African Metallurgy (Materials Focus - Applied Science/Tech)

Methodological Evaluation of Manufacturing Plants Systems in Ghana using Difference-in-Differences Approach for Yield Improvement Analysis

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Abstract

The manufacturing sector in Ghana is crucial for economic growth but faces challenges related to efficiency and yield. A Difference-in-Differences approach will be employed to analyse pre- and post-intervention yield data from selected manufacturing plants. The DiD model will control for potential confounding factors using robust standard errors and likelihood inference to ensure the validity of the results. An initial analysis revealed a significant increase in yield by approximately 15% across all participating plants, with notable improvements observed in the metallurgy sector. The DiD model demonstrated its effectiveness in quantifying yield improvement and provided robust evidence for systemic adjustments to enhance manufacturing efficiency. Manufacturing companies should adopt a structured monitoring system based on the findings and continue evaluating their systems using similar statistical models for continuous improvement. Difference-in-Differences, Manufacturing Efficiency, Yield Improvement, DiD Model The maintenance outcome was modelled as $Y\{\} = beta0 + beta1\,X\{\} + ui + varepsilon\{\}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: *Geography, Africa, Spatial Analysis, Ghana, Manufacturing, Econometrics, Difference-in-Differences, Productivity, Supply Chain*

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