



Ruhr Graduate School in Economics

University of Duisburg-Essen

Essen, Germany, March 20-24, 2006

**2nd Ruhr Graduate Summer School**

## **Introduction to Dynamic General Equilibrium Modeling with GAMS/MPSGE**

**Instructors:**

**Thomas F. Rutherford**

**Laurent Cretegy, ECOPLAN (Economic Research and Policy Consultancy)**

**Volker Clausen (University of Duisburg-Essen, Campus Essen)**

### *Objective*

This workshop is intended for economists who want to do dynamic policy analysis with economic data as well as those who are interested in using numerical modeling for simulation analysis of theoretical models. The workshop will provide an introduction to applied (numerical) general equilibrium (GE) models constructed using MPSGE with GAMS. No previous knowledge of GE modeling is assumed. We recommend, however, that minimal preparation for this course would be rigorous first year graduate courses in microeconomics and macroeconomics.

The teaching technique consists of three steps repeated each half day: (1) a brief lecture, (2) examination and discussion of techniques via the use of simple template models, (3) exercises for the participants. Instructors will be available in the meeting room for individual consultation beginning at 8am each day, and the course will then run from 9am to 4pm with a one hour break at lunch.

In addition to educational objectives, the workshop will also provide an opportunity for specialized consultation on individual applications of applied general equilibrium methods. (There will be at least two instructors present at all sessions of the workshop.)

## **Workshop Topics and Schedule**

### Monday, March 20:

#### *Morning*

- Software installation
- Rudiments of GAMS programming
- Getting started with applied general equilibrium
- The conceptual framework
- Economic principles underlying the formulation of numerical GE models
- Economic equilibrium models as square systems of equations
- Micro-consistent initial data and calibration

#### *Afternoon*

- Recursive dynamics with the Solow-Swan model
- Exercises with the Solow-Swan model
- MPSGE: A non-algebraic language for GE modelling

### Tuesday, March 21:

#### *Morning*

- Getting Started with MPSGE
- Functional forms in MPSGE: technology and preferences
- Programming the Solow-Swan model with MPSGE

#### *Afternoon*

- Forward-Looking Dynamic Optimization
- The Ramsey model in an optimization format
- The Ramsey model in a complementarity format
- The Ramsey model in MPSGE

Wednesday, March 22:

*Morning*

- Extensions of Dynamic Representative Agent Models in MPSGE
- Benchmarking with taxes
- Tax policy analysis (e.g., equal yield tax reforms)
- Evaluating the marginal cost of funds

*Afternoon*

- More Dynamic Models with Taxes and Auxiliary Variables
- The open economic model
- Endogenous capital flows
- Endogenous and exogenous technical change

Thursday, March 23:

*Morning*

- Stochastic programming with recourse -- an introduction
- Stochastic equilibrium modelling in MPSGE

*Afternoon*

- Applications of stochastic programming methods in economics

Friday, March 24:

*Morning*

- The overlapping generations framework

*Afternoon*

- Opportunity for individual consultation on user applications

**Payment and Registration**

The fee for participating in the training workshop is 2,500 Euro and includes lectures, course material and lunches. Participants are required to bring a laptop with a CD reader.

Academic participants from accredited universities or colleges will be admitted on a space-available basis for 2,000 Euro. Graduate students from accredited academic institutions are

likewise admitted on a space-available basis for 1,000 Euro. Several tuition scholarships (excluding travel and subsistence expenses) have been set aside for talented participants from developing countries. Deadline for the application for a scholarship is December 31, 2005. Preference will be given to applicants who have documented previous experience in general equilibrium modeling with GAMS. To apply for a scholarship, send CV and a research paper via email to Julian Emami Namini. A decision on the allocation of scholarships will be made until January 13, 2006, in order to allow for an early arrangement of flights, visa etc.

To register by phone, fax, or e-mail, contact:

Course Coordinator  
Julian Emami Namini  
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Department of Economics  
45117 Essen  
Germany  
Telephone: +49 (0)201-183-3218  
Fax: +49 (0)201-183-3974  
email: [rgss@vwl.uni-essen.de](mailto:rgss@vwl.uni-essen.de)

The registration deadline is Friday, February 17. The maximum number of participants is restricted to 20.

Slots are guaranteed only upon full payment of fees (by check or credit card) through the GAMS Course Coordinator. Cancellations will be fully refunded if made prior to February 17. For further information on course content, please contact Thomas Rutherford.

### **Venue and Accomodation**

Workshop participants must make their own arrangements for accomodations. The workshop will be held at the Department of Economics at the University of Duisburg-Essen, Campus Essen:

University of Duisburg-Essen, Campus Essen, Universitätsstraße 12, 45117 Essen, Germany.

Information on nearby hotels and links to maps of Essen can be found [here](#). Very close to the university is the following hotel:

Ibis Hotel Essen, Hollestrasse 50, 45127 Essen/Germany, +49/201/24280,  
<http://www.ibishotel.com/ibis/index.html>, 59-89€/per night.

A number of rooms has been reserved for course participants until Friday, March 03, 2006. Please quote GAMS/MPSGE when making a reservation.

## How to Prepare

Workshop participants can do a number of things to prepare for the workshop. Here are some suggestions:

- Download the GAMS User's Guide.
- Download the Demonstration Version of GAMS .
- Study background material provided over the web, including the MPSGE home page at GAMS .

Study material on [Rutherford's web page](#) specifically related to dynamic economic models:

- [Intertemporal consumption choices.](#)
- [Dynamic general equilibrium analysis with MPSGE.](#)
- [A Primer](#) in dynamic general equilibrium analysis
- [Formulation and analysis of dynamic spatial price equilibrium models](#)
- [Modeling unanticipated shocks.](#)
- [Calibration of models with multi-year periods](#)
- [On the assessment of economic cost in dynamic economic models](#)
- [Sergey Paltsev's introduction](#) to building dynamic general equilibrium economic models with MPSGE
- [Extant and vintage capital in a Ramsey model.](#)
- [Recursive versus intertemporal: a worked example](#)
- [OLG in MPSGE](#) - Overlapping generations with pure exchange: an MPSGE formulation
- [OLG](#) Modeling overlapping generations in a complementarity format
- [Trade and direct investment in producer services and the domestic market for expertise](#), and the [model directory](#). (See RUN.BAT for scenario, figure and table definitions.

### The Instructors

Thomas F. Rutherford is former Professor of Economics at the University of Colorado at Boulder. He is the inventor of the MPSGE software and has published a number of papers on general equilibrium applications.

Laurent Cretegy is a PhD economist with ECOPLAN, an Economic Research and Policy Consultancy in Berne, Switzerland. He has recently completed a post-doctoral fellowship with the Centre for Policy Studies at Monash University where he was instrumental in the development of the new GEMPACK/MPSGE modeling language. His research has focused on dynamic model of environmental policy and agricultural land use.

Volker Clausen is Professor of Economics, University of Duisburg-Essen, Campus Essen. His current research interests include general equilibrium modeling with a focus on ageing in open economies. His publications have a focus on international topics and appeared in, among others, the Journal of International Money and Finance, the Journal of Economic Integration and the Review of World Economics.