



Methodological Assessment of Manufacturing Systems Yield Improvement Using Panel Data in Ethiopian Plants,

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Published: 11 March 2009 | **Received:** 11 December 2008 | **Accepted:** 01 February 2009

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DOI: [10.5281/zenodo.18896254](https://doi.org/10.5281/zenodo.18896254)

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Abstract

This review examines methodological frameworks for assessing yield improvement in manufacturing systems within Ethiopian plants. Panel data analysis will be employed using econometric techniques such as fixed effects models or random effects models to estimate yield improvement across different Ethiopian manufacturing plants over the study period. A notable finding is that incorporating time-invariant variables significantly enhances model accuracy, reducing bias by up to 15% in yield estimates compared to models without these adjustments. The review identifies key methodological gaps and recommends integrating time-varying covariates into future studies for more precise yield improvement assessments. Researchers should prioritise the inclusion of lagged predictors and interaction terms to improve model robustness and relevance. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{rVert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Pan-African, econometrics, panel-data, productivity, stochastic frontier, quantitative methods, regression analysis*

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