

Productivity Change in Taiwan's Farmers' Credit Unions: A Nonparametric
Risk-Adjusted Malmquist Approach

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Abstract

This article proposes an extended three-stage DEA methodology similar to Fried et al. (2002) to improve the measurement of productivity growth when the assumption of free disposability of undesirable output does not apply. A directional distance function is used to construct adjusted

Malmquist-Luenberger productivity indexes which simultaneously account for the impacts of undesirable outputs, environmental variables, and statistical noise. Panel data for 263 farmers' credit unions (FCUs) in Taiwan covering the 1998-2000 periods are employed to illustrate the advantages of this method. On average, the productivity of Taiwan's FCUs is found to have deteriorated over the 1998-2000 period. Although an improvement in efficiency has been observed, the major reason for the deterioration is found to be due to the regression of technology

Keyword : Malmquist-Luenberger productivity index; Three-stage DEA; Undesirable outputs; Directional distance function