



Methodological Evaluation of Secondary Schools Systems in Ethiopia Using Panel Data for System Reliability Analysis

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Abstract

The secondary education system in Ethiopia is a critical component of the country's educational infrastructure. Despite significant investments, there are concerns regarding its efficiency and effectiveness. Panel data from a representative sample of secondary schools across Ethiopia were analysed. A System Reliability Analysis model was employed, incorporating robust statistical methods to estimate system reliability parameters. The analysis revealed that around 75% of the schools in the study area demonstrated high levels of system reliability, with notable disparities observed between urban and rural settings. This study provides insights into the current state of secondary education systems in Ethiopia through a novel application of SRA. The findings suggest potential areas for improvement within the educational sector. Further research should focus on understanding factors that contribute to system reliability, with targeted interventions aimed at enhancing resource allocation and teacher training programmes. The empirical specification follows $Y = \beta_{\sigma+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African education, Methodological evaluation, Panel data, System reliability, Educational infrastructure, Regression analysis, Quality assessment*

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