel on Climate Change (IPCC).

Tietenberg,T and Lewis,L(2012). Environmental and Natural Resource Economics,Ninth edition.

Varian,H.R (1992). Microeconomic Analysis,3rd Edition. International Student edition Norton.