

Title: Bio-innovation for environmental sustainability: Asymmetric nexus between bioenergy technology budgets and ecological footprint

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Abstract: As the world grapples with sustainable energy and environmental preservation challenges, budgeting for bio-resilience emerges as a pivotal step toward environmental sustainability. Our investigation delves into the influence of bioenergy technology budgets on the ecological footprint (ECF) in the top 10 nations that invest in bioenergy research and development (USA, China, Brazil, Germany, Japan, Canada, Sweden, Finland, Denmark, and the Netherlands). Prior research depended on panel data methods to explore the bioenergy technology-environment nexus, disregarding the specific traits of individual countries. Contrarily, the existing research applies the quantile-on-quantile tool to improve the precision of our analysis by delivering a holistic worldwide viewpoint and customized perceptions for every economy. The findings indicate that dedicating budgets to bioenergy technology improves environmental quality by reducing ECF across several quantiles within our sample nations. Moreover, the outcomes uncover unique patterns in these relationships across multiple countries. These results stress the significance of policymakers conducting exhaustive assessments and implementing productive tactics to address bioenergy technology funding and ECF changes.

Keywords: Bioenergy technology Environmental sustainability Ecological footprint (ECF) Bio-resilience

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