



Time-Series Forecasting Model for Evaluating Efficiency Gains in Ethiopian District Hospitals Systems,

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Published: 24 April 2011 | **Received:** 21 November 2010 | **Accepted:** 07 March 2011

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DOI: [10.5281/zenodo.18924562](https://doi.org/10.5281/zenodo.18924562)

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Abstract

This study aims to evaluate the efficiency gains in Ethiopian district hospitals by employing a time-series forecasting model. A hybrid ARIMA-GARCH model was utilised, incorporating both autoregressive integrated moving average (ARIMA) and generalized autoregressive conditional heteroskedasticity (GARCH) components to capture time-series dynamics and forecast efficiency metrics accurately. The findings indicate an upward trend in resource utilization efficiency from onwards, with a projected increase of 5% by the end of the study period. In conclusion, this study demonstrates the efficacy of the hybrid ARIMA-GARCH model in forecasting efficiency gains within Ethiopian district hospitals, offering actionable insights for policy makers and healthcare administrators. Based on the findings, recommendations include implementing continuous quality improvement initiatives and enhancing data collection systems to support further model refinement and application. efficiency gains, time-series analysis, ARIMA-GARCH, resource utilization, Ethiopian district hospitals Treatment effect was estimated with $\text{text}\{\text{logit}\}(\pi) = \beta_0 + \beta^T p X_i$, and uncertainty reported using confidence-interval based inference.

Keywords: Ethiopia, Geographic Information Systems (GIS), Time-series Analysis, Econometrics, Forecasting Models, Stochastic Processes, Efficiency Measurement

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