African Laser Physics (Pure Science)

Bayesian Hierarchical Model Assessment for Efficiency Gains in Ugandan Manufacturing Plants Systems

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Abstract

Efficiency gains in manufacturing systems are crucial for sustainable economic development in Uganda. A comprehensive analysis was conducted using a series of Bayesian hierarchical models to estimate and compare efficiency gains. Data from production records, labour force statistics, and market prices were utilised for the analysis. Bayesian hierarchical models demonstrated significant variability in their estimates of efficiency improvements across different industries, with some showing gains as high as 15% in productivity metrics. The findings suggest that tailored Bayesian approaches can offer more accurate insights into efficiency performance compared to traditional methods, providing valuable information for policymakers and industry leaders. Further research should explore the implementation of these models in a broader range of Ugandan manufacturing sectors to validate their applicability and reliability. Bayesian Hierarchical Models, Manufacturing Efficiency, Uganda, Production Analysis The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Bayesian statistics, Hierarchical modelling, Econometrics, Uganda, Manufacturing systems, Efficiency measurement, Spatial econometrics*

ABSTRACT-ONLY PUBLICATION

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