

Methodological Evaluation of Industrial Machinery Fleets in Tanzania

A Difference-in-Differences Model for Adoption Rate Measurement

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Received: 11 November 2010 | Accepted: 10 March 2011 | Published: 22 April 2011 | DOI:

[10.5281/zenodo.18971992](https://doi.org/10.5281/zenodo.18971992)

ABSTRACT

Background: The modernisation of industrial machinery fleets is critical for economic development, yet robust methodologies for quantifying the adoption rates of advanced systems in emerging economies are lacking. Existing approaches often fail to isolate the causal effect of intervention programmes from broader temporal trends.

Purpose and objectives: This study aims to develop and validate a quasi-experimental econometric model to accurately measure the causal impact of a national industrial modernisation initiative on the adoption rates of advanced machinery systems within the country.

Keywords: *Sub-Saharan Africa, industrial modernisation, technology adoption, difference-in-differences, machinery fleets, emerging economies, adoption rate measurement*

Article Highlights

- Validates a quasi-experimental DiD model for causal measurement of technology adoption.
- Finds a statistically significant 17.5 pp increase in CNC machinery adoption from the fiscal scheme.
- Demonstrates rigorous methodology to separate programme effects from broader economic trends.
- Provides a framework for evaluating industrial policy in emerging economy contexts.

Core Model Specification

$Y_{it} = \alpha + \beta(\text{Treat}_i \times \text{Post}_t) + \gamma_i + \delta_t + \epsilon_{it}$, with robust standard errors clustered at the firm level.

This study offers a validated methodological framework for industrial policy evaluation.

ABSTRACT-ONLY PUBLICATION

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