

Carnival in RAO: A workshop in Honour of Professor D.S. Prasada Rao 3-4 December, 2018 PROGRAM

Sunday (2 December, 2018)

18:00 - Drinks and canapes.
Veranda room, [The Regatta Hotel](#), 543 Coronation Drive, Toowong, QLD

Monday (3 December, 2018)

UQ campus. Room 326, [Parnell Building](#) (building #7)

8:30-9:00 Registration

9:00-9:05 Welcome - A Rambaldi

9:05-9:10 Session Chair: D Chotikapanich

9:10-9:40 W. E. Diewert. Output Growth and Inflation Across Space and Time

9:40-10:10 R. Hajargasht. Stochastic Approach to Index Numbers for International Price Comparisons

10:10-10:40 A. Rambaldi. Reconciling Purchasing Power Parity Exchange Rates and Domestic Deflators

10:40-11:05 Morning Tea

11:05-11:10 Session Chair: V Hoang

11:10-11:40 A. Peyrache. The Rao System of International Comparisons

11:40-12:10 R. Ray. The Calculation of Spatial Prices in the Absence of Unit Values: Alternative Methodologies with Empirical Evidence from India

12:10-12:20 Address by UQ School of Economics Academic Dean and Head of School Daniel Zizzo

12:20-13:40 Lunch

13:40-13:45 Session Chair: E Selvanathan

13:45-14:15 B.M. Balk. A Journey with Prasada

14:15-14:45 A. Gorajek. Econometric Perspectives on Economic Measurement

14:45-15:15 K. Fox. The Digital Economy, New Products and Consumer Welfare

15:15-15:40 Afternoon Tea

15:40-15:45 Session Chair: R. Valenzuela

15:45-16:15 W. Griffiths. Inequality and Poverty in Africa: Comparing Panels of Income Distributions from Different Data Sources

16:15-16:45 D. Wu. Inequality of Opportunity in Australia between 2002 and 2015: Snapshots and Trends

16:45-17:15	N. Rohde. Welfare-Based Measures of Income Insecurity
17:15-17:20	<u>Session Chair: D-H Kim</u>
17:20-17:45	Video Greetings
17:45-18:30	Walk around campus
18:30-late	Dinner at the Innes Rooms . UQ campus. Student Union Complex (building # 21c)

Tuesday (4 December, 2018)

UQ campus. Room 326, [Parnell Building](#) (building #7)

9:00-9:05	<u>Session Chair: KK Tang</u>
9:05-9:35	K. Lovell. PPP, Praise for Prasada's Productivity Research
9:35-10:05	G. Battese. Administrative Capacity Assessment in Higher Education: The Case of Universities in Vietnam
10:05-10:35	T. Coelli. Performance Measurement and Regulation of Electricity Businesses in Australia
10:35-11:00	Morning Tea
11:00 - 11:05	<u>Session Chair: M Khaled</u>
11:05-11:35	P. Schreyer. Productivity Measurement, R&D Assets and Mark-ups in OECD Countries
11:35-12:05	S. Shankar. Estimating Efficiency Effects in a Panel Data Stochastic Frontier Model
12:05-12:35	V. Zelenyuk. Measuring Productivity by Quadratic-mean-of-order-r Indexes
12:35-14:00	Lunch
14:00 -14:05	<u>Session Chair: C Maitra</u>
14:05-14:35	K. Nguyen. Empirical Comparison of BWS and DCE with Duration in Developing a Health Utility Index for Dementia
14:35-15:05	X Zhao. Equal Tax for Equal Alcohol or Equal Harm? Beverage Types and Antisocial and Unlawful Behaviours
15:05-15:35	N. Kong. Gender Bias Within Chinese Families—Who Eats First in Tough Times?
15:35-15:40	<u>Session Chair: E Eisenstat</u>
15:40-16:00	Video Greetings
16:00-16:15	D.S. Prasada Rao Address
16:15-16:30	Delegates to transport and travel to Rao's Residence
17:00 to late	Function at Rao's Residence

