Oriented stochastic data envelopment models: Ranking comparison to stochastic frontier approach*

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Abstract

Results of data envelopment analysis sensitively respond to stochastic noise in the data. In this paper, by introduction of output augmentation and input reduction I extend additive models for stochastic data envelopment analysis (SDEA), which were developed by Li (1998) to handle the noise in the data. Applying the linearization procedure by Li (1998) the linearized versions of models are derived. In the empirical part of this work, the efficiency scores of Indonesian rice farms are computed. The computed scores are compared to the stochastic frontier approach scores by Druska and Horrace (2004) and weak ranking consistency with results of stochastic frontier method is observed.

Abstrakt

Výsledky hodnocení efektivnosti získané analýzou obalu dat (DEA) jsou citlivé na přítomnost náhodného šumu v analyzovaných datech. V tomto článku odvodím orientované verze aditivních modelů prezentovaných v Li (1998), které berou v úvahu vliv náhodného šumu na efektivnost produkční jednotky. V části věnované aplikaci stochastických modelů analyzuji míru konzistence odhadů technické efektivnosti v závislosti na zvolené metodě. Skóre efektivnosti farem podle přístupu SDEA a DEA je porovnatelné s výsledky, které Druska and Horrace (2004) získal pomocí metody stochastické hranice produkční množiny.

Keywords: stochastic data envelopment analysis, linear programming, efficiency, rice farm
JEL classification: C14, C61, L23, Q12

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