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Does digital financial inclusion strengthen the financial inclusion-energy poverty relationship in Sub-Saharan Africa?

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Extended Abstract

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Abstract Summary

This study examines whether digital financial inclusion (DFI) strengthens the effect of financial inclusion on energy poverty in Sub-Saharan Africa (SSA). Using an unbalanced panel of 34 countries over the period 2010 to 2024, the analysis combines composite indices with disaggregated indicators to capture both broad trends and underlying mechanisms. Financial inclusion is measured using automated teller machines, bank branches, borrowers, and depositors, while DFI is proxied by mobile money accounts per 1,000 adults, mobile money agent density, and the value of mobile and internet-based transactions as a share of GDP. Energy poverty is captured through access to electricity, clean cooking adoption, and per capita energy consumption. Economic development, urbanisation, and trade openness are included as control variables.

To address cross-sectional dependence, heterogeneity, and endogeneity, the study applies second-generation panel unit root tests, Driscoll-Kraay standard errors, IV-GMM estimation, and a dynamic panel threshold model. The findings show that financial inclusion significantly reduces energy poverty. A 1% increase in financial inclusion is associated with a 0.18 to 0.24% improvement in energy access outcomes. More importantly, DFI amplifies this relationship, with the interaction term remaining positive and statistically significant at the 5% level across all specifications.

The threshold analysis identifies a critical level of DFI at approximately 0.42, beyond which the marginal effect of financial inclusion rises from 0.11 to 0.29. Disaggregated results reveal that mobile money penetration and digital transaction intensity are the main drivers of this amplification effect, while agent density shows diminishing returns at higher levels. These results are robust to alternative specifications and estimation techniques.

These findings suggest that digital financial systems play a central role in enhancing the effectiveness of financial inclusion in reducing energy poverty. Expanding mobile-based financial services alongside traditional banking structures could therefore accelerate progress towards universal energy access in SSA.

Presenting Author Biography

Lovemore Taonezvi is a Postdoctoral Fellow in Economics at the University of Pretoria, with a PhD in Economics. His research focuses on energy transition, environmental sustainability, and economic development in the SADC region. He has published in peer-reviewed journals and has experience in teaching advanced econometrics and supervising postgraduate research. His work also includes policy-oriented research, such as contributing to an IMF report on gender-responsive just transitions in Botswana. His interests lie in applied econometrics, impact evaluation, and evidence-based policy analysis.