



Methodological Evaluation of Secondary Schools Systems in Rwanda Using Panel Data for Clinical Outcome Measurement

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Abstract

The secondary education system in Rwanda faces challenges that affect student outcomes. A mixed-method approach combining quantitative panel data analysis with qualitative case studies was employed to assess school performance metrics. Panel-data estimation revealed that a specific intervention strategy improved student test scores by an average of 12% in mathematics and 8% in English over two academic years. The effectiveness of the implemented interventions is supported by robust statistical evidence, indicating potential for replicable improvements in other educational contexts. Further research should explore the scalability of these findings to larger populations and across different subject areas. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta\operatorname{Vert}^2$, with performance evaluated using out-of-sample error.

Keywords: *African geography, panel data analysis, econometrics, qualitative research, mixed methods, educational evaluation, clinical outcomes*

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