Environmental Engineering and Management Journal

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THE NEXUS BETWEEN INDUSTRIALIZATION, FOREIGN DIRECT INVESTMENT, AND ECOLOGICAL FOOTPRINT IN SUB-SAHARAN AFRICA: A DYNAMIC GMM APPROACH

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Abstract

Achieving ecological sustainability in Sub-Saharan Africa (SSA) poses a significant challenge as the region seeks to balance the economic imperatives of industrialization (IND) and Foreign Direct Investment (FDI) with ecological preservation. The environmental impact of these drivers remains a topic of debate, motivating this study to address two key research questions: (1) How do industrialization and FDI individually and collectively affect the ecological footprint (EF) in SSA? (2) What are the causal relationships between industrialization, FDI, and EF? To explore these questions, the study utilizes a panel dataset of 36 SSA countries spanning 1990 to 2022. Dynamic GMM estimation techniques are employed to account for endogeneity concerns, ensuring robust results, while the Dumitrescu-Hurlin causality test is used to identify causal links among variables. The findings reveal that industrialization contributes to an increase in EF, indicating its adverse environmental effects, whereas FDI is associated with a reduction in EF, reflecting its potential to promote environmentally sustainable practices. Causality tests further demonstrate bidirectional relationships between IND, FDI, and EF, along with unidirectional causality from trade openness to EF. These results have significant policy implications, emphasizing the need for stringent environmental regulations to mitigate the ecological impact of industrialization and for strategic policies that harness FDI to drive sustainable economic growth. The findings advocate for a balanced development model that integrates economic advancement with environmental preservation, aligning with global sustainability objectives and ensuring ecological security for future generations.

Key words: emerging economies, environmental sustainability, foreign direct investment, industrialization, sustainable development

Received: May, 2024; Revised final: February, 2025; Accepted: April, 2025

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