

ABSTRACT

This study analyzes the factors influencing carbon dioxide (CO_2) emissions in the seven largest emitting countries (China, USA, Russia, Japan, Germany, South Korea, and Saudi Arabia) for the 1994–2023 period using the STIRPAT model. The method employed is panel data regression with a Fixed Effect Model (FEM) approach.

The results indicate that population and energy consumption have a significant positive impact on emissions. A key finding reveals that the Environmental Kuznets Curve (EKC) hypothesis is not supported, as both GDP and GDP squared exhibit positive effects, forming a monotonically increasing relationship without a turning point. Furthermore, cross-section fixed effects analysis uncovers significant heterogeneity; China possesses the highest baseline emissions (dummy) due to its carbon-intensive industrial structure, while other developed nations show lower baseline emissions. This confirms that GDP growth in these countries remains exploitative toward the environment.

Keywords: Carbon Emissions, STIRPAT, Environmental Kuznets Curve (EKC), Fixed Effect Model, Country Heterogeneity.