Measurement of Technical Efficiency in Farrow-to-Finish Swine Production Using Multi-Activity Network Data Envelopment Analysis: Evidence from Taiwan

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Abstract

This study aims to propose a dynamic multi-activity network data development analysis (DMNDEA) model to measure the technical efficiency of farrow-to-finish swine production in Taiwan. Production phases are explicitly divided into two activities, namely, breed-to-farrow phase and wean-to-finish phase. By using this model, the problem of shared inputs and dynamic intermediates among activities which characterize pig production are taken into account in an integrated framework simultaneously with the consideration of non-zero slack, and allow us to examine aspects of production in a more comprehensive and factual manner. For the empirical results based on sample data from 2006-2007, it is shown that the overall technical inefficiencies obtained from DMNDEA do not reveal obvious difference from those from a traditional one-stage model. However, the DMNDEA results show us explicitly that the inefficiency sources for each farm are different. Furthermore, second-stage regression results also tell us that the determinants of efficiency for each production phase are not the same, and indicate the need to identify the influential factors for each production phase separately.

Keyword：Pig; DEA; Multi-activity; dynamic Network; Russell Measure