



Methodological Evaluation of Municipal Water Systems in Ghana Using Difference-in-Differences for Cost-Effectiveness Analysis

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Abstract

Ghana's municipal water systems face challenges in ensuring equitable access to clean drinking water. A longitudinal study employing DiD regression analysis with robust standard errors to assess changes over time in water supply reliability and affordability across different municipalities. Initial data suggest a significant reduction in water supply failures by 20% within the first year of implementation, though variability exists between urban centers. The DiD model effectively quantifies cost-effectiveness improvements but highlights the need for targeted interventions to address regional disparities. Investigate specific areas requiring additional funding and support, particularly those with higher failure rates. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, African, Spatial, Econometric, Longitudinal, Panel, DiD*

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