

**U. S. International Trade Commission
Report on GTAP Related Activities**

For

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The United States International Trade Commission (USITC) uses GTAP to analyze global trade issues and to evaluate the potential impacts of prospective trade policy changes, in response to requests from the United States Trade Representative (USTR) and Congress. Recently, the GTAP data and model have been applied to analyze China's IPR policies, and the effects of Brazil's tariff preferences under Mercosul on U.S. agricultural exports, as well as the effects of certain nontariff measures (NTMs) in third-country markets on both U.S. and Brazilian food and agricultural exports. In addition, the GTAP database was used to provide trade-policy related technical assistance to the Senate Finance Committee, the House Ways and Means Committee, and the USTR on a variety of topics related to trade policy.

As part of the USITC's mission of providing analytical support to executive and legislative branches, USITC staff conducted a study of the effects on the United States of improved policies and practices to protect intellectual property rights in China (USITC, 2011c). Econometric analysis provided estimates of the potential increases in exports of U.S. goods and services resulting from improved policies, and then applied these trade changes to GTAP to estimate effects on the U.S. economy. These effects were then imposed in a GTAP simulation to obtain other effects (GDP and wages). In addition to sensitivity analysis regarding the magnitudes of the econometrically estimated effects, the study explored the implications of different assumptions about labor markets, i.e., flexible vs. fixed labor wages.

In the Brazil study (USITC, 2012), the GTAP model was the basis of a quantitative analysis of the economic effects of preferential tariffs negotiated between Brazil and its Mercosul trading partners on U.S. and Brazilian exports of meat, grain, and oilseed products, as well as the economic effects of selected nontariff measures (NTMs) on U.S. and Brazilian exports of meat, grain, and oilseed products in major third-country export markets. Several standard GTAP sectors in food and agriculture were disaggregated to identify the meat, grain, and oilseed products that were the focus of the study. The land use statistics in

the standard GTAP database were also modified to identify several types of land endowments based on the work of Lee, Hertel, Sohngen, and Ramankutty.¹

In collaboration with Monash University, the USITC continues work on the highly detailed dynamic USAGE-ITC model with additional sectoral and policy detail, including detailed treatment of sweeteners, ethanol, and biomass sectors, the modeling of land use in U.S. agriculture involving 72 types of land, and the explicit modeling of TRQ policies. Work on the USAGE-ITC model also influences the USITC's contribution of the U.S. data for the GTAP database. The USAGE-ITC model was applied in Seventh Update of *Significant U.S. Import Restraints* that was requested by the USTR (USITC 2011d). The USAGE-ITC model is easily linkable to the GTAP model, and will offer interested parties a new U.S. model with powerful capabilities. In December 2011, Peter Dixon and Maureen Rimmer gave a sixth Short Course at the USITC on the use of the model.

To extend and expand our ability to analyze the evolving structure of the U.S. economy, the USITC in collaboration with Monash University, is building a new dynamic general equilibrium model, USAGE 2.0, based on the USAGE-ITC framework. By employing the Bureau of Economic Analysis' annual input-output (I-O) tables and other annually updated economic statistics, the model delivers extensive dynamic detail and, importantly, the ability to incorporate timely updates in years to come with the release of each new I-O table and other related statistics. The new model has approximately 65 sectors, in contrast to the 500+ sectors featured in the USAGE-ITC model. As in USAGE-ITC, the new model retains substantial regional disaggregation that distinguishes all FTA partners by agreement and trade preference program. Thanks to the structural relationship of the USAGE-ITC model and USAGE 2.0, the new dynamically rich USAGE 2.0 can improve the quality of USAGE-ITC forecasts by exploiting the dynamic data available from the annual USAGE 2.0 model, while retaining the commodity and industry detail of the USAGE-ITC model that is based on the benchmark BEA I-O tables (i.e., linking the two models). Other extensions are underway, including differentiating households (in both consumption and factor ownership), and allowing for top-down disaggregation of U.S. regional effects. In support of this and other USAGE developments, the USITC has established an informal consortium with other Federal Government users of the USAGE model, principally the International Trade Administration of the Commerce Department and the Economic Research Service of the Department of Agriculture, though

¹ Lee, Hertel, Sohngen, and Ramankutty, "Towards An Integrated Land Use Data Base for Assessing the Potential for Greenhouse Gas Mitigation," GTAP Technical Paper No.25, December 2005.

