



Methodological Evaluation of Power-Distribution Equipment Systems in Senegal Using Panel Data for Cost-Effectiveness Measurement

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Abstract

{ "background": "Power distribution equipment systems (PDES) play a critical role in ensuring reliable electricity supply in Senegal. However, there is limited data available to assess their cost-effectiveness.", "purposeandobjectives": "To evaluate PDES systems in Senegal using panel data methodology and estimate the cost-effectiveness of these systems with robust statistical techniques.", "methodology": "A fixed effects model will be applied to analyse panel data from various regions within Senegal over a five-year period. The model is specified as:\n
$$Y_{it} = \beta_0 + \sum_{j=1}^J \beta_j X_{jit} + u_i + e_{it}$$
\nwhere Y_{it} represents the cost-effectiveness measure for region i in year t , X_{jit} are explanatory variables including investment costs, maintenance frequency, and energy output, u_i accounts for unobserved heterogeneity across regions, and e_{it} captures random disturbances.", "findings": "The panel data analysis reveals significant differences in cost-effectiveness among different regions, with some showing substantial over-expenditure on PDES investments compared to others.", "conclusion": "This study provides a robust methodological framework for assessing the cost-effectiveness of PDES systems in Senegal, offering insights that can inform policy and investment decisions.", "recommendations": "Policy makers should prioritise data collection and analysis to identify regions where PDES investments could be improved or scaled up based on this model's findings.", "keywords": "Power distribution equipment systems, cost-effectiveness, panel data, fixed effects model, Senegal", "contributionstatement": "This paper introduces a novel methodological approach using panel data for evaluating and measuring the cost-effectiveness of PDES systems in Senegal." } --- Background Power distribution

equipment systems (PDES) play a critical role in ensuring reliable electricity supply in Senegal. However, there is limited data available to assess their cost-effectiveness. Purpose

Keywords: *Sub-Saharan, econometric, panel data, stochastic frontier, reliability analysis, cost-benefit, geographic information systems*

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