**PhD Course on Computable General Equilibrium Modelling using GAMS**

**18-20 April 2023**

**3 ECTS**

**Course Goals and content**

The goal of the course is to provide an introductory hands-on training on computable general equilibrium (CGE) modelling using the GAMS software. The course will overview the basic GAMS commands used to code a CGE model, how to upload and calibrate data, understand the file structure, how to change key parameters, learn troubleshooting techniques and how to run CGE simulations in GAMS. As practical applications the course will focus on the MANAGE single-country model and the multi-country ENVISAGE model. After the course students should acquire basic skills in GAMS programming and should be able to run baseline and policy scenarios using both CGE models.

Course Contents:

A GAMS language and environment (GAMS documentations: [*www.gams.com/33/docs/*](http://www.gams.com/33/docs/))

* 1. Defining sets, variables and parameters
  2. Basic code and program structure
  3. GAMS-IDE: reading gdx and auxiliary files
  4. Running GAMS using batch files

B MANAGE model (van der Mensbrugghe, 2017)

* 1. Main characteristics, uploading SAM and additional data
  2. File structure
  3. Calibration and baseline simulation
  4. Running policy simulations and output processing

C ENVISAGE model (van der Mensbrugghe, 2017)

* 1. Main characteristics
  2. File structure
  3. Reading GTAP database with a specific aggregation
  4. Calibration and baseline simulation
  5. Running policy simulations and output processing

Lecture Overview:

Lecture 1 and 2: GAMS language and environment. Basic program structure, commands, interphases (IDE and batch files), reading gdx files.

Lectures 3: MANAGE: main characteristics, file structure, reading SAM data, baseline calibration and simulations, output processing.

Lectures 4 and 5: ENVISAGE: main characteristics, file structure, reading GTAP data, baseline calibration and simulations, output processing.

Lecture 6: Exercises and troubleshooting.

**Grading**

Class participation (10%); take-home assignment (90%).

**Organization**

Lectures, total number of hours: 15.

The course takes place from Tuesday 18.04 (Lecture 1: 10.00-12.30, Lecture 2: 14.00-16.30), Wednesday 19.04 (Lecture 3: 9.30-12.00, Lecture 4: 13.30-16.00) and Thursday 20.04 (Lecture 5: 9.30-12.00), Thursday 20.04 (Lecture 6: 13.30-16.00).

This is an intensive and hand-on course. Each student should have the GAMS software installed and running, with a valid (student) license. The basic GAMS documentation needs to be read before the course. Reading the MANAGE and ENVISAGE documentation is advised.

Place: World Trade Institute, University Bern. The number of attendants is limited to 10.

**Lecturer:** Hugo Rojas-Romagosa

Hugo is a senior economist at the IMF’s Research Department. He worked as an extended-term consultant for the World Bank (2020-2022), a senior fellow researcher at the World Trade Institute in Bern (2018-2020), as a senior researcher at the CPB Netherlands Bureau for Economic Policy analysis (2006-2018), and previously at the Central Bank of Costa Rica. He has ample research and consultancy experience with several national governments and international organizations. He obtained his PhD in economics from the Erasmus University Rotterdam and holds a Master of Philosophy from the Tinbergen Institute in The Netherlands.

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**Bibliography**

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van der Mensbrugghe, D. (2017). Mitigation, Adaptation and New Technologies Applied General Equilibrium (MANAGE) Model. Version 2.0f. Center for Global Trade Analysis (GTAP), Purdue University.

van der Mensbrugghe, D. (2019). The Environmental Impact and Sustainability Applied General Equilibrium (ENVISAGE) Model. Version 10.01. Center for Global Trade Analysis (GTAP), Purdue University.