[*QUALITY GOVERNANCE, INCOME AND TECHNOLOGICAL PROGRESS' IMPACT ON LATIN AMERICA'S CO2 EMISSIONS*]

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Overview

This paper tests three hypotheses regarding the relationship between income, the quality of government and technological progress on CO2 emissions for Latin America. The hypotheses are the following: H1: The emissions have a relation of CKA. H2: The quality of the institutions affects the CKA relationship, mitigating the environmental impact of economic growth. H3: Technological progress allows reaching the maximum points of the CKA faster.The results confirm the CKA hypothesis. Any increase in political stability mitigates greenhouse gas emissions. The results for the technological progress variable also satisfy the theoretical expectations.

Methods

To test hypothesis the Environmental Kuznets Curve is used as a start point in Eq (1).

$$Y_{it} = \beta_1 X_{it} + \beta_2 {X_{it}}^2 + \beta_3 {X_{it}}^3 + \beta_4 Z_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (1)$$

where i = i, …, N are countries included in the and t = 1, …, T are years inside the period under analysis. Y captures environmental quality measured through pollutant emissions. X measures income level for each of the countries. Z is a vector including control variables largely used in specialized literature, while μ_i captures the unobserved fixed effect for every country and δ_t represents the specific effect from time. ε is the error term. To smooth the outliers and directly obtain the elasticities, logarithms have been taken in both sides so Eq (1) is re written as,

$$lnGEIpc_{it} = \beta_1 lnPIBpc_{it} + \beta_2 {lnPIBpc_{it}}^2 + \beta_3 {lnPIBpc_{it}}^3 + \beta_4 Z_{it} + \mu_i + \delta_t + \varepsilon_{it} \quad (2)$$

Aditionally the model includes crossed products (PIB pc*INST) and (PIB pc*TECH), to better capture the interaction effect on emissions. PIB measured GDP, INT represent energy intensity and TECH caputures the technological progress. Finally, pollutant heaven hypothesis is tested by using international trade (COMER), and Direct Foreign Investment as a control variable (IED) in following Eq

$$lnGEIpc_{it} = \beta_1 lnPIBpc_{it} + \beta_2 {lnPIBpc_{it}}^2 + \beta_3 {lnPIBpc_{it}}^3 + \beta_4 INST_{it} + \beta_5 TEC_{it} + \beta_6 (lnPIBpc_{it} * INST_{it}) + \beta_7 (lnPIBpc_{it} * INST_{it})^2 + \beta_8 (lnPIBpc_{it} * INST_{it})^3 + \beta_9 (lnPIBpc_{it} * TEC_{it}) + \beta_{10} (lnPIBpc_{it} * TEC_{it})^2 + \beta_{11} (lnPIBpc_{it} * TEC_{it})^3 + \beta_{12} lnPT_{it} + \beta_{13} IE_{it} + \beta_{14} EE_{it} + \beta_{15} COMER_{it} + \beta_{16} IED + \mu_i + \delta_t + \varepsilon_{it}$$

Results

Obtained results were as expected at an acceptable level of significance. The only exception was for COMER variable

Conclusions

Evidence supports H1, H2 and H3.

References

Pablo-Romero, M. d., & De Jesús, J. (2016). Economic growth and energy consumption: The Energy-Environmental Kuznets Curve for Latin America and the Caribbean. Renewable and Sustainable Energy Reviews, 1343-1350.