Title: Testing the non-linear environmental effects of ongoing renewable energy transition in underdeveloped nations: The significance of technological innovation, governance, and financial globalization.

Author Name: Muntasir Murshed.

Abstract: Underdeveloped nations are often confronted with unsuccessful attempts made at containing their atmospheric discharges of carbon dioxide. In this regard, high fossil fuel dependency within these nations is assumed to be the major factor that has compromized their emission-abatement objectives. Notably, the renewable energy deployment rate in the majority of the underdeveloped nations worldwide has not only been below par but these nations have rather evolved to become more reliant on fossil fuels over time. Against this backdrop, this study considers a case study of 119 underdeveloped nations and explores the non-linear environmental effects of undergoing renewable energy transition, controlling for their levels of technological innovation, governance, and financial globalization. Overall, using data from 2001 to 2021 and employing advanced panel estimators, the findings in a nutshell endorse the inverted U-shaped relationship between more renewable energy use and per capita carbon dioxide emissions in the long run. Besides, improving governance quality is observed to impose emission-reducing effects while technological progress boosts emissions in the long run. By contrast, financial globalization is not witnessed to influence the long-run emission figures of the concerned underdeveloped nations. However, the findings are heterogeneous across underdeveloped nations belonging to different development stages and regional locations. Nevertheless, it is recommended that underdeveloped nations should design policies relevant to amplifying renewable energy deployment rates, develop green technologies, establish a sound democratic environment, and green their financial globalization policies in order to realize their carbon emission-abatement objectives.

Keyword: Carbon Dioxide Emissions, Environmental Sustainability, Underdeveloped Countries, Fossil Fuel Dependency, Renewable Energy Consumption.

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