A novel inverse DEA-R model for inputs/output estimation

**Javad Gerami**

Department of Mathematics, Shiraz branch, Islamic Azad University, Shiraz, Iran.

Corresponding authors: E-mail: [Geramijavad@gmail.com](mailto:Geramijavad@gmail.com)

**Abozar Sohrabi**

Department of Mathematics, Kerman branch, Islamic Azad University, Kerman, Iran.

E-mail: assohrabi20@gmail.com

**Abstract**

In this paper, we propose inverse data envelopment analysis (DEA) models in the presence of ratio data. We present the inputs/output estimation process based on ratio based DEA (DEA-R) models. We first present a multiple objective linear programming (MOLP) model to determine the level of inputs based on the perturbed outputs, assuming that the relative efficiency of the under evaluation decision making unit (DMU) preserve. We also present the relationship between the Pareto solutions of the proposed MOLP model and the optimal level of inputs and outputs of the new DMU. We presented criterion models to determine the efficiency of the new DMU in the inputs/output estimation process based on inverse DEA-R models in the presence of ratio data. We showed that in the presence of ratio data the selection of criterion model can be important, in order to we provide a new criterion model in the inputs/output estimation process in the presence of ratio data, and so on the amount of calculations is reduced. We have shown that the results for the new criterion model are the same as the existing criterion model presented in the paper. In order to show the validity of the proposed approach in the inputs/output estimation process based on the inverse DEA-R models, we provide an application of our models in a real life for a set of data regarding to medical centers in Taiwan and finally we present the research results.

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