

# Can we really benchmark airports?

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Previous studies on airport benchmarking show that DEA is a popular method for measuring the relative efficiency of airports. The DEA model categorizes decision-making units into two groups, those that are deemed efficient and define the Pareto frontier and those that lie within the envelope and are deemed inefficient. The model does not require a-priori weights on indicators, a functional form specification of the production function nor the inefficiency distribution. Instead, it searches for a path to the frontier and clearly defines benchmarks for those units considered inefficient.

Gillen and Lall (1997) and Pels et al. (2003) were among the first to open up the black box of airport productivity and developed two separate models to evaluate terminal and airside operations independently, among other reasons because of different assumptions with regard to returns-to-scale. We argue that it is more reasonable to analyze the airports as a single unit due to the direct complementarities and the difficulty in separating inputs between the terminal and airside. This leads to the application of network DEA measuring the relative efficiencies of international airports with respect to both aeronautical and concession activities. In contrast to basic DEA, network DEA considers an (intermediate) output of one division as an input for another division, thereby linking the terminal and airside side activities.

The focus of this paper is to apply network DEA as a benchmarking tool to assess the relative efficiency of European airports. To further improve the benchmarking process of 43 European airports over 10 years, we identify appropriate targets by combining integer linear programming with a dynamic clustering mechanism. To ensure an unbiased benchmark, the airports will be clustered according to their vertical integration regarding the provision of ground handling activities. Finally, PCA-DEA was used to improve the discrimination of the results. In a second stage the non-parametric Kruskal-Wallis analysis will test the effects of exogenous factors including privatization, regulation and competition, which are assumed to influence the airport's ability to operate efficiently.

Whereas the Eastern European airports were identified as outliers Vienna, Frankfurt and Munich airport were all ranked with 100% efficiency in maximizing revenues and minimizing costs. In the second-stage analysis especially the form of regulation has been identified as a significant effect on the airports efficiency.

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