HOW ECONOMIC DEVELOPMENT AFFECTS ECOLOGICAL FOOTPRINT: A COMPARATIVE ANALYSIS OF DEVELOPED VS. DEVELOPING ECONOMIES

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Overview

The study investigates a potential relationship between the ecological footprint and economic development, taking the case of developed vs developing countries. The analysis has been done for G-7 (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) and G-5 countries (Brazil, China, India, Mexico, and South Africa) from 1996 to 2018. The research covers various aspects of economic development like, income growth, financial development, technological development and human development. Also, the study includes clean energy consumption and corruption as control variables. The impact and size of ecological footprint vary from country to country as per their development level. As development takes place, more and more exploitation of natural resources is required. Therefore, development has a huge role in the ecological footprint. A Plethora of studies has analysed the role of CO_2 emissions on economic development. However, to the best of my knowledge, only a few studies have analysed the direct relationship between development and ecological footprint. Therefore, this study sees the role of ecological footprint in various countries and at different development levels. This research is valuable in analysing the various aspects of economic development on ecological development in a comprehensive way and segregating the effects for developed and developing countries.

Methods

To analyse the panel data, especially when there are more time periods and countries, it is not only essential to check the stationary of the series but also the heterogeneity and cross-section dependence in the panel. Traditional panel data analysis models like fixed effect assume panel parameters are homogeneous. With large time series component, non-stationarity become important in macro panels. Levin Lin Chu's (2002) and Phillip Perron's (Breitung & Franses, 1998), as well as second-generation Cross-sectionally Augmented Dickey–Fuller (CADF) panel unit root tests, have been used to check stationarity. The second-generation unit root test is helpful in checking cross-section dependence and heterogeneity in the panels. Panel ARDL test has been used to check the long-run co-integration. Finally, Fully Modified Ordinary Least Squares (FMOLS) regression has been used to study the relationship between ecological footprint and other dependent variables. FMOLS is helpful in examining the long-run relationship taking care of endogeneity and autocorrelation in the residuals.

Results

We resolve the multicollinearity problem by standardising the Financial Development Index, Urbanisation, Human Capital Index, and Corruption perception index. The cross-sectional dependence test shows that all variables—aside from the use of clean energy are cross-sectionally independent. The Levin Lin Chu and IM-Pesaran-Shin unit root tests show that all the variables are non-stationarity at the level. Similarly, CADF results confirm the non-stationarity of the series. The FMOLS regression results show that in the case of developed countries, per capita income, use of clean energy, urbanisation, and research and development expenditure influence the ecological footprint directly. In contrast, the human capital index, technological innovation and market capitalisation have an inversely proportional relationship with the ecological footprint. On the other hand, in developing and emerging economies, per capita income, use of clean energy, urbanisation, corruption perception index and market capitalisation hold a significant inverse relationship with ecological footprint, while the financial development, human capital index, technological innovations and expenditure on research and development have a significant positive relationship with the ecological footprint. It is interesting to note that income, clean energy consumption and urbanisation have different roles in the ecological footprint in these sets of countries.

Conclusions

The findings are helpful for policymakers to check the significant economic factors and accordingly devise policies to monitor and regulate their ecological footprints given the country's development needs. Since the earth's carrying capacity is fixed and the growth need of development is different, there are avenues for developed and developing countries to collaborate to attain long-term sustainable growth paths.

References

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