PROGRAM

Course: Computable General Equilibrium Modelling

Professors:
Professor Mark Horridge
Dr Robert Waschik

Assistant:
Tiago Barbosa Diniz

Period: 6-10 August
Time Schedule: 8.45am-12.30pm / 1.30pm-6pm
Classroom hours: 40 hours
Venue: Enap – SAIS Área 2A Brasília-DF

Goals:
Introducing participants to computable general equilibrium modelling and to the GEMPACK software used to solve equilibrium models.

Description:
The course focuses on a typical single-region applied general equilibrium model: the ORANI-G model of the Australian economy. Variants of the ORANI model of the Australian economy have been used extensively for policy analysis in Australia for more than two decades. ORANI-G (a generic version of ORANI) has been used as the basis of many single-country models including models of Thailand, China, Brazil, South Africa, Pakistan, the Philippines and Denmark. GEMPACK software is used by research workers in hundreds of different locations in about 80 countries around the world.

Contents:
- Basic theory and structure shared by most CGE models
- How such models are represented and solved using GEMPACK
- How to interpret and report model results.

Methodology:
The course will be presented using Australian data for the first 3.5 days, when the focus is on more instructive material. For the more interactive material over the final 1.5 days, group exercises will be conducted using Brazilian data. Course participants will receive a USB memory stick with course material that includes a directory containing the Brazilian data/model, so that at any time participants may compare results and data from Australian and Brazilian versions.
### TIMETABLE

#### Session 1
**Monday August 6th**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</table>
| 9.00am-10.30am| Course Welcome and Introduction  
The Broad Structure of a CGE model - 4:oranig.ppt (1-19)                  |
| 10.30am-11.00am| Morning Tea                                                              |
| 11am–12.30pm  | Hands-On Computing with ORANI-G: First simulation  
2:FirstSim.doc  
2*firstsim.xls   |

**12.30pm–1.30pm**  
**Lunch**

#### Session 2
**Monday August 6th**

<table>
<thead>
<tr>
<th>Time</th>
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</table>
| 1.30pm–3.15pm | Introduction to ORANI-G: Sets, Solution Method, the TAB file  
Computing: Interrogating the Data  
2*firstsim.ppt  
4:oranig.ppt (20-40) |
| 3.15pm–3.45pm | Afternoon Tea                                                            |
| 3.45pm-6.00pm | Theory: Core Coefficients  
Computing: Interrogating the Data  
6:HandsOnA.doc  
6:HandsOnB.doc |

#### Session 3
**Tuesday August 7th**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</table>
| 8.45am-10.30am| Theory: Production Structure  
Computing: Closure and Homogeneity  
7:HandsonB.doc |
| 10.30am-11.00am| Morning Tea (mid-session)                                                |
| 11am–12.30pm  | Overview of GEMPACK (including condensation)  
2:GEMPACK.ppt |

**12.30pm–1.30pm**  
**Lunch**

#### Session 4
**Tuesday August 7th**

<table>
<thead>
<tr>
<th>Time</th>
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| 1.30pm–3.45pm | Computing: Wage Cut Simulation  
Wage Cut Simulation: Analysis and Discussion  
8:Wagecut.doc  
8:Wagecut.ppt |
| 3.45pm-4.15pm | Afternoon Tea                                                            |
| 4.15pm-6.00pm | Computing: Wage Cut Simulation: Industry Results  
Wage Cut Discussion (industry results)  
8*Wagechart.xls  
8*WageAns.doc |
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<tr>
<th>Session 5</th>
<th>August 8th</th>
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</table>
| 8.45am-10.30am | Theory: Output mix: Export/Local mix, Capital creation  
4:oranig.ppt (85-103)  
Computing: AnalyseGE & Tariff Simulation 1  
- 9: Ant.doc  
9*tarfsim.ppt |
| 10.30am-10.50am | Morning Tea (mid-session) |
| 10.50am–12.30pm | Theory: Household Demands 4:oranig.ppt (104-121) |
| 12.30pm–1.30pm | Lunch |

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<tr>
<th>Session 6</th>
<th>August 8th</th>
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</table>
| 1.30pm–3.15pm | Theory: Other Final Demands, market clearing 4:oranig.ppt (122-144)  
Computing: Tariff Simulation 2  
- 9: Ant.doc  
9*AntAns.doc  
9*Tarfcut.xls |
| 3.15pm–3.45pm | Afternoon Tea (mid session) |
| 3.45pm-6.00pm | Theory: Tariff simulation discussion  
- 4: 4:oranig.ppt  
Computing: Adding Equations to Model- 10:NewEq.doc |