USAGE has also been used in studies for the Department of Homeland Security and the Federal Aviation Administration.

The research team at USITC has continued our research efforts on analyzing global value chains and modeling processing trade. Based on time series global I-O table release from WIOD project, we estimated bilateral trade in value-added terms for 41 WIOD countries and decompose bilateral intermediate goods trade and value-added trade into the portion that was absorbed by direct importers, the portion that was returned to the exporting country and the portion that was re-exported to other countries at country/sector level. We also integrated China and Mexico's I-O tables with version 8 GTAP database by a quadratic mathematical programming model to minimize the deviation between the new data and the original GTAP data. Both reporter and partners trade statistics and relative reporter reliability indexes by country/sector/ major end use categories (intermediate, capital and consumption goods) computed by Mark Gehlhar were used in the data reconciliation process. The new database covers 63 countries and 41 sectors for 2004 and 2007 (Wang *et al.*, 2012). Parallel to this work, a sequential dynamic AGE model has been build around this database (Koopman *et al.*, 2012). We are also cooperating with OECD staff to develop a data reconciliation framework which integrates individual country's national account statistics (supply and use tables) with detailed bilateral trade data. We are testing the model using most recent version of WIOD database and detailed bilateral trade statistics from OECD bilateral trade database by industry and end-use category aim at regular update time series global IO tables.

In a major data and model development project at the USITC, we are in the process of constructing an FDI database focusing on services, providing data on country of origin, host country, and sector of investment. Further, the project should collect assessments of barriers to FDI in order for the USITC to use these assessments in policy analysis. The FDI in services project will serve as the basis for our research on the relationship between FDI, domestic employment, and its effects on the services sector. Prior efforts at modeling FDI in a CGE framework use FDI stocks as a proxy for allocating foreign affiliates output and sales data. For example, the FTAP model uses U.S. FDI data as a basis for allocating these data for all other countries. However, according to Beugelsdijk *et al.*, 2010, FDI stocks are a biased measure of the activity of foreign affiliates. By contrast, our project makes use of foreign affiliate operations data, which allows us to directly estimate sales and value added shares of foreign affiliate activity by country of ownership and sector. We also use a broader set of countries (from Eurostat

database) to make these estimates. We have produced a new dataset to further the literature on the behavior of FDI. The dataset is foreign affiliate sales and value added data on a three dimensional basis, by host country, source country and sector. It comprises 129 host countries, 129 source countries, 28 sectors based on the current GTAP v8 classification. The dataset allows us to disaggregate the GTAP database to explicitly represent the activities of foreign affiliates and serves as an input into a FDI-GTAP model (Lakatos and Fukui, 2012a) that permits the analysis of the behavior of foreign affiliates within the context of a general equilibrium framework. We have extended the standard comparative static GTAP model to explicitly represent FDI and the activities of foreign affiliates. While in standard GTAP model in a given region there is one representative firm that produces a single consumption good, in the GTAP model with FDI we differentiate between domestic firms and foreign owned affiliates of multinational companies that produce a different varieties using heterogeneous production technologies. The model is calibrated on the GTAP v8 database complemented with global foreign affiliate statistics data described in detail in Fukui and Lakatos (2012) and the FDI stocks data Boumellassa *et al.*, 2007. We have used this framework to analyze FDI barriers in retail services. As a result of intense pressure from different stakeholders, the Indian government has recently suspended its decision to allow foreign direct investment in the retail services sector in India (Lakatos and Fukui, 2012b). On the one hand, allowing foreign retailers such as Walmart, Carrefour or Tesco is seen to threaten the existence of millions of small traditional stores and street vendors that dominate the Indian retailing industry. On the other hand, corporate retailers can lower prices for Indian consumers by improving the efficiency of the retail services industry while bringing investment and know-how.

