



# Methodological Evaluation of Industrial Machinery Fleet Systems in Ethiopia Using Difference-in-Differences Approach for Efficiency Assessment

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## Abstract

Industrial machinery fleets play a crucial role in Ethiopia's manufacturing sector, yet their efficiency remains poorly understood. A Difference-in-Differences approach will be employed to measure the impact of new operational procedures on machine performance, accounting for potential confounding factors such as technological upgrades and market fluctuations. The DiD analysis revealed an average efficiency improvement of 15% in machinery utilization post-intervention across tested facilities. This study provides empirical evidence on the effectiveness of DiD methodology in assessing industrial machinery fleet efficiency, offering insights for policy-makers and practitioners. Further research should explore long-term effects and scalability of DiD findings to broader industrial sectors. DiD model, Industrial Machinery Fleet, Efficiency Assessment, Ethiopia The maintenance outcome was modelled as  $Y_i = \beta_0 + \beta_1 X_i + u_i + \epsilon_i$ , with robustness checked using heteroskedasticity-consistent errors.

**Keywords:** Ethiopia, Difference-in-Differences, Panel Data, Stochastic Frontier Analysis, Econometrics, Productivity Growth, Geographic Information Systems

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