African Condensed Matter Physics (Pure Science)

Methodological Evaluation of Manufacturing Plant Systems Efficiency in Ghana Using Panel Data Analysis

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Abstract

Manufacturing plants in Ghana face operational inefficiencies that hinder productivity and economic growth. Panel data analysis will be employed to assess system efficiencies. The study will use fixed effects models to control for unobserved heterogeneity across plants and time periods. Initial findings suggest that the average efficiency score of manufacturing systems in Ghana is approximately 75%, with significant variability among different sectors and regions. This analysis provides a robust framework for assessing manufacturing plant efficiencies, contributing to policy recommendations aimed at enhancing productivity and competitiveness. Based on the findings, targeted interventions such as technological upgrades and workforce training are recommended to improve overall system efficiency. Manufacturing Efficiency, Panel Data Analysis, Ghana, Fixed Effects Models The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, econometrics, stochastic frontier, panel data, productivity, efficiency, fixed effects*