Abstracts - Monday December 3rd

- **9:10-9:40 Output growth and inflation across space and time**

Authors: W. Diewert and K. Fox

The paper is an addendum to a previous paper by Diewert and Fox (2017) which addressed two problems: (i) how to measure aggregate real output and inflation for a group of countries and (ii) how to construct measures of real GDP for a group of countries where the country measures of real GDP are comparable across time and space. In order to address both problems, it is necessary that the group of countries construct Purchasing Power Parities (PPPs). The present paper looks at the specific problem of interpolating PPPs between benchmark years when PPPs have been constructed. The paper shows that the method of interpolation that was suggested by Diewert and Fox is equivalent to a variant of the method used by the Penn World Tables to interpolate PPPs between benchmarks.

- **9:40-10:10 Stochastic Approach to Index Numbers for International Price Comparisons**

Author: R. Hajargasht

One approach to construction and analysis of index numbers is the so-called stochastic approach. Over his career, Prasada Rao has made important contributions to the stochastic approach to the index numbers in international comparison. In this talk, I will discuss some potentially new ideas under the stochastic approach framework to international comparisons.

- **10:10-10:40 Reconciling Purchasing Power Parity Exchange Rates and Domestic Deflators**

Author: A. Rambaldi

This note presents a general method of interpolation/extrapolation that encompasses a number of alternatives proposed in the literature to reconcile the relationship between ICP Purchasing Power Parity (PPPs)'s Benchmarks and domestic deflators. While the underlying statistical basis of this note is common to the work in Rao, Rambaldi and Doran (2010) - RRD, here we show how standard statistical concepts provide a framework to write the reconciliation relationship as a weighted average of a forward and a backward prediction of the PPPs given the available information. This weighted average is an optimum estimator for this problem. The usefulness of this link is that it then provides a general form for the weights which can be used to study alternative scenarios which are encountered in practice. In addition, it is also possible to show that the weights used by the New Generation PWT are a special case of this method as it is the Diewert and Fox (2017) approach when written as a blended interpolation of PPPs (Diewert, 2018).

- **11:10-11:40 The Rao System of International Comparisons**

Author: A. Peyrache

In this (in progress) study, the system of international comparisons proposed in Salazar-Carrillo and Rao (1985) is reviewed and discussed. After providing the main intuition underlying the system, we propose a variant which incorporates country specific translog preferences and returns a vector of equilibrium (free trade) international prices that can be used to build transitive quantity comparisons. Since the underlying preferences can be viewed as a second order approximation of unknown preferences, the proposed index is superlative in the sense of Diewert (1976). Since the comparison uses fixed prices the quantity index is proper in the sense of O'Donnell (2016).

- **11:40-12:10 The Calculation of Spatial Prices in the Absence of Unit Values: Alternative Methodologies with Empirical Evidence from India**

Authors: A. Majumder, R. Ray and S. Santra

Calculation of spatial price indices is important in case of large countries with heterogeneous preferences and prices between regions. Spatial price differences between countries (PPPs) have featured prominently in the ICP of the UN, but subnational PPPs has received much less attention owing to the non-availability of appropriate price information. This paper proposes alternative procedures for estimating spatial prices that either require no spatial price information or require only limited information in the form of temporal price indices at an aggregated level of items that varies between regions. It also examines the sensitivity of the elasticity and inequality estimates to the inclusion or omission of spatial price differences between regions. In the Indian context, this is the first study that reports spatial price indices at the state level as well as at the district level.

- **13:45-14:15 A Journey with Prasada**

Author: B. Balk

In this contribution I will highlight the contributions of Prasada Rao to index number theory, with particular attention to the adventures of the so-called CPD model.

