

ABSTRACT

Persistent growth in carbon dioxide (CO₂) emissions remains a major environmental challenge in the BRICS countries (Brazil, Russia, India, China, and South Africa), as rapid economic expansion continues to be accompanied by heavy reliance on fossil energy and natural resource extraction. This study analyzes the effect of Gross Domestic Product (GDP), renewable energy consumption (RE), and natural resource rents (NRR) on CO₂ emissions, and examines the moderating roles of Control of Corruption (CoC) and the Digitalization Index (DIG), in the BRICS countries.

This study uses panel data from five BRICS countries over the period 2014–2024 (55 observations). The analysis employs the Fixed Effect Model (FEM) with White period robust standard errors across three sequential models (baseline, non-moderation, and full moderation), combined with Moderated Regression Analysis (MRA) to test the moderating variables.

The results show that GDP and NRR have a positive and significant effect on CO₂ emissions in all models, with NRR exhibiting the strongest effect. RE has a negative and significant, though relatively small, effect. CoC and DIG show no significant direct effect, and their moderating roles on the NRR and CO₂ and RE and CO₂ relationships are statistically insignificant, although the coefficient directions align with theoretical expectations. These findings indicate that economic growth and natural resource dependence remain the dominant drivers of carbon emissions in the BRICS region, while institutional and digital factors have yet to play a significant moderating role.

Keywords: CO₂ emissions, GDP, renewable energy, natural resource rents, governance, digitalization, BRICS