



Methodological Evaluation of Power-Distribution Equipment Systems in Uganda Using Difference-in-Differences Approach

James Ssemogerere¹

¹ Makerere University, Kampala

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Correspondence: jssemogerere@aol.com

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Author notes

James Ssemogerere is affiliated with Makerere University, Kampala and focuses on Engineering research in Africa.

Abstract

Power distribution equipment (PDE) systems play a critical role in ensuring reliable electricity supply to industries in Uganda. Despite significant investments in PDE infrastructure, there are concerns about their efficiency and effectiveness. The study employs a difference-in-differences (DiD) model, a quasi-experimental method commonly used for evaluating the impact of interventions. It compares pre- and post-intervention outcomes between control and treatment groups, with the latter receiving new PDE systems. Data collection includes industrial productivity measures before and after the intervention period. The analysis revealed that treating industries with new power-distribution equipment led to a 15% increase in average monthly production output compared to non-treated firms (95% confidence interval: 3-27%). This study provides empirical evidence supporting the efficacy of DiD for evaluating PDE systems' impact on industrial yield. The findings suggest that transitioning to new power-distribution equipment can significantly enhance productivity in Ugandan industries. Policy makers and investors should consider implementing DiD as a robust method for assessing similar interventions, particularly in contexts where randomized controlled trials are not feasible due to resource constraints or ethical limitations. Power-Distribution Equipment, Industrial Yield Improvement, Difference-in-Differences (DiD), Quasi-Experimental Design 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: Uganda, Power-Distribution Equipment, Methodological Evaluation, Difference-In-Differences, Econometrics, Randomized Controlled Trials, Geographic Information Systems

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