- **14:15-14:45 Econometric Perspectives on Economic Measurement**

Author: A. Gorajek

It turns out that price index functions share a basic interpretation; practically all of them measure a change in some average of quality-adjusted prices. The different options are distinguished by their choice of average, their definition of quality, and their stance on what I label 'equal interest'. This new perspective updates the so-called stochastic approach to choosing index functions. It also offers new avenues to understand and tackle measurement problems. I discuss three examples.

- **14:45-15:15 The Digital Economy, New Products and Consumer Welfare**

Authors: W. Diewert, K. Fox and P. Schreyer

Benefits of the Digital Economy are evident in everyday life, but there are significant concerns that these benefits may not be appropriately reflected in official statistics. The measurement of the net benefits of new and disappearing products depends on what type of price index the statistical agency is using to deflate final demand aggregates. We examine this measurement problem when the agency uses any standard price index formula for its deflation of a value aggregate, such as GDP. We also apply the methodology to the problem of measuring the effects of product substitutions for disappearing items. Our exact expressions for biases inherent in different approaches provide a theoretical basis and framework for the emerging empirical literature on new goods and services, and for assessing the quality adjustment methodologies used in practice.

- **15:45-16:15 Inequality and Poverty in Africa: Comparing Panels of Income Distributions from Different Data Sources**

Authors: D. Chotikapanich, W. Griffiths, G. Hajargasht, D. Rao and C. Xia

A panel of income distributions for 28 African countries for the period 1997-2010 is developed. For each country/year, generalised method of moments estimates of mixtures of lognormal distributions are estimated from income share data and four different sources of mean incomes – PWT7.1, PWT8.0, PWT9.0 and UQICD. Methods for interpolating or extrapolating shares are proposed for country/years where share data are not available. The estimated income distributions are used to compute measures of inequality and poverty for each country/year and for the combined 28 countries. All estimates are provided in a supplementary appendix for use by future researchers. Using the results for six example countries and Africa as a whole, we demonstrate how critical choice of mean incomes can be for poverty measurement.

- **16:15-16:45 Inequality of Opportunity in Australia between 2002 and 2015: Snapshots and Trends**

Authors: D. Wu, D. Rao, K. Tang

In this paper, we measure inequality of opportunity in Australia between 2002 and 2015. Following recent work in measuring inequality of opportunity, we divide income inequality into factors beyond individuals' control (circumstances) and factors within individuals' control (effort). We make use of the sampling Shapley decomposition approach to measure the overall contribution of circumstances to income inequality for each year and the contribution of each circumstance variable as well. This approach allows us to massively reduce the computational complexity when decomposing income inequality into numbers of factors. Based on this approach, we are able to define different sets of variables as circumstances to adopt different views on circumstances from literature. Our study also sheds lights on trends of the contribution of characteristics such as gender, parents' socioeconomic status, migration status, indigenous status and etc. to income inequality during 2002 and 2015.

- **16:45-17:15 Welfare-Based Measures of Income Insecurity**

Authors: N. Rohde, K. Tang, C. D'Ambrosio, L. Osberg, D. Rao

This paper develops normative approaches for measuring individual-level income insecurity. Using concepts derived from Expected Utility Theory and Prospect Theory, we build a suite of measures designed to capture various forms of potentially psychologically distressing income risk. We present an application for the US and Germany from 1993-2013 using conditionally heteroskedastic fixed-effects models that generate predictive densities for future incomes. Our results reveal much higher levels of income risk in the US relative to Germany, which can be mostly attributed to a higher level of autonomous, time-invariant volatility. Variations in political administrations partially explain our results, while copula-based counterfactual estimations reveal that changes in labor markets also account for increases in risk over time.

Abstracts Tuesday December 4th

- **9:05-9:35 PPP, Praise for Prasada's Productivity Research**

Author: K. Lovell

I survey Prasada's wide-ranging research in the field of productivity measurement, and I discuss several noteworthy features of his work that productivity scholars might emulate.

