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Economic efficiency when prices are not fixed: Disentangling quantity and price efficiency

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Abstract

This paper proposes an approach to compute cost efficiency in contexts where units can adjust input quantities and to some degree prices so that through their joint determination they can minimise the aggregate cost of the outputs they secure. The model developed is based on the data envelopment analysis (DEA) framework and can accommodate situations where the degree of influence over prices ranges from minimal to considerable. When units cannot influence prices at all the model proposed reduces to the standard cost efficiency DEA model for the case where prices are taken as exogenous. In addition to the cost efficiency model, we introduce an additive decomposition of potential cost savings into a quantity and a price component, based on Bennet indicators.

Keywords: Cost efficiency; price efficiency, Bennet Indicators, Data Envelopment Analysis

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1 Introduction

Traditional models for computing cost and revenue efficiency date back to Farrell (1957) and will be called Farrell cost or revenue efficiency models. Since the appearance of Data Envelopment Analysis (DEA) in 1978 (see Charnes et al. (1978)) cost efficiency and revenue efficiency have been computed through linear programming models, when an option for the use of non-parametric models is taken. The alternative is to compute cost or revenue efficiency based on the definition of parametric

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