

A Policy Analysis of Cost-Effectiveness in Ghana's Industrial Machinery Fleets

A Panel-Data Estimation Framework, 2000–2026

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ABSTRACT

Background: The cost-effectiveness of industrial machinery fleets is a critical yet under-analysed factor in the economic viability of Ghana's construction and manufacturing sectors. Existing policy evaluations often rely on cross-sectional data, which fails to account for unobserved heterogeneity and dynamic efficiency changes over time.

Purpose and objectives: This policy analysis aims to develop and apply a panel-data estimation framework to rigorously measure the cost-effectiveness of industrial machinery fleets. The objective is to identify the key technical and operational determinants of cost-efficiency to inform national industrial and infrastructure policy.

Keywords: *Panel-data estimation, Cost-effectiveness analysis, Industrial machinery, Sub-Saharan Africa, Policy evaluation, Ghana*

Article Highlights

- Panel-data framework captures unobserved firm heterogeneity and dynamic efficiency changes.
- Utilisation rate is a key determinant, with significant cost savings from increased use.
- Fleet age shows a non-linear relationship, with costs escalating after a specific threshold.
- Policy should incentivise shared utilisation platforms and standardised maintenance.

Analytical Framework

Fixed-effects regression on a balanced panel of firm-level operational records (2000–2026), with inference based on robust standard errors clustered at the firm level.

This analysis provides a robust evidence base for industrial and infrastructure policy in Ghana.

ABSTRACT-ONLY PUBLICATION

This is an abstract-only publication. The complete research paper with full methodology, results, discussion, and references is available upon request.

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