



Methodological Evaluation of Time-Series Forecasting Models for Measuring Efficiency Gains in Smallholder Farm Systems in Ghana (1980s)

Methodological
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Forecasting Models

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Abstract

The study examines smallholder farm systems in Ghana to evaluate time-series forecasting models for measuring efficiency gains. A comparative analysis of various time-series forecasting methods including ARIMA (Autoregressive Integrated Moving Average) was conducted. Robust standard errors were used for inference, ensuring the reliability of the model parameters. The ARIMA model demonstrated a significant improvement in capturing trends and seasonality within smallholder farm data, with an R^2 value of 0.85 indicating strong explanatory power. Time-series forecasting models provide valuable insights into efficiency gains among Ghanaian smallholders, offering practical tools for policy makers to support agricultural development. Further research should explore the scalability and generalizability of these findings across different regions and farming contexts in Ghana. The empirical specification follows $Y = \beta_{0+\beta}^{-} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, Smallholder, Time-Series, Econometrics, Efficiency, Forecasting, Granger Causality*

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