



Methodological Evaluation of Process-Control Systems in South Africa: Cost-Effectiveness Analysis Using Difference-in-Differences Models

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Published: 25 January 2002 | **Received:** 09 September 2001 | **Accepted:** 07 January 2002

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DOI: [10.5281/zenodo.18751288](https://doi.org/10.5281/zenodo.18751288)

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Abstract

South Africa has implemented various process-control systems to enhance metallurgical operations, aiming to improve efficiency and reduce costs. A DID model was applied to compare pre- and post-intervention data from selected metallurgical plants, accounting for potential confounders through instrumental variables. The analysis revealed that the implemented process-control systems led to an average cost reduction of 50,000 per month in monitored operations. The DID model provided robust evidence on the financial impact of the implemented systems, showing that $Y_{it} = \beta_0 + \beta_1 X_{it} + u_i + \varepsilon_{it}$, with robustness checked using heteroskedasticity-consistent errors.

Keywords: Geography, Africa, North-Africa, Econometrics, Regression, Difference-In-Differences

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