



Evaluation of South African Secondary School Systems Using Panel Data for Efficiency Measurement

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Abstract

The evaluation of secondary school systems in South Africa's education sector is crucial for improving educational outcomes and resource allocation. A mixed-method approach combining quantitative panel-data estimation with qualitative insights will be employed. The study will use a stochastic frontier model (SFM) to measure school performance and resource allocation effectiveness. The SFM revealed that schools in rural areas had significantly lower efficiency scores than those in urban settings, indicating the need for targeted interventions. This research underscores the importance of addressing geographical disparities to enhance educational efficacy across South African secondary schools. Policy recommendations include increasing funding for rural schools and implementing technology-based solutions to improve resource utilization and teaching methods. Secondary education, School efficiency, Panel data analysis, Stochastic frontier model, Agricultural subjects The empirical specification follows $Y = \beta_{0+\beta} X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: African Geography, Panel Data, Efficiency Measurement, Stochastic Frontier Analysis, Education Policy, School System Evaluation, Quantitative Methods

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