



# Center for Global Trade Analysis Newsletter

## GTAP Technical Paper - Systematic Sensitivity Analysis

### Systematic Sensitivity Analysis with Respect to Correlated Variations in Parameters and Shocks

by Horridge, Mark and Ken Pearson

GTAP Technical Paper No. 30

We show how you can carry out systematic sensitivity analysis (SSA) with respect to parameters and/or shocks, which vary according to a specified covariance matrix. You can use the existing SSA tools in RunGTAP or RunGEM to do this if your model is implemented in GEMPACK.

Those SSA tools assume that all parameters or shocks are varying independently (i.e., the distributions of all parameters or shocks are uncorrelated) or together (i.e., are completely correlated). The techniques in this paper remove those restrictions. However, users need to make small modifications to the TAB file for the model. Different modifications are needed for different SSA scenarios.

Further, the standard SSA procedure built into RunGTAP and RunGEM allows you to compute the sensitivity of model results either with respect to variations in parameter values or with respect to variations in shock values, but you cannot vary both parameters and shocks at the same time. Our discussion concentrates on the parameter case. However, we later show how shock variation may be modelled as a type of parameter variation. This opens the door to simultaneous variation of shocks and parameters.

We include worked examples of the techniques described, based on the standard GTAP Model.

### *About the Authors*



Pearson

Ken Pearson is the originator of the GEMPACK software suite which is widely used by members of the GTAP Network. He also taught in two dozen GTAP Short Courses. Anyone who has benefited from his lectures or labs will appreciate the fact that he started his career as a theoretical mathematician, and he retains that same parsimonious rigor when teaching about methods for economic modeling. Ken has also created many valuable innovations which have changed the way we do our work. A good example of this is AnalyseGE, a tool which brings together theory, data, parameters and results to allow the AGE modeler to quickly understand what is driving a particular result.



Horridge

Mark Horridge has made wide-ranging contributions to the GTAP Network. He has long been notable for his creative economic modeling as well as his ability to create software products solve real needs. RunGTAP revolutionized the way the short course is taught, allowing for easy entry into global CGE modeling. Mark's SPLITCOM utility is widely used to disaggregate the GTAP Data Base for specific policy applications. And TASTE, co-authored with David Laborde puts into individual members' hands the capacity to do sophisticated trade policy analysis of the sort that was recently only possible in the leading international organizations.

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## GTAP Needs Your I-O Table!

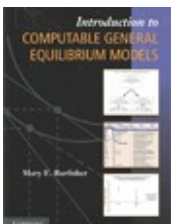


Individuals who contribute an I-O table for the GTAP Data Base will receive a **FREE** copy of the data base. By GDP and population size, the top 8 countries not yet in GTAP are Saudi Arabia, Israel, Algeria, Qatar, Libya, Iraq, Puerto Rico, and Syrian Arab Republic.

Other I-O tables in serious need of updating are those listed in the GTAP Chopping Block. These are countries with I-O tables prior to 1993 (Hong Kong, Zimbabwe, Tanzania, and Uganda). These countries will not be included in the GTAP 8 Data Base unless we receive more recent I-O tables.

For further information about how to contribute, please visit: [www.gtap.agecon.purdue.edu/databases/contribute/](http://www.gtap.agecon.purdue.edu/databases/contribute/).

## GTAP Resource Center Highlights



### Introduction to Computable General Equilibrium Models

By Mary Burfisher

This book is a practical, introductory, how-to guide to CGE models. It provides intuitive and graphical explanations of the economic theory that underlies a CGE model and provides many examples and hands-on exercises.



Burfisher

The databases used in textbook examples and model exercises can be downloaded from the GTAP website at: [www.gtap.agecon.purdue.edu/resources/res\\_display.asp?RecordID=3485](http://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=3485). This book is available for purchase from Cambridge University Press and Amazon.

### GTAP 7 Land Use Data Base

In line with the release of the version 7 GTAP-AEZ Land Use Data Base, the Center for Global Trade Analysis is also providing the GIS files that were used to construct the data base. Specifically, these files contain the fractional land cover data for each grid cell, at 0.5 x 0.5 degree resolution. The land cover data is available for 7 land types.

Please be aware of the limitations of these GIS files. The version 7 release represents an update of the original, version 6 data base, the documentation for which should be read in conjunction with this update. Details regarding the procedures and assumptions used to update these files can be found in GTAP Research Memorandum No. 19. In order to access these files, users must first be a subscriber of the GTAP 7 Data Base and the GTAP Satellite Data and Utilities.

## GTAP Network Sightings



April 25, 2011—Washington DC, USA

Andres Garcia (World Bank)  
Csilla Lakatos (International Trade Commission)  
Nelson Villoria (Purdue)  
Tom Hertel (Purdue)  
Maros Ivanic (World Bank)  
Betina Dimaranan (IFPRI)  
Amer Ahmed (World Bank)  
Amanda Leister (ERS/USDA)  
Carlos Ludena (Inter American Development Bank)  
Simeon Ehui (World Bank)

## GTAP Events

### 2011 African Short Course in Global Trade Analysis

*"Introduction to Applied General Equilibrium Analysis in a Multi-Region Framework"*

The Center for Global Trade Analysis recently held the 2011 African Short Course in Global Trade Analysis from April 10-16 at the United Nations Conference Centre in Addis Ababa, Ethiopia.

In total, 24 individuals from 15 different countries participated in this course which was co-sponsored by the United Nations Economic Commission for Africa, the African Trade Policy Centre and the World Bank.

