Global Computable General Equilibrium (CGE) Modelling: Online Course

Course Description

This course is an intermediate course in (practical) global computable general equilibrium (CGE) modelling using the GLOBE_t model (see below) implemented using the General Algebraic Modelling System (GAMS) software. The course is designed for individuals who have a well-developed background in economics and basic CGE modelling, who wish to develop the technical skills needed to become a CGE modeller and/or become competent users of modern comparative static global CGE models. The course emphasises the development of the skills required to implement systematic policy experiments and the interpretation of the results from those experiments. The course also develops the participants understanding of the behavioural relationships in, and the calibration of, CGE models, while enhancing GAMS coding skills. The course uses a mix of video presentations (lectures and 'how to' videos), practical computer exercises and policy analyses exercises.

The materials are organised in 4 modules offered over 5 weeks, with support offered in a sixth week to allow for 'slippage'. The first two modules have a total of 10 components, each of which requires approximately 3 hours of input from the participants. The third module has three components: the first is a series of presentations providing advice on interpreting and presenting CGE results, while the second and third are exercises in interpreting model results, each requires approximately 9 hours. The final module of the course is devoted to a guided research project that requires about 18 hours of input. Thus, participants should allocate upto 90 hours over 5 weeks to complete the course. Each module requires the participants to submit a deliverable; this allows the tutor to monitor progress and understanding.

Participants on this course are required to have completed the 'Practical Computable General Equilibrium (CGE) Modelling course' (see www.cgemod.org.uk/introcge.html for

details) or provide proof of equivalent or greater skills.[1] The methods used in this course require an understanding of Social Accounting Matrices (SAMs), and the relationships between SAMs and CGE models.

The course assumes that the participants have an in-depth knowledge of microeconomic theory, especially general equilibrium theory, and a reasonable understanding of standard techniques of mathematical economics, especially those relating linear homogenous functions. It is assumed that participants have appreciable experience with programming in GAMS and in the use of MS Excel.

The course is delivered via an electronic learning environment – Moodle. Moodle provides an environment that allows the delivery of learning materials in a structured and organised manner, and an asynchronous forum in which participants can engage with other participants and with the course tutor. The course tutor is available, by email and/or the Moodle message system, to answer specific questions and provide help with problems: questions and requests for advice submitted between 0800 and 1600 UTC will be responded to by the end of the next working (Monday to Friday) day, i.e., by 1600 UTC. Each module requires the participants to submit an assignment; this allows the tutor to monitor progress and understanding, and to intervene if participants are not understanding concepts and techniques or having difficulties. Feedback is provided for each assignment.

This course does NOT use a GUI (Graphical User Interface) to access GAMS. Experience has demonstrated that the use of GUI's by participants on training programmes typically limits the development of the skills needed to be a good CGE modeller or user of CGE models, while encouraging the belief that CGE models are 'black boxes'. Basic GAMS programming skills, and an understanding of economic theory, demonstrates that allegations that CGE models are 'black boxes' are false. The development of GAMS, or GEMPACK, programming skills greatly extends the ability of the user to exploit the power of CGE models, and, at the same time, opens up the potential that participants can, in the future, change behavioural relationships in CGE models.

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[1] We provide a set of exercises for which satisfactory completion is deemed 'proof of equivalent or greater skills'.

A time limited licence for GAMS is available courtesy of GAMS Corporation.

Course Aims and Objectives

Course Aims

To develop the CGE modelling skills of participants (using GAMS) so they

    i)   understand the behavioural relationships used in CGE models;

    ii)   understand the impact of different behavioural relationships used in CGE models;

    iii)   understand the calibration of the behavioural relationships in CGE models;

    iv)   can formulate appropriate CGE policy experiments; and

    v)   can interpret the results generated by global CGE models.

Course Objectives

On completion of the course the participants will be able:

    i)   formulate and code appropriate policy experiments;

    ii)   identify and understand the strengths and limitations of CGE models;

    iii)   modify behavioural relationships;

    iv)   interpret the results from global CGE; and

    v)   identify, and present, the policy implications of simulations using global CGE models.

GLOBE Models

This course uses the GLOBE_t CGE model, which is also used in the global variant of the 'Recursive Dynamic CGE Modelling Course' (www.cgemod.org.uk/rdyn_cge.html). GLOBE_t is a development of the open source GLOBE_1 and GLOBE_2 models (www.cgemod.org.uk/globe.html). GLOBE_t is a state-of-the-art CGE model designed for the analyses of a wide range of real-world policy issues and an advanced base for the further (academic) model development.

Participants on this course will be given access to versions of the GLOBE_3 model. There are no future plans (as of early 2020) to make GLOBE_3 (or STAGE_3) open source; the plan is to restrict the distribution of GLOBE_3 (and STAGE_3) to participants of the Global (and single country) CGE courses offered by CGEMOD.

