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Graph Productivity Change Measure Using the Least Distance to the Pareto-Efficient Frontier in Data Envelopment Analysis

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Abstract: This paper proposes a new method to measure productivity change of decision making units in the full input-output space. The new approach is based on the calculation of the least distance to the Pareto-efficient frontier and hence provides the closest targets for evaluated decision making units to reach the strongly efficient frontier with least effort. Another advantage of the new methodology is that it always leads to feasible solutions. The productivity change in the new approach is operationalized as a Luenberger-type indicator in the Data Envelopment Analysis framework and it is decomposed into efficiency change and technical change. The paper empirically illustrates the new method using recent data on the Spanish quality wine sector.

Keywords: Data Envelopment Analysis, productivity change, closest targets, least distances, Principle of Least Action, graph measures

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