

Heteroscedastic Parametric and Semiparametric Smooth Coefficient Stochastic Frontier Application to Technical Efficiency Measurement

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Abstract : Variants of production frontier models have emerged, however, only a limited number of them are applied in empirical research. Hence the effects of these alternative frontier models are not well understood, particularly within sub-Saharan Africa. In this paper, we apply recent advances in the production frontier to examine levels of technical efficiency and efficiency drivers. Specifically, we compare the heteroscedastic parametric and the semiparametric stochastic smooth coefficient (SPSC) models. Using rice production data from Ghana, our empirical estimates reveal that alternative specification of efficiency estimators results in either downward or upward bias in the technical efficiency estimates. Methodologically, we find that the SPSC model is more suitable and generates high-efficiency estimates. Within the parametric framework, we find that parameterization of both the mean and variance of the pre-truncated function is the best model. For the drivers of technical efficiency, we observed that longer farm distances increase inefficiency through a reduction in labor productivity. High soil quality, however, increases productivity through increased land productivity.

Keywords : pre-truncated, rice production, smooth coefficient, technical efficiency

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