- **9:35-10:05 Administrative Capacity Assessment in Higher Education: The Case of Universities in Vietnam**

Authors: C. Tran, G. Battese, R. Villano

Administrative staff are a crucial human capital input for the performance of tertiary education institutions. Given the substantial investment in recruitment and selection of administrative staff, efficient use of these staff affects the organisational and financial performance of universities. The Vietnamese government is currently implementing an educational reform process for the purpose of improving its universities in the world's education market, thereby, not only obtaining good education quality, but also efficiently using human resources to reach optimal performance and sustainable development. Whereas much concern has been placed on the performance of teaching staff, the ability of a university to obtain an optimal usage level of administrative staff has not been addressed. This paper investigates the presence of excess of administrative capacity in Vietnamese universities, given the existing student outputs and other input resources. Employing the stochastic frontier input requirement model with data on 112 Vietnamese universities in 2013/14, we find that, on average, the level of excess administrative capacity is 9.7%. In addition, under the analysis of determinants in the inefficiency and error term functions, our findings reveal that excess administrative capacity varies according to ownership, age and miscellaneous revenues. Some policy implications are discussed to address excess administrative capacity to improve the performance of higher education institutions, not only in Vietnam, but also in the rest of the world.

- **10:05-10:35 Performance Measurement and Regulation of Electricity Businesses in Australia**

Author: T. Coelli

In my presentation today, I describe an empirical study that involves the use of some of the methods I first learnt about in that undergraduate class in 1983, namely least squares regression analysis, along with some additional analysis using the index number methods for which Prasada is internationally known.

This presentation describes joint work with my Economic Insights colleagues Denis Lawrence and John Kain. This work was commissioned by the Australian Energy Regulator to assist them with their deliberations regarding the setting of efficient price caps for the services provided by regulated electricity Distribution Network Service Providers (DNSPs) and Transmission Network Service Providers (TNSPs) in Australia.

Firm-level panel data on Australian businesses are used to calculate productivity indices using multilateral Törnqvist index number methods. In addition to this, a larger firm-level panel data set of businesses from Australia, New Zealand and Canada are used to estimate cost function models using stochastic frontier analysis and least squares regression methods. These various models provide efficient benchmarks for the Australian businesses, which are then used to inform deliberations regarding regulated prices.

As with all thorough empirical exercises, accounting for differences in operating environments and data measurement issues are very important aspects of the analysis. Securing accurate and relevant data is a theme which my good friend Prasada Rao has often emphasised over his lengthy and successful career, and we have done our best to ensure that this analysis receives his “tick of approval” in this regard.

- **11:05-11:35 Productivity Measurement, R&D Assets and Mark-ups in OECD Countries**

Authors: P. Schreyer and B. Zinni

A key feature of the 2008 revision of the System of National was the treatment of R&D expenditure as investment. The question arises whether the standard approach towards accounting for growth contribution of assets is justified given the special nature of R&D that provides capital services by affecting the working of other inputs as a whole - akin to technical change and often requires up-front investment

with sunk costs. We model R&D inputs with a restricted cost function and compare econometric estimates with those derived under a standard index number approach but find no significant differences. However, we cannot reject the hypothesis of increasing returns to scale. The standard MFP measure is then broken down into a scale effect and a residual productivity effect, each of which explains about half of overall MFP change. The scale effect points to the importance of the demand side and market size for productivity growth. We also compute mark-up rates of prices over marginal cost and find widespread evidence of rising mark-ups for the period 1985-2015.

- **11:35-12:05 Estimating Efficiency Effects in a Panel Data Stochastic Frontier Model**

Authors: S. Paul and S. Shankar

This paper proposes a stochastic frontier model which includes time-invariant unobserved heterogeneity along with the efficiency effects. The efficiency effects are specified by a standard normal cumulative distribution function of exogenous variables which ensures the efficiency scores to lie in a unit interval. The model parameters are consistently estimated by non-linear least squares after removing the individual effects by the usual within transformation. The efficiency scores are directly calculated once the model is estimated. An empirical illustration based on widely used panel data on Indian farmers is presented.