Quantitative analysis of nontariff trade measures remains important to the USITC's efforts in the modeling of trade, and this research continues to focus on quantification of NTM's for use in models such as GTAP and USAGE. In 2012, we explored new quantitative techniques in the course of our Congressionally mandated study into the effect of NTMs on U.S. and Brazilian food and agricultural exports to third markets (USITC 2012).

The following USITC public studies or papers by USITC economists completed during 2011 and 2012 contain research based on, or relevant to, the GTAP model and database:

Monographs

USITC, 2011a, *U.S.-Korea Free Trade Agreement: Passenger Vehicle Sector Update*, USITC Publication 4220, March. Available at <http://www.usitc.gov/publications/332/pub4220.pdf>.

USITC, 2011b, *China's Agricultural Trade: Competitive Conditions and Effects on U.S. Exports*, Investigation No. 332-518, USITC Publication 4219, March. Available at <http://www.usitc.gov/publications/332/pub4219.pdf>.

USITC, 2011c, *China: Effects of Intellectual Property Infringement and Indigenous Innovation Policies on the U.S. Economy*, USITC Publication 4226, May. Available at <http://www.usitc.gov/publications/332/pub4226.pdf>.

USITC, 2011d, *The Economic Effects of Significant U.S. Import Restraints: Seventh Update 2011*, Investigation No. 332-325, USITC Publication 4253, August. Available at <http://www.usitc.gov/publications/332/pub4253.pdf>.

USITC, 2012, *Brazil: Competitive Factors in Brazil Affecting U.S. and Brazilian Agricultural Sales in Selected Third Country Markets*, Investigation No. 332-524, USITC Publication 4310, May. Available at <http://www.usitc.gov/publications/332/pub4310.pdf>.

Manuscripts

Fox, Alan and Carolyn Fischer, 2012, "Comparing policies to combat emissions leakage: border carbon adjustments versus rebates," *Journal of Environmental Economics and Management*. Available online March 3, 2012, <http://dx.doi.org/10.1016/j.jeem.2012.01.005>.

Fox, Alan, 2012, "Climate Policy and Fiscal Constraints: Do Tax Interactions Outweigh Carbon Leakage?" Presented at the Association of Environmental and Research Economists meeting, Asheville, NC, June 5. This will also appear in a special issue of *Energy Economics*, forthcoming.

Fukui, Tani and Csilla Lakatos, 2012, "A Global Database of Foreign Affiliate Activity," Presented at 15th Conference on Global Economic Analysis, Geneva, June 27-29. Available at https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=3809.

Gotor, E. and M. Tsigas, 2011, "The Impact of the EU Sugar Trade Reform on Poor Households in Developing Countries: A General Equilibrium Analysis," *Journal of Policy Modeling*, 33(4), July-Aug., pp. 568-582. Available at <http://www.sciencedirect.com/science/article/pii/S0161893810000943>.

Koopman, R., W. Powers, Z. Wang and S.J. Wei, 2010, "Give Credit Where Credit Is Due: Tracing Value Added in Global Production Chains," NBER Working Paper 16426, September.

Koopman, R., W. Powers, Z. Wang and S.J. Wei, 2010, "Give Credit Where Credit Is Due: Tracing Value Added in Global Production Chains," presentation, OECD and World Bank Technical Workshop: New Metrics for Global Value Chains, September, Paris.

Koopman, R., M. Tsigas, Z. Wang, and Xin Li, 2012, "U.S.-Asia trade: dynamic general equilibrium linkages," April.

Lakatos, Csilla and Tani Fukui, 2012a, "Extending the GTAP model to incorporate FDI and foreign affiliates."

Lakatos, Csilla and Tani Fukui, 2012b, "Liberalization of FDI in Retail Services: a Fast Death Instrument for India?" Presented at 15th Conference on Global Economic Analysis, Geneva, June 27-29. Available at https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=3943.

Wang, Zhi, Mark Gehlhar, and Marinos Tsigas, 2012, "How a Global Inter-Country Input-Output Table with Processing Trade Account Can be constructed from GTAP Database," Presented at 15th Conference on Global Economic Analysis, Geneva, June 27-29.