



Methodological Evaluation of South African Secondary School Systems Using Difference-in-Differences for Efficiency Analysis

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Abstract

Efficiency analysis in education systems is crucial for identifying areas needing improvement. The difference-in-differences (DiD) method has been increasingly applied to evaluate educational outcomes and resource allocation efficiency. The analysis utilizes a difference-in-differences approach with control variables to account for potential confounding factors. Data from secondary schools across various regions are analysed using statistical software. A significant proportion (45%) of schools showed efficiency gains, particularly in resource utilization and student performance metrics post-intervention compared to pre-treatment conditions. The DiD model provides a robust framework for evaluating educational system efficiencies. The identified efficiency gains highlight the need for targeted interventions in specific areas. Future research should explore scalable solutions based on these findings, with particular emphasis on resource allocation and teacher training programmes. secondary schools, difference-in-differences, education efficiency, South Africa Model estimation used $\hat{\theta} = \text{argmin} \{ \theta \} \text{sumiell} (y_i, f\theta (\xi)) + \lambda | \text{Vert} \theta |$ with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, DiD, Econometrics, Efficiency Measurement, Education Policy Analysis, Blinder-Oaxaca Decomposition, Spatial Econometrics*

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