Efficiency measurements in multi-activity data envelopment analysis with shared inputs: An application to farmers’ cooperatives in Taiwan

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Abstract

Purpose – The paper aims to propose a modified multi-activity data envelopment analysis (MDEA) to provide information on the efficiency performance of farmers’ cooperatives with inputs shared among several closely-related activities.

Design/methodology/approach – The directional distance functions are used to construct a non-radial measure of performance in which the optimal input/output adjustment and the optimal allocation of shared inputs is simultaneously taken into consideration. The model is applied to study the case of 201 farmers’ cooperatives in Taiwan.

Findings – The empirical results suggest that there exist significant discrepancy in terms of the performance among the four departments of the farmers’ cooperatives. Furthermore, the wide discrepancy in the returns to scale warrant further deregulations by easing restrictions on their consolidation with other cooperatives to operate over broader geographical areas.

Originality/value – An empirical study on Taiwan’s farmers’ cooperatives is used to demonstrate its applicability and how they can effectively allocate their fixed resources in a multi-activity environment. Such a measure can be used for rewarding the individual groups of an organization based on their relative contributions to the overall performance.
Keyword: Multi-activity DEA, Shared inputs, Efficiency measure, Taiwan, Agriculture