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EDITORIAL - Data Envelopment Analysis for performance measurement in developing countries

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There has been continuous and rapid growth in the field of Data Envelopment Analysis (DEA) since it was originally been proposed by Charnes et al. (1978) on the basis of the seminal work of Farrell (1957). There is now a considerable amount of theoretical articles (Emrouznejad, Yang 2018) in measuring various notations of efficiency, such as technical efficiency, cost efficiency and revenue efficiency, in both static and over time frameworks, as well as measuring Total Factor Productivity Growth (TFPG). The family of DEA models is also employed routinely in many areas from assessment of public organizations such as health care systems, educational institutions and governmental bodies to private organizations such as banks and service providers.

The articles comprising this special issue of the Central European Review of Economics and Management contribute to the theory and applications of DEA in Developing Countries. As a result of the rigorous refereeing process, 8 articles were accepted for inclusion in this special issue. This set of articles represent only a small fraction of the total number of submitted manuscripts, but can still offer a well-balanced mix of topics of DEA in the Developing Countries.

The first four articles of this issue are related to efficiency measurement in banking and financial institutions in some developing countries.

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This issue start with the first article that deals with economic interpretations of DEA in measuring banking efficiency. Maryam Hasannasab and Dimitris Margaritis focus on evaluation of the banking systems of Central and Eastern Europe (CEE). They employ parametric forms of distance functions to obtain shadow prices of bank inputs and outputs and contrast and compare them with price proxies typically employed in empirical studies. Specially they show how knowledge of one input price can be used to price outputs and how one output price can be used to price inputs along with information on input and output quantities. They use a Shephard-type input/output distance function as the technology constraint for profit maximisation to obtain the input and output 'crossover' pricing rules. They find differences between shadow prices and actual prices suggesting that input and/or output mix may not be consistent with cost minimization or revenue and profit maximization. They also report that bank efficiency is highest on average in Estonia, which also boasts the highest bank capitalization rate in the CEE region.

Janet Ganouati and Hédi Essid, the authors of the second article in this issue, evaluate the productivity of Islamic banks in 13 countries over the period 2005-2014 using a Malmquist productivity index. By decomposing the productivity into scale efficiency, technological change and technical efficiency, they identify source of productivity change in Islamic banks. They find that the Islamic banks are productive and efficient over the study period. Further, they also show that subprime crisis had a slightly negative effect on productivity in Islamic banking industry.

On the same topic the third article in this issue examines the impact of global financial crisis in bank efficiency in Saudi Arabia. Md. Golam Solaiman, Abdul Kader, Peter Wanke and Md. Abul Kalam Azad apply DEA during 2006-2014 on eleven commercial banks from Saudi banking sector which covers almost 50% of total banks within the country. Overall, their results show that banks in Saudi Arabi are inefficient in terms of technical and scale efficiency. The results also reveal these banks are not immune to the global financial crisis, though, only one bank has kept their unit efficient positions during the study period. It is also shown that the impact of global crisis on bank efficiency is found visible among other banks. They have also test the robustness of this study.

In the next article, Santa Kar and Joyeeta Deb analysis performance of Microfinance Institutions (MFIs) in India. First, they explain that MFIs emerged as major player in providing microfinance services and therefore such institutions need to be financially sustainable in order to achieve their double bottom-line objective. Therefore, this article proposes a two-stage analysis to measure the performance of Indian MFIs and verify the impact of sustainability on the efficiency of the MFIs. In the first stage non parametric DEA framework is developed to estimate the efficiency of the MFIs and to gauge to what extent the production of the bad output could be minimized. In the second stage, Tobit regression is used to identify the factors that have significant impact on efficiency of the MFI, particularly to answer whether sustainability has any significant impact on the efficiency of the MFIs.

The domain of the next two articles is the evaluation of healthcare systems. Zungu Mathias Mulumba, Lindah Nalubanga, Christine Nankanja, Kwihangana Manasseh and Jonas Månsson, Jimmy Hollén measure the technical efficiency in Ugandan referral hospitals using a Data Envelopment Analysis framework. They decompose long-run technical efficiency of hospitals into short-term technical efficiency, scale efficiency and congestion. Their results reveal that the source of the long-run inefficiency varies over the years. For 2012, more than 50% of the observed inefficiency relates to scale factors. However, in 2013 and 2014 the major contributor to the long-run inefficiency was input congestion.

In the sixth article, Maria Stella de Castro Lobo and Edson Correia Araujo use dynamic network DEA model in period 2008-2013, to depict the relationships that take place between diverse levels of care (primary health care/PHC and secondary-tertiary health care/STC) in Brazil. This study measure the performance of Brazilian state capitals, which implement key health policies and assist patients from smaller surrounding municipalities, especially for STC. They show that projections onto the frontier enable establish own management diagnosis and goals for financing and development.

The next two articles are related to performance comparison in information technology industry and performance benchmarking of Indian states. Prosenjit Das evaluates Total Factor Productivity Growth (TFPG) of Indian IT industry during the period from 2004-05 to 2014-15. The author considered a balanced panel consists of

70 IT firms. Further, the TFPG of Indian IT industry has been decomposed into three components: catch-up, frontier-shift, and scale efficiency change (SEC). Das finds that during the study period, the average TFP and frontier-shift has been improved while catch up effect is found to have been declined. It is also shown that the variables, such as export have positive and statistically significant impact on the catch-up and frontier-shift. Salaries and wages intensity have positive impact on TFPG. Export intensity, Salaries and wages intensity have positive impact on TFPG while age of the firms has positive impact on catch-up and TFPG. On an average, the firms which spent on research and development (R&D) have experienced improvement in TFPG and frontier-shift. This study has also found that the impact of the US subprime crisis has been negative on catch-up, frontier-shift, and TFPG.

Finally, in the last article in this issue, Ram Pratap Sinha constructs an index of fiscal performance of Indian states using four non-parametric approaches: Data Envelopment Analysis (DEA), Free Disposal Hull (FDH), Order-m and Order-alpha. This study uses a two-stage approach, where in the first stage, four non-parametric methods have been used to evaluate the performance of Indian states for five consecutive years. Further, in order to tackle the problem of estimation bias (due to sampling variations) bootstrapped DEA and bootstrapped Order-m methods have been applied. In the second stage, impact of indebtedness on the performance of the states has been assessed using a censored regression framework. The major outcome of this study is the construction of a fiscal performance index based on multiple indicators. Moreover, the second stage results indicate that state performance is significantly influenced by their degree of indebtedness. The proposed approach in this article can be effectively used to benchmark state performance which can serve as a basis for resource transfer from the central government to the states.

To conclude, we are grateful to all the authors and to the many reviewers who made this special issue a success. Although it was not possible to include all submitted manuscripts, the editors of this special issue hope that all authors found the feedback helpful for their future work. We also extend our thanks to Professor Dr. Joost (Johannes) Platje, Editor-in-Chief of the Central European Review of Economics and Management, for giving us the opportunity and for providing full support during preparation of this special issue.

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