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DYNAMIC NEXUS AMONG GLOBALIZATION, ECONOMIC COMPLEXITY, FOREIGN INVESTMENTS, AND ENVIRONMENTAL QUALITY: EVIDENCE FROM A CROSS-SECTIONALLY AUGMENTED AUTOREGRESSIVE DISTRIBUTED LAG (CS-ARDL) APPROACH

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Abstract

In the global race toward climate neutrality, a critical challenge lies in balancing economic integration with environmental sustainability. As countries deepen their engagement with the global economy, it becomes increasingly important to understand the environmental consequences of foreign direct investment (FDI) and trade openness (TO), particularly in regions vulnerable to ecological degradation. This study investigates how FDI and TO affect environmental quality in Middle East and North Africa (MENA) region and examines whether this relationship is moderated by economic complexity (ECI), which reflects a country's level of productive knowledge and technological capability. Using panel data from 18 MENA countries spanning 1995 to 2023, the study employs the Cross-Sectionally Augmented Autoregressive Distributed Lag (CS-ARDL) model to capture both short- and long-run equilibrium dynamics. Environmental quality is proxied by two indicators: carbon dioxide (CO_2) emissions and ecological footprint (EF). The results reveal that both FDI and trade openness contribute to environmental improvement, with significant reductions in CO_2 emissions and EF observed in both the short and long run. Notably, these positive effects are amplified in countries with higher ECI, suggesting that more complex economies are better equipped to adopt clean technologies, diversify production systems, and enforce environmental regulations. Granger causality analysis indicates bidirectional causal relationships between FDI, trade, ECI, and environmental outcomes, highlighting dynamic feedback mechanisms. A robustness check using the KOF Globalization Index confirms the consistency of the results. The findings underscore the importance of structural transformation and technological upgrading in aligning globalization with environmental goals.

Key words: climate neutrality, CS-ARDL, economic complexity, ecological footprint, globalization

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