

# Exploring the Effects of Circular Economy on Green Growth: Evidence from Top Six Leading Circular Economies

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## **Abstract**

Given the escalating concerns surrounding climate change and global warming, it is crucial to investigate the potential impact of the circular economy on tackling these critical challenges. The objective of this research is to examine the possible impacts of a circular economy on production-based carbon emission, this domain has yet to be thoroughly investigated. To align with this goal, this research examined data spanning 1991 to 2020 from six advanced circular economies, applying numerous estimation techniques to ensure robust and reliable results, namely Autoregressive Distributed Lag-Pooled Mean Group (ARDL-PMG), Autoregressive Distributed Lag-Mean Group (ARDL-MG), Autoregressive Distributed Lag-Dynamic Fixed Effects (ARDL-DFE), Fully Modified Ordinary Least Squares (FMOLS), Autoregressive Distributed Lag-Error Correction Model (ARDL-ECM), stability analysis and Pairwise Dumitrescu-Hurlin (D-H) causality. The findings of this study reveal a significant negative relationship between circular economy practices and production-based carbon emissions across the panel and in individual countries over the long term, except for Spain. Adopting circular economy concepts often reduces production-based carbon emissions in almost all of the countries evaluated. Research and development, natural resources rent, and human development contribute to decreasing the environmental impact of production processes in the panel long-run. Findings also highlight a unidirectional causal effect from the circular economy, research and development, natural resources rent, information communication technology, and human development to production-based carbon emissions. The results of this research reveal the potential effects of a circular economy on production-based carbon emissions within six advanced circular economies. These findings not only contribute to a better understanding of the challenges faced in achieving sustainable development but also serve as a call to action for practitioners and policymakers to devise effective strategies.

## **Keywords**

Circular Economy, Production Based Carbon Emissions, Research & Development, Human Development Index, ARDL-PMG, ARDL-MG, ARDL-DFE