Introduction to CGE

Short Course on CGE Modeling, University of the South Pacific

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July 23-27, 2012

Course Outline

- Brief Introduction to CGE
- GAMS Primer
- Demand
- Firms and Supply
- Trade
- Tariffs and Other Interventions
- The Armington Assumption
- Closure
- Social Accounting Matrices
- Standard CGE Models

Course Objectives

- By the end of the course you should have a solid understanding of the structure of standard CGE models.
- By working with small scale models, you should have developed a strong understanding of the basic causal mechanisms at play within large-scale models.
- You should have developed enough skill in GAMS programming to begin building your own models and/or modifying existing models to suit your own purposes.

What is CGE?

- Computable general equilibrium (CGE) models are numerical models based on general equilibrium theory. Their objective to turn the abstract models of general equilibrium theory into a practical tool for policy analysis.
- They are multi-sectoral, and in many cases multi-regional, and the behavior of economic agents is modeled explicitly through utility and profit maximizing assumptions.
- Economy-wide constraints are rigorously enforced. In other words, the markets in a CGE model are all linked together.
- CGE models have been widely adopted in the trade policy literature. Recent surveys of their application see Scollay and Gilbert (2000), Gilbert and Wahl (2002), Robinson and Thierfelder (2002), Lloyd and MacLaren (2004) and Hertel and Winters (2005).

What is CGE?

- As a practical matter, a CGE model consists of a set of behavioral relationships drawn from economic theory.
- The relationships are implemented using specific functions in the form of a computer program (usually written in either GAMS or GEMPACK, but sometimes other languages).
- The model will also consist of a set of data that represents the economic system, and data specifying the nature of behavioral relationships.
- Together, these form a quasi-experimental setting where different policy scenarios can be considered before setting them loose.

Example

- A small example can illustrate the idea.
- The demonstration model features a single economy producing two goods.
- The economy uses two factors of production with constant returns to scale technology.
- Assuming full employment and perfect mobility of factors across production, we have one of the dominant models of trade theory — the Heckscher-Ohlin-Samuelson model.

Advantages of CGE

- High degree of theoretical consistency.
- The ability to highlight the importance of linkages between sectors.
- The ability to incorporate unique features of an economic system.
- The ability to predict values for many economic variables in the system.

Limitations of CGE

- The data requirements of CGE models are substantial.
- The human capital investment required in building/using these models is very high.
- There is often uncertainty over parameters, specification, and experimental design.
- By covering all sectors in an economy, a CGE model may miss key features of critical sectors.
- It can be difficult to know what is driving the results (the 'blackbox' critique).