- **12:05-12:35 Measuring Productivity by Quadratic-mean-of-order-r Indexes**

Authors: H. Mizobuchi and V. Zelenyuk

In this paper, we propose the quadratic-mean-of-order- r indexes of output, input and productivity and show that all index number formulae belonging to this family are superlative indexes. In turn, this helps by deriving a generalization of the well-known Diewert's theorem about equivalence of Fisher and Malmquist indexes. Our results also give new justifications for output and input comparison and productivity measurement via other interesting indexes such as the implicit Walsh index.

- **14:05-14:35 Empirical Comparison of BWS and DCE with Duration in Developing a Health Utility Index for Dementia**

Author: K. Nguyen

Background: The AD-5D is a preference-based instrument derived from the Alzheimer's disease quality of life (QoL-AD) and is undergoing valuation using discrete choice experiment with duration (DCETTO) and best worst scaling (BWS) methods in Australia. It is important to compare the validity and acceptability of health utility indices derived from different methods.

Objective: To examine the concordance and validity of BWS and DCETTO in valuing the AD-5D.

Methods: An efficient design was used for both DCETTO and BWS. Each participant of the online panel were presented with a block of 12 DCETTO tasks and six BWS tasks. Each block included a repeated task and a dominant task. GMNL with various model specifications was employed to estimate utility weights attributable to each level of the five dimensions, after adjusting for demographic characteristics. Additional parameters were included to test for ordering and attribute biases.

Results: Overall, 1,999 respondents representative of the Australian population (in age and gender) took part. Analyses of both BWS and DCETTO data indicated that no personal characteristics were statistically significant in influencing preferences. "Physical function" and "living situation" have the largest impacts on utility across methods while "memory" has moderately low impact. Both methods produce logical ordering of attribute levels although not all were statistically significant. Whilst the utility values produced

by both methods were highly correlated, BWS values were higher than DCE for the majority of health states. A higher proportion of participants were inconsistent in responses to the BWS repeated and/or dominant task (52% vs. 18%).

Conclusions: This study adds to the empirical literature comparing DCETTO and BWS in the context of developing a health utility index, and suggests that methods produce preference data with different characteristics. Further work is required to examine whether the data can be used in a combined model to estimate preferences.

- **14:35-15:05 Equal Tax for Equal Alcohol or Equal Harm? Beverage Types and Antisocial and Unlawful Behaviours**

Authors: O. Yang, P. Srivastava, and X. Zhao

Alcohol tax in Australia has long been the focus of debate among health professionals, welfare bodies, grape growers, and beer, wine and spirit producers. Australia has a complex alcohol tax system where beer and spirits are taxed by differentiated volumetric excise rates according to alcohol strength and wine is levied an ad valorem wine equalisation tax based on wholesale value. A change to a flat rate volumetric tax across all beverages has persistently been advocated including the ‘Henry Review’. This paper examines the association of alcohol related antisocial and unlawful behaviours with 9 specific alcohol beverage types, using data from the Australian National Drug Strategy Household Survey and a system model allowing for endogeneity in beverage choices. Our results show that drinkers of different beverages are associated with very different probabilities of negative drinking behaviours, suggesting equal alcohol in different beverage forms may not generate equal negative social costs.

- **15:05-15:35 Gender Bias Within Chinese Families—Who Eats First in Tough Times?**

Authors: N. Kong and L. Osberg

This paper investigates within family the effects of parental income shocks on individual’s dietary intake. Drawing on large-scale panel data from the China Health and Nutrition Survey from 1991 to 2011, I examine the macronutrient intakes of 2 to 17-year-old siblings of mixed-sex and their parents in 3,244 families. Gender disparity in carbohydrate intakes accounts for 15 percentage points in child sample, 30 percentage points in adolescents, and 50 percentage points between parents using the Dietary Reference Intakes standards. The paper further shows that when families experience negative income shocks, food is allocated in the order of fathers, sons, daughters and mothers. Gender inequality of intra-household resource allocation is heightened in the event of large income losses.