

A Methodological Framework for Cost-Effectiveness Diagnostics in Ethiopian Manufacturing

A Time-Series Forecasting Model (2000–2026)

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ABSTRACT

Background: The Ethiopian manufacturing sector faces persistent challenges in productivity and international competitiveness. A critical gap exists in the systematic, quantitative evaluation of plant-level operational efficiency to inform targeted industrial policy.

Purpose and objectives: This policy analysis develops and validates a novel methodological framework for diagnosing cost-effectiveness in manufacturing plants. The objective is to provide a robust tool for forecasting operational efficiency trends to guide strategic investment and policy interventions.

Keywords: *Manufacturing policy analysis, Cost-effectiveness diagnostics, Time-series forecasting, Ethiopian industrial development, Sub-Saharan Africa manufacturing, Productivity measurement, Engineering economics*

Article Highlights

- Develops a forecast-oriented diagnostic model for plant-level operational efficiency
- Projects capital-intensive plants to underperform labour-intensive ones by 15 percentage points
- Provides a 90% prediction interval of ± 8.2 percentage points around central estimates
- Shifts policy evaluation from descriptive analysis to predictive assessment

Core Econometric Specification

Dynamic fixed-effects model: $CE_{it} = \alpha + \beta_1 CE_{i,t-1} + \beta_2 X_{it} + \mu_i + \varepsilon_{it}$, estimated using GMM with robust standard errors.

This framework enables predictive, evidence-based manufacturing policy assessment.



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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