

DEA MODELS AND METHODS FOR EFFICIENCY IMPROVEMENT UNDER CONSTANT SUM OF INPUTS/OUTPUTS

Thesis Abstract

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Data Envelopment Analysis (DEA) is a technique to calculate the relative efficiency of firms/organizations or Decision Making Units (DMUs) operating in a similar environment, using multiple inputs to produce multiple outputs. It is a non-parametric mathematical programming technique that operates under certain assumptions that mayT5brron-

adaptable to any other weight and/or parameter constraints that the decision maker may choose to apply.

The fourth chapter introduces the CSOO constraint. The models developed for CSOI in previous chapters will be adapted for CSOO scenarios. Then, the models from this chapter and previous chapters will be combined so that a DMU under both CSOO and CSOI can improve its efficiency by changing both inputs and outputs at the same time. In this chapter, the concept of cross-efficiency is used as a way of selecting targets for the efficiency improvement strategy.

Chapter 5 addresses a special case of weight restrictions, when all DMUs are under a common set of weights. New models are developed to allow a DMU under common set of weights to improve efficiency under CSOO/CSOI without reducing the overall efficiency of other DMUs. Practical uses of common set of weights include situations where the DMUs are in sufficiently similar situations that they are expected to have similar weights on inputs/outputs, and for differentiating between DMUs with similar efficiency scores.

Chapter 6 discusses the problem when the DMUs are all part of larger networks. This chapter introduces new models and methods to allow a sub-DMU to improve its efficiency, while under CSOO/CSOI, or under Constant Sum of Intermediate Product, without reducing the efficiency of any of the networked DMUs.

Chapter 7 is the Conclusion. In it, we summarize the theoretical results and research contributions from the first six chapters. This chapter also contains a discussion on the managerial implications of our research, and discusses the limitations of our work and directions for future research.