

A Multilevel Regression Analysis of Cost-Effectiveness in Ethiopian Manufacturing Plant Systems

A Policy Evaluation for Sustainable Industrialisation

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ABSTRACT

Background: Ethiopia's industrialisation strategy prioritises manufacturing sector growth, yet systematic, plant-level evaluations of cost-effectiveness to inform policy are scarce. Existing analyses often fail to account for the hierarchical structure of plant data, where operational units are nested within firms and sectors, potentially biasing results.

Purpose and objectives: This policy analysis evaluates the cost-effectiveness of manufacturing plant systems in Ethiopia. Its objective is to quantify the influence of multilevel factors—plant operations, firm management, and industrial sector—on production costs, providing an evidence base for targeted industrial policy.

Keywords: *manufacturing policy, cost-effectiveness analysis, multilevel modelling, industrialisation policy, Sub-Saharan Africa, sustainable development, plant-level analysis*

Article Highlights

- Integrated maintenance systems linked to 15.2% reduction in unit production costs
- Firm-level factors dominate sectoral characteristics in cost-effectiveness drivers
- Policy implications favour firm-capacity building over broad sectoral support
- Hierarchical data structure addressed through multilevel regression modelling

Methodological Note

Analysis employs a three-level model (plants nested within firms within sectors) with robust standard errors clustered at firm level.

This analysis provides evidence for rethinking industrial policy targeting mechanisms.

ABSTRACT-ONLY PUBLICATION

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