Abstract

This study examines the relationship between economic growth, sustainable development, and carbon dioxide emissions in 12 Central and Eastern European countries over a 25-year period from 1995 to 2019. Utilizing both production-based and consumption-based CO_2 emissions as dependent variables, the research aims to elucidate the impact of various economic indicators on environmental sustainability. Fixed effects and Prais-Winsten regression models with Panel-Corrected Standard Errors (PCSE) are employed. The findings reveal three critical insights. First, all CEE countries are positioned in the pre-turning point phase of the Environmental Kuznets Curve (EKC), with the Visegrád Group countries being the closest to reaching the EKC turning point compared to other countries. This suggests that these countries may experience increasing CO_2 emissions until they reach a higher level of economic development, after which emissions are expected to decline.Temporal analysis method further to examine two distinct periods, indicating that while economic growth and human development initially drove significant increases in emissions, recent trends suggest a decoupling effect. Second, significant relationships are identified between economic growth, industrial sector contributions, urbanization, and the adoption of renewable energy with both production-based and consumption-based CO_2 emissions. However, the effects of service sector employment and imports on CO_2 emissions are not consistently significant. Third, the study finds a stronger correlation between the Human Development Index and CO_2 emissions compared to GDP. This indicates that policies focusing solely on GDP growth may underestimate environmental impacts. In conclusion, this study provides valuable insights into the complex interactions between economic growth and environmental sustainability in

the CEE region.