

## Abstract

This study examines how capital adequacy shapes the operational efficiency of Islamic banks in Sub-Saharan Africa (SSA), with particular emphasis on its role as an internal risk-absorption mechanism rather than a purely prudential stability buffer. Despite its central role in Islamic banking regulation, the efficiency implications of capital adequacy, particularly in developing and institutionally constrained Islamic finance markets, remain largely unexplored. Based on a balanced panel of fully-fledged Islamic banks in SSA from 2010 to 2024, the paper employs a two-step empirical approach. Bias-corrected operational efficiency scores are estimated in the first stage using the Simar–Wilson two-stage Data Envelopment Analysis (DEA) framework. In the second stage, we explore the non-linear effects of capital adequacy on efficiency using panel regression techniques, controlling for bank-specific and institutional factors. To address endogeneity, persistence, and reverse causality, a dynamic panel model is estimated using System GMM as a robustness check. The findings indicate a non-linear relationship between capital adequacy and operational efficiency. Moderate capital buffers are associated with improved efficiency through higher loss absorption capacity and stabilisation of operating costs, while excessive capitalisation is accompanied by scale inefficiencies and less effective intermediation. These results indicate that Islamic banking exhibits an efficiency trade-off in capital adequacy, as prudential strength beyond an optimal level may limit productivity in resource allocation. The study makes an important contribution to Islamic banking literature by reframing capital adequacy as a channel of structural efficiency and by providing rare dynamic evidence from SSA. This raises policy implications and suggests the need for commensurate capital calibration that balances prudential resilience against operational efficiency for emerging Shari'ah-compliant banking systems.