

The Enhanced Russell-based directional distance measure with undesirable outputs: An application to OECD and Non-OECD countries

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Abstract

Following the spirit of the Enhanced Russell Graph Measure (ERGM), the current paper proposes an Enhanced Russell-based directional distance measure (ERBDDM) model for dealing with desirable and undesirable outputs in DEA and allowing some inputs and outputs to be zero. The proposed method is analogous to the non-oriented output slacks-based measure (NOSBM) model and directional output distance function approach, in that they also allow the expansion of desirable outputs and the contraction of undesirable outputs. The ERBDDM is superior to the NOSBM model and traditional approach, since it not only can identify all the inefficiency slacks as it compares to the latter, but also avoids the misperception and misspecification of the former which fails to identify null-jointness production of goods and bads. The paper also imposes strong complementary slackness condition (SCSC) on the ERBDDM model to deal with an occurrence of multiple projections. Furthermore, we explore the issues involved in using computed DEA-based efficiency scores for policy evaluations and possible funding guidance in 99 countries' production.

Keyword : slacks-based model, directional distance function, undesirable output, Enhanced Russell graph measure