AEA poster presentation

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Computable General Equilibrium Models:
Tools for Undergraduate Teaching in Economics

What the Project is About

- Course curriculum and CGE model developed and used in senior research seminars at the U.S. Naval Academy

- Course develops computable general equilibrium (CGE) models as a technology tool for hands-on learning in undergraduate economics

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For the Teacher

- Uses state-of-the art CGE models and databases available for free on the internet (www.GTAP.org and www.GAMS.com)

- Uses menu-driven CGE models and Excel – no prior experience in CGE models or programming code is necessary to teach the course

- Curriculum is appropriate for research seminars, independent study, or as a supplemental tool for real world policy analysis in economic theory courses

For the Student

- CGE models are a laboratory in which to conduct controlled economic experiments and learn how to use economic theory to anticipate and explain results

- Curriculum assumes previous undergraduate coursework in micro and macro economics

- Curriculum provides hands-on applications and case studies to illustrate and solidify theory from public finance, international trade, economic development, labor economics and environmental policy courses

Student Accomplishments

Examples of student research topics in U.S. Naval Academy senior research seminars using the CGE model curriculum:

- Falling union wages in the U.S. auto sector
- Economic development and trade policy reform in Tanzania
- Oil price rise and Dutch Disease in Venezuela
- China's CO_2 emissions and taxes
- The U.S. FAIR Act – options for U.S. tax reform
- Greece's agricultural trade policy options
- The decline of Italy's couture fashion industry
- U.S. labor immigration

Models and Databases

- Models
  - Global Trade Analysis Project (GTAP) CGE
  - "TUG-CGE" GAMS-based CGE model

- Database
  - GTAP
  - 2004 base year (Version 7)
  - 113 countries/regions
  - 57 industries

Database: the Social Accounting Matrix (SAM)

	Act.	Comm.	Factor	Ind. tax	Direct tax	Reg. HH	HH	Gov't.	S-I	Trd mar-gin	ROW	Total
Activities		17,952										17,952
Commodities	7,920						6,926	1,529	1,991	19	889	19,273
Factors	9,096											9,096
Indirect Tax	936	20					30					987
Direct Tax			1462									1,462
Regional household			6731	987	1,462							9,179
Household						6,956						6,956
Government						1,529						1,529
Savings-Investment			903			694				21	372	1,991
Trade Margin		40										40
Rest-of World		1,261										1,261
Total	17952	19,273	9096	987	1,462	9,179	6,956	1,529	1,991	40	1261	
Source: GTAP												

Exercises and Economic Concepts

- Model development – relate data to undergraduate economics:
  - Macroeconomics: national income accounts, trade deficit, foreign borrowing
  - Microeconomics: production input requirements, intermediate goods and primary factors, technology and productivity
  - Indirect and direct tax instruments: income taxes, production taxes, sales taxes, tariffs and export taxes

Exercises and Economic Concepts

- Food fight, US Agricultural Subsidies
  - Production and the role of subsidies
- How Immigration can Lift Wages
  - Factor supply shocks, the role of factor substitution in production
- Energy Price Increases
  - World price shocks, terms of trade changes

Exercises and Economic Concepts

- ## US Tariff Elimination
  - Tariffs, import substitution elasticity in consumption, trade and welfare

- ## Income Taxes vs. a National Sales Tax
  - Direct and indirect taxes, tax policy and government revenue

Resources

- "Tools for Undergraduates" (TUG) CGE

  website: http://www.usna.edu/Users/econ/thier/tug/tug.html
  GAMS based model and exercises

- Burfisher, Mary. *Introduction to Computable General Equilibrium Models* (forthcoming), Cambridge University Press

  GTAP based model and exercises

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