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<tr>
<th>Session 7</th>
<th>August 9th</th>
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| 8.45am-10.30am | Theory: Purchasers Prices and Macros  
4:oranig.ppt (145-160)  
Theory: Investment, Labour Market, Closure  
- 4:oranig.ppt (161-199) |
| 10.30am-10.50am | Morning Tea (mid-session) |
| 10.50am–12.45pm | Theory: Regional Extension  
t10:regional.ppt |
| 12.45pm–1.45pm | Lunch |

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<tr>
<th>Session 8</th>
<th>August 9th</th>
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| 1.45pm–3.30pm | Official Photo  
Theory: Q&A session  
Group Projects: Allocation and Computing  
11*Groupproj.doc  
11*Groups.doc |
| 3.30pm–4.00pm | Afternoon Tea (mid section) |
| 4.00pm-6.00pm | Group Projects: Computing and Analysis  
- 11*Groupproj.doc  
11*Groups.doc |
Session 9  
August 10th

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<th>Time</th>
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<tbody>
<tr>
<td>8.45am-10.30am</td>
<td>Group Projects: Preparing Reports</td>
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<tr>
<td>10.30am-10.50am</td>
<td>Morning Tea</td>
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<tr>
<td>10.50am–12.30pm</td>
<td>Group Projects: Preparing Reports</td>
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12.30pm–1.30pm Lunch

Session 10  
August 10th

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<th>Time</th>
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<tbody>
<tr>
<td>1.30pm–3.30pm</td>
<td>Presentation of Reports on Group Simulations</td>
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<tr>
<td>3.30pm-4.00pm</td>
<td>Course Wrap-up</td>
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Bibliography:


https://www.copsmodels.com/oranibook.htm

Short Bio:

Professor Mark Horridge

*PhD (UniMelb), MA (Cantab), BA (ANU)*

Director GEMPACK Software, Centre of Policy Studies
Professor Mark Horridge is a Research Professor at Victoria University's Centre of Policy Studies (CoPS). From 2007 to 2013 Mark held a similar position at CoPS, Monash University. He holds a PhD in economics from the University of Melbourne.

Mark leads the small team behind GEMPACK software, the CGE modelling system developed at CoPS over many years by Ken Pearson and others. He has also been involved in development of the MMRF and TERM regional CGE models that are used for Australian policy analysis. He has helped to build CGE models for many other countries, including China, Thailand, Finland, South Africa, Brazil, Poland, the Philippines, Japan, Vietnam, Indonesia, and Taiwan. Pursuant to these international projects Mark has undertaken around 60 overseas trips paid for by an external client. He has organised or taught in around 80 training courses at Monash or elsewhere.

Mark has published 26 refereed journal articles and 12 book chapters.

Mark has been associated with the [Global Trade Analysis Project](https://www.copsmodels.com) (GTAP) in various ways since its inception, and since 2009 is one of three 'members-at-large' of the GTAP Consortium or Advisory Board.
Dr Robert Waschik

PhD (Western University, London, Canada)

Senior Research Fellow, Centre of Policy Studies

Robert Waschik is a Senior Research Fellow with the Centre of Policy Studies (CoPS).

Before joining CoPS in April 2015 he was a Senior Lecturer in the School of Economics at La Trobe University. He moved to Australia from his native Canada in July 2000, where we worked as an Assistant/Associate Professor in the School of Business at Wilfrid Laurier University in Waterloo, Ontario. He has accumulated considerable experience as a university lecturer teaching subjects in international trade, public economics and general equilibrium modelling, among many others, and has supervised a number of Honours, masters and PhD students over the past 25 years.

Robert earned his PhD in Economics from Western University in London, Canada, in 1990. He has published 18 articles in refereed academic journals.

His recent research projects have included an investigation of the effects of international sanctions against Iran, a comparison of the Australian Federal government’s Direct Action policy to abate greenhouse gas emissions with the recent Carbon Pollution Reduction Scheme, and trade creation and trade diversion effects of an Australia-China Free Trade Agreement. These research projects have all involved the use of Computable General Equilibrium models.

Tiago Barbosa Diniz

PhD Candidate, Applied Economics (ESALQ/USP)

PhD Candidate in Applied Economics, Tiago has been working with CGE models for the last 7 years, mostly for environmental and energy questions. His academic studies have been published in journals and conferences proceedings national and internationally. For his CGE study of the economic impacts of the Brazilian New Forest Code, he received awards as the VI Prêmio Dirceu Pessoa de Economia (2012), XIX Prêmio Brasil de Economia (2013) and Prêmio Rui Miller Paiva (2016). For public and private sectors, he has been engaged in projects developing economic scenarios and analyzing regional and public policies.

He was a Visiting Researcher at the Centre of Policy Studies (CoPS), Victoria University, and he is currently an economist at Eletrobras CHESF and consultant. Tiago holds a Master’s degree in applied economics from the University of São Paulo and a Bachelor’s degree in economics from the Federal University of Pernambuco.