

A Basic Course in Economic Simulation Modeling using GAMS

Preface etc.

Chapter 1: Introduction to GAMS for economic problems
(Jesper Jensen's Welcome to GAMS)

Chapter 2: Examples of economic equilibrium problems translated into GAMS

2.1 Simple supply-demand problem illustrating complementarity
Model M2-1

2.2 Maximization of utility subject to a linear budget constraint
Formulated as a NLP problem:
Formulated as an MCP using first-order conditions:
Formulated as an MCP using Marshallian and Hicksian demand functions:
Model M2-2

2.3 Extension of the utility optimization problem: add a rationing constraint
Formulated as a NLP problem and an MCP.
Formulated as an MPEC
Automating scenario generation
Model M2-3

2.4 Brief introduction to sets: Model M2-3 in set notation
Model M2-4

2.5 Toward general equilibrium: a simple one-good, one-factor, one consumer
example
Model M2-5

Chapter 3: The Basic Closed-Economy General-Equilibrium Model as an MCP

3.1 The structure of a general-equilibrium model: optimization at the sector and
household level

3.2 Micro-consistent data: product exhaustion and market clearing

3.3 Calibration and replication: background: production, cost and expenditure
functions, Shepard's lemma for the Cobb-Douglas function

- 3.4 Two goods, two factors, one representative consumer
Model M3-4
Model M3-4b adds taxes
 - 3.5 Initially slack activities
Model M3-5
 - 3.6 Labor-leisure decision
Model M3-6
 - 3.7 Two households with different preferences and endowments
Model M3-7
- Chapter 4: Examples of Familiar Industrial-Organization Problems Modeled in GAMS
- 4.1 Cournot and Bertrand Oligopoly with Continuous Strategies
Model M4-1
 - 4.2 Nash equilibria with discrete strategies
Model M4-2
 - 4.3 An insurance problem illustrating moral hazard and adverse selection
Model M4-3 modeled as an NLP
Model M4-3b modeled as an MCP
- Chapter 5: Examples of Uses of the NLP Solver in Familiar Economics and Statistics Uses
- 5.1 OLS as an NLP problem
Model M5-1
 - 5.2 OLS one step up: constrained non-linear least squares with the NLP solver
Model M5-2
 - 5.5 Reading and Writing to/from Excel
Model M5-3
 - 5.3 Balancing a matrix to create micro-consistent data using NLP
Model M5-4
 - 5.4 Matrix inversion as an MCP
Model M5-5

Chapter 6: General Equilibrium with Distortionary Taxes, Public Goods, Externalities, Optimal Taxation and Redistribution Policies

- 6.1 Taxes in the benchmark data
Model M6-1
- 6.2 Labor supply taxation: introducing equal-yield tax reform
Model M6-2a
Model M6-2b introduces equal yield constraint
- 6.3 Public consumption goods
Model M6-3
- 6.4 Optimal provision using a Samuelson rule
Model M6-4
- 6.5 Public intermediate (infrastructure) good with optimal provision
Model M6-5
- 6.6 Pollution from production affects utility
Model M6-6a
Model M6-6b uses MPEC to solve for the optimal pollution tax
Model M6-6c uses constraint equation to solve for the optimal pollution tax
- 6.7 Optimal taxation and redistribution
Model M6-7 adapts M3-7 to an MPEC maximizing social welfare

Chapter 7: Adding Scale Economies and Imperfect Competition to General Equilibrium

- 7.1 A brief introduction to the CES function - more later
- 7.2 Monopoly, with fixed costs (increasing returns)
Model M7-2
- 7.3 Oligopoly: Cournot competition with identical products and free entry
Model M7-3
- 7.4 Monopolistic-competition I: large group
Model M7-4
- 7.5 Monopolistic-competition II: small group
Model M7-5

- Chapter 8: Open Economy Models for Competitive Economies
- 8.1 Small open economy
Model M8-1
 - 8.2 Small open economy: tariffs versus trade costs
Model M8-2
 - 8.3 Small open economy: calibrating to tariffs in the benchmark
Model M8-3
 - 8.4 Small open economy: modeling a quota
Model M8-4a modeled with an endogenous (variable) tax equivalent
Model M8-4b modeled as supply/demand for licenses
 - 8.5 Large economy and the optimal tariff (rest of world not explicitly modeled)
Model M8-5
 - 8.6 Two-country Heckscher-Ohlin model: Nash tariffs as an iterative MPEC
Model M8-6a scalar version
Model M8-6b same model in set notation
- Chapter 9: Open Economy Models for Imperfect Competition and Scale Economies
- 9.1 A two-country oligopoly model
Model M9-1
 - 9.2 A two-country monopolistic-competition model
Model M9-2
 - 9.3 Monopolistic-competition with horizontal multinationals
Model M9-3
- Chapter 10: Basics of Dynamic Modeling:
- 10.1 Comparative steady-state analysis
Model M10-1
 - 10.2 Converting an Infinite Horizon Problem to an MCP
Model M10-2 (currently only available in an MPS/GE format)

Chapter 11: Toward CGE Modeling;

10.1 CES functions and the calibrated-share form

10.2 The Armington assumption

10.3 The MPS/GE subsystem of GAMS

10.4 From an IO Table into GAMS