Timetable

Online courses are run in four cycles – Oct/Nov, Nov/Dec, Jan/Feb and March/April – with recruitment for each course limited to c12 participants. The global course will run in cycles 3 and 4.

The timetables for courses are available at www.cgemod.org.uk/ttable.html

Course Fees

The course fees and conditions are detailed at www.cgemod.org.uk/fees.html

Discounts are offered for participants from developing countries ('Low-income economies' and 'Lower-middle-income economies' as classified by the World Bank) and students. Additional discounts are offered for participants who take multiple courses offered by CGEMOD.

A limited number of scholarships are available to students from developing countries. Applications for a scholarship must be made at the time of registration; applications must be accompanied by a case for being awarded the scholarship that is not longer than one-side of A4/US letter. Applicants must be registered at a degree awarding institution, correspond from an academic email address and provide confirmation of their status from an academic advisor.

Registration

Registration is online at www.cgemod.org.uk/regist.html

Further Information

For further information please contact Professor Karen Thierfelder
Email: karen@cgemod.org.uk

Global CGE (Online) Course

Module O11: GLOBE_t CGE Model: Theory

	Topic	Tasks	Exercises
O11:1	Intro to GLB_t	Review the model and note the extensions to SMOD_on used in the Practical CGE modelling course	Exercise 1: Run model set up and check solution
O11:2	Trade, Prices and Accounting Identities and Tax relationships in GLB_t	The modelling of price and trade relationships in a global model	Calculating prices & accounting matrices for Africa (Deliverable O11.1)
O11:3	Tax Instruments and Productions	Code trade lib. simulations; Loop over sim; use GDX to access results.	Exercise 2: Trade Policy, *Ad Valorem* Tariff Changes in one regions
O11:4	Tariff changes in one region	Review Excel files needed to use SeeResults	Exercise 3: Accessing Model Results using SeeResults
O11:5	Tariff changes & tax replacement	Code alternative macroeconomic closures; loop over sim, clos, and elas	Exercise 4 & 5: Trade Policy: and Tax Replacement & Sensitivity Analysis in one region

Module O12: GLOBE_int CGE Model: Exercises

	Topic	Tasks	Exercises
O12:1	Introduction to the GLB_t database	Understanding the structure of the database	No computer exercises
O12:2	Configuring the GLB_t model	Understanding the structure of, and data used in, glb_t model	Exercise 6: Loading data, calibrating and configuring the glb_t model
O12:3	Free Trade Agreement experiment in GLB_it	Analysing an Africa OECD FTA	Exercise 7: Coding and analysing a simple FTA experiment using SeeResults
O12:4	Save and Restart	Implement experiments using Save and Restart	Exercise 8: Comparing results with different methods for running experiments
O12:5	Production tax changes	Code alternative factor market clearing behaviour; loop over sim, clos, elas	Exercise 9: Analyses of input subsidies and unemployment (Deliverable O12.2)

Module O13: Interpreting Model (GLOBE_int) Results: Exercises

	Topic	Tasks	Exercises
O13:1	Analysing and reporting results	Appreciating the formulation and interpretation and presentation of policy experiments	No computer exercises
O14:2	Interpreting model results (I)	Analysing an OECD Africa FTA vv OECD Africa Customs Union	Interpreting FTA experiments
O14:2	Interpreting model results (II)	Analysing productivity growth in a global context	Interpreting implications of interdependency

Programme Module O14: GLOBE_int Course Project

The objectives of the project are to develop your ability to (i) implement policy experiments in a small global CGE model; (ii) interpret the results of your policy experiments, (iii) carry out systematic sensitivity analyses and (iv) present a report. There are five elements to the project; model recalibration, experiment programming, policy experiments and interpretation, sensitivity analyses and project report.

The available data are from GTAP 8: the database has been partially aggregated. You will need to devise an (further) aggregation consistent with your proposed project and set up the supporting Excel database.

Your remit is that of an economic consultant who has been employed to analyse policy issues that are relevant and current to your chosen country, and can be conducted using a global CGE model. You are required to identify the policy issue, code the policy experiments, interpret and write up the results and conduct sensitivity analyses. The final report will be a maximum of 15 pages, including all tables and graphics.

	Topic	Tasks	Exercises
O14:1	GLB_t project	The project aims are 1. set up and implement policy experiments in the glb_t CGE model; & 2. interpret the results of your policy experiments	There are seven elements to the project; 1. choose an aggregation and write-up the 'backstory' 2. Setup the model's Excel database 3. model recalibration and testing; 4. experiment programming; 5. policy experiments and interpretation; 6. sensitivity analyses; and 7. project report