New Approaches in the Application of Environmental Kuznets Curve

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INTRODUCTION

Environmental Kuznets Curve (EKC), based on the homonymous author [1] was introduced in 1991 [2]. It describes the relationship between economic growth and environmental degradation by an inverted U or bell shape (Fig.1), interpreting that, due to scale and technological effect respectively, environment first receives pressure from agricultural and industrial emitted polluting elements and after a turning point, degradation starts to decrease.

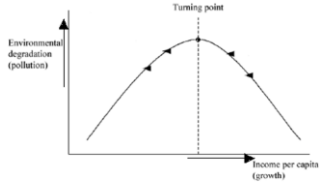

Figure 1: Inverted U shaped EKC

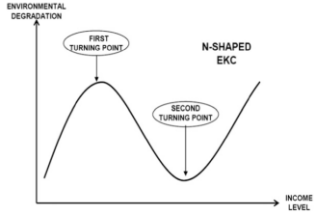

Figure 2: N shaped EKC

Since 1994, over than 3,000 scientific documents have been published, the majority of which come from China. Scientists conclude either in the presence of an EKC or reject its existence. Many others support EKC but in a different shape, i.e., N, inverted N, M, U, S, L or monotonic (Fig.2).

ANALYSIS

Bibliometrics [3] through Elsevier Scopus: Found 2,620 documents in English language. Since 2018, over 50% of the total have been published, especially from Chinese institutions and dealing with environmental, energy and economic issues. Many of them are published in scientific papers and the most popular keyword is 'EKC'.

Bibliographic review: Since January 2023, we have studied 546 documents from 1994 to 2014 [4][5][6] and constructed a table to organize important elements, such as title, author, journal, doi, publication and examined country, dependent and independent variables, EKC verification approval, shape of EKC, conclusions, limitations and proposals.

The most famous independent variable in econometric models is GDP per capita, accompanied in many cases with population density, energy use, democracy and education level and trade openness. Dependent variables vary from the environmental topic and include air (CO, NOx, PM, SO2 and CO2), water (fertilizers, nitrates and phosphates) and solid (metals and pharmaceuticals) polluting elements or other indicators such deforestation rate and endangered species. Econometric regressions is the main tool to relate the above variables.

CONCLUSIONS

In many conclusions, either verifying or rejecting EKC hypothesis, need for policy actions is underlined in order to develop economies in a sustainable environment. Studying the whole bibliography [7] and using data from national and international bases, we are planning to write a review including all the above elements and construct various econometric models in a way to examine the new approaches of the EKC.

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