

Improving Production Possibility set with virtual DMUs in DEA

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Data envelopment analysis (DEA) has been proven to be an effective tool for performance evaluation and benchmarking since it was first introduced by Charnes et al. (1978). After the first CCR model, a number of different DEA models have been proposed, and these models have wide applications in various performance evaluation problems. This text determines the shortcoming with some example. Moreover, by adding virtual DMUs with mean values or confidence interval tries to improve estimation of the frontier, and analyze its effects on CCR and BCC models. Another subject discusses is about super efficiency Infeasibility model. Using super-efficiency, with regard to ranking efficient units, is increasing in DEA. However, this model has some problems such as the infeasibility. Thus, this text studies infeasibility of the input-based super-efficiency model (because of the zero inputs and outputs), and presents a solution by adding two virtual DMUs with mean values (one for inputs and one for outputs). Adding virtual DMUs to Production Possibility Set (PPS) changed the basic super-efficiency model, so a new model is proposed for solving this problem. Finally, numerical examples with a real-world data set are provided to clarify the matter.

Keywords : data envelopment analysis efficiency Optimization confidence interval mean value

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