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moderate price variation and relatively large data, accounting measures in FinDEA tend reliably proxy the physical measures in conventional DEA. However, with high price variation and relatively small sample sizes, accounting measures in FinDEA tend to diverge away from the productivity measured by conventional DEA. We discuss the implementation of the findings for future FinDEA researchers to mitigate potentially biased results.

DEA45-161 **Mapping the research landscape of DEA in higher education: a bibliometric analysis**

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Data Envelopment Analysis (DEA) is the leading non-parametric methodology for measuring the efficiency of homogeneous decision-making units (DMUs). It's seminal paper by Charnes et al. (1978) was applied in education, and the most recent survey on DEA from 1978 to 2021 (Emrouznejad et al, 2022) indicates that the third most common application of DEA is in the field of education, after energy and banking. We conduct a bibliometric analysis to outline the benefits of DEA's ability to boost performance in higher education. We use the PRISMA protocol for systematic reviews, and in the Scopus database, we searched inTitle-Abstracts-Keywords with the following keywords: "(data envelopment analysis and higher education) OR (DEA and higher education)," specifying the document type as solely "articles" and the time period from the database's first article to the date of the search. A total of 545 papers were found, but the final sample for analysis regarding the inclusion phase of the PRISMA protocol consists of 328 papers from the period 1990–August 2022 published in 190 SCOPUS-indexed journals. We use data visualization for descriptive analytics of most influential journals, papers, and most-profiled authors and software VOSviewer to construct co-authorship maps in order to depict the relationship between authors, articles, and countries; text mining and the construction of co-occurrence maps to determine the important keywords by their frequency in different time frames and methodology-related text mining to identify the relevance of different methods and models.

Based on our findings, academics' interest has grown considerably over the past five years (46% of papers have been published). The top relevant journals are Socio-Economic Planning Sciences based on the number of published articles (15) and Economics of Education Review based on citations (849). The observed articles have been written by 635 distinct individual authors. The network visualization maps for keyword co-occurrence in each decade show enlargement not only in the new keywords but also in the methods and models used. Super-efficiency DEA models appear to be the most relevant, followed by the Malmquist index. The advanced dynamic network DEA model was prominent in the last two

years, indicating the frequent application and development of new or improved methods for panel data handling. The multi-stage and multi-frontier DEA models and robustness analysis are still relevant. Those results are in line with the study of the recent DEA methodology development (Emrouznejad, 2022), where the Malmquist index, network DEA, and two-stage DEA are among the six most commonly used types of keywords. Bootstrapping, regression models, and square structural equation modeling are also relevant approaches used together with DEA models. Furthermore, we discovered that artificial intelligence is a relevant term due to the advancement of data science methods and their application in big data handling.

DEA45-162 **Proposal of mixed method in efficiency for best practices on sucroenergetic sector**

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This study aimed to present a proposal of mixed methodology with analysis and integration in efficiency studies, seeking best practices and applications in the sucroenergetic sector through the relationship between productivity and optimization of results. This mixed-method methodology was proposed in i) definition of the theoretical mathematical model, ii) definition of the efficiency model, technique, definition of ranking and respective sampling criteria, and iii) definition of variables that influence this efficiency, that will be bases for research instrument applied at case studies (quanti-quali integration). Notably, this method can develop stakeholders of sugar-energy production chain to achieve and improve their efficiency through best practices generated through production analysis. Although this methodology has been applied in other economic sectors, such as education, banking, healthcare and solid waste, with opportunities for replication in different periods and countries using variables from public or private databases.

DEA45-163 **Technical efficiency of Italian theatrical firms – a bootstrap and conditional DEA approach**

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This research applies the most recent extensions of DEA approaches, such as the double-bootstrap (DB) DEA and conditional DEA, to evaluate the effect of subsidies and other efficiency determinants on the output-oriented technical efficiency (TE) of Italian theatrical firms. To that aim, we use balance sheet data for 126 theatrical firms operating in Italy over the period 2006-2014. We account for their diverse production technologies by splitting the sample into three distinct groups of theatres (theatre production companies, permanent theatres and opera houses). The

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