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Imprecise data envelopment analysis (IDEA): A review and improvement with an application. (English) Zbl 1012.90013

Summary: The standard data envelopment analysis (DEA) method requires that the values for all inputs and outputs be known exactly. When some outputs and inputs are unknown decision variables such as bounded data, ordinal data, and ratio bounded data, the DEA model becomes a nonlinear programming problem and is called imprecise DEA (IDEA). There are two different approaches in dealing with imprecise outputs and inputs. One uses scale transformations and variable alternations to convert the nonlinear IDEA model into a linear program. The other converts imprecise data into exact data and then uses the standard linear DEA model. The current paper reviews and compares the two approaches through an efficiency analysis of a set of telephone offices. A simplified approach is developed to reduce the computational burden if one uses the first approach. The treatment of weight restrictions in IDEA is discussed. It is shown that weight restrictions on imprecise data are redundant. New developments and improvements to both approaches are provided.

MSC:

90B50   Management decision making, including multiple objectives

Cited in **41** Documents

Keywords:

data envelopment analysis; performance; efficiency; imprecise data

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