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Methodological Evaluation of District Hospitals Systems in Senegal using Panel Data Estimation for Measuring Efficiency Gains

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Abstract

District hospitals in Senegal play a crucial role in providing healthcare services, especially to underserved rural areas. However, their operational efficiency varies widely and is influenced by numerous factors such as resource allocation, patient volume, and staff expertise. The study employs a stochastic frontier analysis (SFA) model to estimate technical efficiency scores for each hospital. This method accounts for inefficiencies due to factors not directly controlled by management, providing a comprehensive view of operational performance. Panel data estimation revealed that resource allocation and patient volume have significant impacts on hospital efficiency. For instance, hospitals with higher patient volumes tend to exhibit greater technical efficiency (TE) scores, indicating better use of resources. The findings suggest that improving resource management strategies could lead to substantial efficiency gains in district hospitals, thereby enhancing overall healthcare delivery in Senegal. District health authorities should prioritise the allocation of essential resources such as medical supplies and personnel based on patient demand. Additionally, regular training programmes for staff can help address skill gaps. district hospitals, panel data estimation, efficiency gains, stochastic frontier analysis, resource management Treatment effect was estimated with $text\{logit\}(\pi) = beta0 + \beta^{\rightarrow} p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: *African geography, panel data, hospital efficiency, econometric methods, healthcare system analysis, rural health services, resource allocation studies*