Introduction to the APPC2014 special issue

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This Special Issue of the Journal of Productivity Analysis (JPA) has been inspired by presentations of research papers at one of the most important conferences in the area of Productivity and Efficiency Analysis—the Asia-Pacific Productivity Conference (APPC2014), organized in 2014 by the Centre for Efficiency and Productivity Analysis (CEPA) at and in conjunction with the School of Economics at The University of Queensland (UQ), and with important support from The Reserve Bank of Australia, Australian Institute for Business and Economics, Australian Government Productivity Commission and New Zealand Productivity Commission.

The conference gathered more than 150 participants from all over the world, and consisted of 38 theoretical and applied sessions, including special-focus sessions targeting specific industries and topics, such as efficiency and productivity in particular industries (banking and energy sectors, regulated industries, agriculture, etc.), topics on USA productivity, EU and APEC productivity, Asia-KLEMS and many more.

Among the many interesting presentations, the conference also featured keynote lectures and addresses from the following renowned scholars:

- Rolf Färe (Oregon State University)
- William Greene (New York University)

- Shawna Grosskopf (Oregon State University)
- Dale Jorgenson (Harvard University)
- Chiang Kao (National Cheng Kung University)
- Subal Kumbhakar (Binghamton University)
- Victor Podinovski (Warwick University)
- Peter Schmidt (Michigan State University)
- Robin Sickles (Rice University)
- Léopold Simar (Université Catholique de Louvain)
- Paul Wilson (Clemson University)

The conference provided an important forum for researchers in the field, giving feedback on many interesting papers that were later submitted to various journals, including this Special Issue. To ensure the high quality of papers for this issue, we made an open call for papers (not limited to conference participants) and we followed the standards proper of the JPA refereeing process. After a thorough refereeing process (most papers had at least two rounds and some had four rounds of revisions), only seven papers have been accepted to this Special Issue and we briefly describe them below.

In the first paper, Simar et al. outline the theory for the estimation of a semi- and non-parametric stochastic frontier model using the local least squares approach (with an empirical illustration based on country level aggregate data). The authors adapt and generalize the idea from the so-called ‘modified OLS’ approach. They first estimate the average production function and several key moments of the residuals using fully non-parametric methods. In the second step, they identify and disentangle the production frontier (as distinguished from the average production function) and the inefficiency by imposing local parametric assumptions on the inefficiency term and assume that the statistical noise is symmetric around zero. They also show

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that if one is interested in estimating not the level but the influence on (in terms of elasticities of) the inefficiency with respect to explanatory factors, then the parametric assumption can be avoided, if replaced with the assumption that the inefficiency term follows an unknown distribution belonging to the one-parameter scale family. Interestingly, note that the authors allow both the statistical noise and the parameter of the inefficiency distribution to be a function of the observed data (e.g., inputs or/and ‘environmental variables’). The authors also sketched the asymptotic theory for the estimators, including the asymptotic theory for the non-parametric estimator of elasticity of inefficiency.¹

In the second paper, Parmeter et al. propose a model for the non-parametric estimation of the determinants of inefficiency. The authors work in the tradition of stochastic frontier modeling and they make standard parametric assumptions on the functional form of the stochastic frontier. The authors assume a type of separability structure where the determinants of inefficiency are different from the inputs and influence only the inefficiency term (not the production frontier). This amounts to an identification assumption that buys the authors the ability to relax distributional assumptions on the inefficiency component of the model. They are therefore able to separately identify (and estimate) the production frontier and the inefficiency effects without making the strong distributional assumptions usually observed in the stochastic frontier literature. The model is in the spirit of the so-called ‘partly linear regression’ framework. A natural question to ask is then what happens if one is willing to assume a distributional assumption of the inefficiency components. The authors approach this problem from a statistical perspective and therefore provide the reader with a statistical test able to test the distributional assumption against their more general model. They also give an empirical illustration based on financial data, to show the working of the model and the statistical test.

