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The Asymmetric Impact of Economic Complexity on Ecological Footprints in Large Asian Emitters: New Evidence from Threshold and Non-Threshold Models

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EXTENDED ABSTRACT

INTRODUCTION:

The environmental effects of human activities are often measured by CO2 emissions. This is while CO2 emission shows only a small part of environmental degradation and does not consider the entire pressure of human activities on the ecosystem. Recently, following the introduction of ecological accounting and ecological footprint, environmental quality using the ecological footprint index has been widely investigated in environmental studies. The ecological footprint is a useful tool that relies on examining the impact of human activities on the environment and the earth, and by using it, the pressure on ecology and the environment can be measured. Therefore, the question of what factors influence the ecological footprint is important. Gross domestic product, energy consumption, financial development, trade and technology are factors affecting the ecological footprint. Another effective factor is economic complexity.The purpose of this study is to investigate the impact of economic complexity on the ecological footprint in selected Asian countries (China, India, Japan, South Korea, and Iran) during the time interval of 1995-2021. These countries experience varying economic complexities and rank below the top 10 countries in terms of CO2 emissions worldwide.

METHODOLOGY:

The methodology of this article is based on the econometrics of the threshold panel, while in order to verify the results, it also uses the non-threshold panel model. Due to the different results in the literature, the threshold panel model was used and it was allowed that the effect of complexity on the ecological footprint depends on the state of the countries in terms of economic complexity. Also, in order to verify the results, the non-threshold panel model is also estimated considering the condition that the effect of complexity on the ecological footprint is a function of the level of the complexity index. It should be noted that before estimating the model, the long-run relationship between the variables of the model is checked.

FINDINGS:

The results of the cointegration test indicate the existence of a long-term relationship between the pattern variables. This relationship is estimated in the form of both threshold and non-threshold panel models. The results show that the environmental hypothesis of Kuznets is confirmed in this group of countries. Renewable energy consumption leads to a significant decrease in the ecological footprint, while fossil energy consumption leads to an increase in the ecological footprint. Financial development in the panel panel threshold model significantly reduces the ecological footprint. By increasing the Economic Complexity Index up to a threshold value of 1.12, the ecological footprint increases at a rate of 0.03, and after that, it increases at a rate of 0.08. Panel Non-threshold estimates indicate that as the economic complexity index increases, the ecological footprint initially decreases at very low levels of knowledge and complexity (economic complexity index less than -1.6) and then increases at an accelerating rate.

CONCLUSION:

Economic complexity is expected to be a win-lose strategy for the environment of selected Asian countries. Therefore, in order to achieve sustainable development, increase the level of knowledge and economic complexity, it is recommended that the studied countries utilize environmentally friendly production processes and technologies, transition to renewable energy sources instead of fossil fuels, and foster growth in the financial sector.

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