Improving the Analytical Power of Dynamic DEA Models, by the Consideration of the Shape of the Distribution of Inputs/Outputs Data: A Linear Piecewise Decomposition Approach

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Abstract : In Dynamic Data Envelopment Analysis (DDEA), which is a subfield of Data Envelopment Analysis (DEA), the productivity of Decision Making Units (DMUs) is considered in relation to time. In this case, as it is accepted by the most of the researchers, there are outputs, which are produced by a DMU to be used as inputs in a future time. Those outputs are known as intermediates. The common models, in DDEA, do not take into account the shape of the distribution of those inputs, outputs or intermediates data, assuming that the distribution of the virtual value of them does not deviate from linearity. This weakness causes the limitation of the accuracy of the analytical power of the traditional DDEA models. In this paper, the authors, using the concept of piecewise linear inputs and outputs, propose an extended DDEA model. The proposed model increases the flexibility of the traditional DDEA models and improves the measurement of the dynamic performance of DMUs.
Keywords : Dynamic Data Envelopment Analysis, DDEA, piecewise linear inputs, piecewise linear outputs
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