In the third paper, Lee et al. address the empirical issue of the environmental impact of airline companies deregulation. The main pollutant considered in the paper is carbon dioxide (CO_2) emissions and the main focus is on the estimation of the variables which are affecting the production of this bad output. The authors use the directional distance function and the associated Luenberger productivity indicator computed for each company (and in each time period) using linear programming techniques. The choice of the directional vector is such that the airline is expanding the good outputs while contracting the bad outputs along a specified direction. This means that any increase in productivity is brought about by having a

reduction in the quantity of pollutant and at the same time an increase in the quantity of the good outputs. The authors estimate the models using world level data on 34 airline companies in the years 2004–2011. An analysis of external factors affecting productivity is conducted using a second stage regression on five external variables (which do not overlap with the inputs used).

In the fourth paper, Lien et al. focus their attention on risk attitudes as possible explanation variables for the observed productivity levels. The focus of the analysis is on the behavior of Norwegian dairy farmers in the year 2009. One of the interesting novelties of the paper is in constructing and incorporating a number of risk indices into their empirical productivity analysis. Specifically, they incorporate these indices in the translog distance function and then estimate it via stochastic frontier analysis approach. One of their main empirical results confirm that risk is affecting the choices that farmers make about inputs and outputs in general and in particular it affects the observed productivity levels. They also find evidence that regional differences in productivity exist, although small.

In the fifth paper, Brea-Solis et al. study the problem of water losses in England and Wales and its relation to regulatory regimes. As pointed out in the paper, England and Wales have suffered from droughts in the last few decades and the fact that a large percentage of users are non-metered put a lot of pressure on the water supply system. The problem of water scarcity is analyzed by looking at the shadow price of water as estimated using data for the period 1996–2010. The authors use the Bayesian method proposed in O’Donnell and Coelli (2005) in order to impose regularity conditions on their input distance function (this is to avoid getting wrong signed shadow prices for water). This method is applied to the data and the authors are then in a position to compare different regulatory periods and regimes and their impact on water saving strategies. Some quite important policy insights are discussed in the paper.

In the sixth paper, Kilicaslan et al. consider the impact of ICT technologies on the productivity of manufacturing firms in Turkey. Their analysis is based on firm level data and covers the period 2003–2012 (for all firms with more than 19 workers). The authors consider a growth accounting approach versus an econometric approach based on dynamic panel data methods. They find, *inter alia*, that while for their data the growth accounting exercise does not provide any evidence on the impact of ICT technology, the panel data econometrics approach shows that ICT impacts positively production in manufacturing. In fact, the authors found that ICT capital productivity is 25–50% higher than traditional capital equipment. Moreover, they also found that the highest ICT capital impact is on firms of small size and low-tech. The paper therefore discusses the opportunity of investing in ICT capital and the inadequacy of growth

¹ This paper was handled by single Guest Editor: A. Peyrache with referees he assigned.

accounting to identify the underlying linkages between productivity and ICT capital.

In the seventh paper, Elnasri and Fox investigate the contribution of research and innovation on productivity growth. The analysis is based on considering a broad range of intangible assets of the business sector that may affect productivity. In particular, the authors focus on the role played by public funding for research and innovation. The analysis is conducted for different types of spending and they found that public spending on research agencies and higher education has significant spillovers on the business sector. On the other hand, the study does not find such significant spillovers onto the business sector from other types of public spending directed towards the private sector, the civil sector or the defense sector. There are therefore clear implication on the reallocation of government funding towards public research in order to maximize productivity growth of the business sector.

Last, but not least, we would like to thank all anonymous reviewers who worked hard to ensure the high quality of the papers entering this Special Issue. We especially thank those reviewers who sacrificed a substantial amount of their valuable time to provide a lot of feedback in order to improve all the submitted works. We would also like to thank the Scientific and Local Organizing Committee: C.A. Knox Lovell, C.J. O' Donnell and D.S. Prasada Rao who helped us (A. Peyrache and V. Zelenyuk) with their wise advices to make the conference and this Special Issue become a valuable contribution to our research community.

All in all, we sincerely wish the readers to enjoy and to benefit from this Special Issue, as we did ourselves, and, importantly, not to hesitate to read it critically and to endeavor to contribute to further improvement and strengthening of the research agenda considered in this Special Issue.