The short courses in global trade analysis are long-standing offerings of the Center for Global Trade Analysis which introduce participants to a standardized framework for conducting global trade analysis in an applied general equilibrium setting. The course also provides participants with ample hands-on training with software that has been tailored to global trade analysis and gives participants the opportunity to interact with economists working on global trade and resource use issues while becoming part of the international GTAP Network.

For further information, please visit: [www.gtap.agecon.purdue.edu/events/Short\\_Courses/2011-African/](http://www.gtap.agecon.purdue.edu/events/Short_Courses/2011-African/).



2011 African Short Course  
Participants

### 14th Annual Conference on Global Economic Analysis

*"Governing Global Challenges: Climate Change, Trade, Finance and Development"*

June 16-18, 2011 | Ca' Foscari University of Venice, San Giobbe Campus | Venice, Italy

The overall theme of the conference is "Governing Global Challenges: Climate Change, Trade, Finance and Development" with minor sub-themes on environment and climate; trade; distributional and equity issues; dynamics and growth; energy supply and security; international health issues; poverty, employment and development; conflicts; natural resources supply and security; methodology; and software and data.

For further information, please visit: [www.gtap.agecon.purdue.edu/events/conferences/2011/](http://www.gtap.agecon.purdue.edu/events/conferences/2011/).



Ca' Foscari University of Venice  
Venice, Italy

### 19th Annual Short Course in Global Trade Analysis

*"Introduction to Applied General Equilibrium Analysis in a Multi-Region Framework"*

August 6-12, 2011 | Purdue University | West Lafayette, Indiana, USA

The objectives of this course are to introduce participants to a standardized framework for conducting global trade analysis in an applied general equilibrium setting, provide hands-on training with software that has been tailored to global trade analysis and give participants the opportunity to interact with economists working on global trade and resource use issues while becoming part of an international network.

A select group of participants, representing 13 different nations, have been chosen to participate in this course.

For further information, please visit: [www.gtap.agecon.purdue.edu/events/Short\\_Courses/2011/](http://www.gtap.agecon.purdue.edu/events/Short_Courses/2011/).



Purdue University  
West Lafayette, USA

## Center for Global Trade Analysis Activity

### Publications and Presentations

Farzad Taheripour and Wallace E. Tyner, "Global Land Use Changes and Consequent CO<sub>2</sub> Emissions due to US Cellulosic Biofuel Program: A Preliminary Analysis," Workshop on Cellulosic Ethanol Land Use Change Modeling with GTAP, University of Chicago, March 25<sup>th</sup>, 2011.

Kemal Sarica and Wallace E. Tyner, "Analysis of US Renewable Fuels Policies Using a Modified MARKAL Mode," Workshop on Cellulosic Ethanol Land Use Change Modeling with GTAP, University of Chicago, March 25<sup>th</sup>, 2011.

Wang, Michael Q; Jeongwoo Han, Zia Haq; Wallace E. Tyner; May Wu; and Amdad Elgowainy. "Energy and greenhouse gas emission effects of corn and cellulosic ethanol with technology improvements and land use changes." *Biomass and Bioenergy*, in press 2011.

Hertel, T. and Stephanie Rosch (2011), "Climate change and agriculture: Implications for the world's poor", VoxEU.org, 17 March.

Narayanan, Badri G. (2011), *The Political Economy of Work by David Spencer*, Journal of Economic Issues, 45(1): 254-5.

Narayanan, Badri G. and Pankaj Vashisht (2011). *Impact of Foreign Investment on Indian Auto Industry* in eds. Shahid Ashraf and Shahid Ahmed. Regional and Multilateral Trade in Developing Countries, Routledge India, London. pp 294-323.

### New Staff Member



Miller Woods

The Center for Global Trade Analysis is also pleased to welcome Monica Miller Woods as the Managing Director. Monica joins the Center from the University of Indianapolis where she was Executive Director for Alumni Relations. Monica is a graduate of Ball State University and holds an M.A. in Communications and a B.S. in Journalism/Public Relations. Monica has also earned a Certificate in Organizational Management from the University of Arizona and is a Certified Meeting Professional from the Convention Liaison Council.

Monica's primary responsibilities at the Center for Global Trade Analysis include managing the day-to-day operations; maximizing graduate student, staff and financial resources; creating new and enhancing existing strategic partnerships; and increasing local and global awareness through marketing, communication and outreach strategies.

## About GTAP



### Center for Global Trade Analysis

Department of Agricultural Economics  
Purdue University  
403 West State Street  
West Lafayette, Indiana 47907-2056  
United States

Phone: +1 (765) 494-4267

Fax: +1 (765) 496-1224

E-mail: [contactgtap@purdue.edu](mailto:contactgtap@purdue.edu)

Web: [www.gtap.agecon.purdue.edu](http://www.gtap.agecon.purdue.edu)

The Global Trade Analysis Project is coordinated by the Center for Global Trade Analysis, which is housed in the Department of Agricultural Economics at Purdue University.

The Center for Global Trade Analysis' mission is to provide leadership in economic policy analysis through better data, fostering collaboration, and research.

Guidance and financial support for the project is provided by the GTAP Consortium, which consists of national and international agencies, with further support provided by sales of the GTAP Data Base.

If you are interested in learning more about GTAP and the Center for Global Trade Analysis, please visit our website: [www.gtap.agecon.purdue.edu](http://www.gtap.agecon.purdue.edu).

