

GTAP at the World Bank 2011-12

The World Bank continues to use GTAP heavily in several modeling studies by different units, including the Development Prospects Group, the Development Research Group, and the International Trade Department of Poverty Reduction and Economic Management (PRMTR), and various Regions.

Development Prospects Group (DECPG)

GTAP data underpins the two global models in DECPG - i.e. Linkage and Envisage. This year we have been using GTAP7 data in several applications, but as of July 2012 we will be using GTAP8 data in the forthcoming applications. Maryla Maliszewska conducted the global modeling applications at DECPG during the past one year. Although Dominique van der Mensbrugge has moved to FAO, he continues to collaborate. Delfin Go oversees the modeling work program in DECPG.

Here are this fiscal year's applications based on the GTAP7 data base:

1. Mobility in Latin America: are countries in the region becoming middle class societies?
Maurizio Bussolo, Elie Murard and Maryla Maliszewska, September 2011

This paper analyses the effect of demographic and economic changes over the 2005-2030 period on the income distribution around the world. It uses a macro-micro modeling framework linking CGE Linkage results with GIDD (Global Income Distribution Dynamics) model, which includes household income distributional data for 121 countries and 90 percent of the world population. The analysis focuses especially on the shifts in the middle class' size and composition in Latin America and the Caribbean. Results show that, between 2005 and 2030, there will be quite a lot of upwards mobility towards the middle class across the world. In the Latin American and Caribbean region this group of people will expand dramatically, almost doubling its size relative to the population.

2. "China 2030 Building a Modern, Harmonious, and Creative High-Income Society
Reaching 'Win-Win' Solutions with the Rest of the World" World Bank, 2012

CGE simulations using the Envisage model are employed in two supporting reports of the China 2030 study. Supporting Report 5 "Reaching 'Win-Win' Solutions with the Rest of the World" presents two scenarios for the evolution of the global economy and China's role through 2030 along with accompanying shifts in sectoral structure of production, relative prices and international trade. Further, in Supporting Report 3 "Seizing the Opportunity of Green Development in China" Envisage has been applied to study the impact of carbon pricing through taxation simulating the introduction of a carbon price in China starting in 2015. Carbon pricing impacts such variables as the cost of emissions reduction, structural shifts in the economy and the pace of economic growth.

Researchers involved in CGE modeling: Maryla Maliszewska, Hans Timmer and Dominique van der Mensbrugge

3. Global Monitoring Report 2012 “Food Prices, Nutrition, and the Millennium Development Goals” World Bank, 2012

In chapter 1 on “Poverty and Food Price Developments” Envisage has been used to analyze the long term trends in demand and supply of food products and the likely developments in food prices through 2025 in two alternative scenarios given the assumptions of productivity growth and demographic trends. A baseline scenario is consistent with official forecasts; and an alternative scenario that involves a doubling of agricultural productivity growth in developing countries relative to the baseline. Both scenarios take into account the consequences of growth and productivity enhancements on climate change and vice versa.

4. Global Development Horizons 2012 “Capital for the Future: Changing patterns of Global Investment Needs and Opportunities”. World Bank, 2012

The standard version of Linkage model has been modified to capture the impact of structural variables such as the level of financial development, quality of institutions or the comprehensiveness of the social security system on savings and investment patterns across the world. Investment activity is allocated across a global portfolio, which responds to country-specific economic growth, real interest rates, and the level of financial development and the quality of institutions. Saving behavior, in contrast, is governed by a country’s demography, financial maturity, and social protection system, along with economic per capita growth. The globally-consistent baseline for saving and investment trends then yields investment and saving outcomes at the global, national, and sectoral levels, along with implied net cross-border capital flows, and additional relative prices of interest (such as the wage-rental ratio). Variations to the baseline result are obtained from changing the paths for the major variables of interest. The report will be completed in the fall of 2012.

Researchers involved in CGE modeling: Maryla Maliszewska, Maurizio Bussolo

Future DECPG studies that use GTAP data may include – (i) An Africa regional study that examines the implications of external shocks and global economic slowdown on African countries (Devarajan, Go, Maliszewska, and van der Mensbrugghe); (ii) a global backcasting exercise to understand how the interactions of global and country structural change shape worldwide economic development during recent decades, and how changes in comparative advantage, globalization and other factors explain the structure of production, consumption, and trade at the global, regional and country level (Go Maliszewska, Timmer, van der Mensbrugghe and others); and (iii) A series of country studies of structural change at the country level, based on an extended version of MAMS (Maquette for MDG simulations) that incorporates concepts from product-space analysis will draw on GTAP data for cross-country patterns of disaggregated service sector value added as well as a supplement to other sources for country-level social accounting matrices. A first application on Morocco is in progress and will be completed during FY2013; other country applications are expected to start during FY2013. (Hans Lofgren and others).

Development Research Group (DECRG)

Biofuel studies

Govinda Timilsina and others extend the ENVISAGE model to incorporate biofuels and land-use change for their global biofuel study. The database was GTAP. The list of outputs of this project include:

Govinda R. Timilsina, John Beghin, Dominique van der Mensbrugge and Simon Mevel (2012). “The Impacts of Biofuel Targets on Land-Use Change and Food Supply: A Global CGE Assessment.” *Agriculture Economics*, Vol. 43, pp. 315-332.

Govinda R. Timilsina, Simon Mevel, and Ashish Shrestha (2011). “Oil price, biofuels and food supply.” *Energy Policy*, Vol. 39, No. 12, pp. 8098-8105.

Govinda R. Timilsina, Stefan Csordás and Simon Mevel (2011). “When does a carbon tax on fossil fuels stimulate biofuels?” *Ecological Economics*, Vol. 70, pp. 2400 – 2415.

“The Impacts of Biofuel Targets on Land-Use Change and Food Supply: A Global CGE Assessment,” World Bank Policy Working Paper 5513, Dec. 2010 (Timilsina, Beghin, van der Mensbrugge, and Mevel).

“Biofuels and Climate Change Mitigation: A CGE Analysis Incorporating Land-Use Change,” World Bank Policy Working Paper 5672, June 2011 (Timilsina and Mevel).

“World Oil Price and Biofuels: A General Equilibrium Analysis”, World Bank Policy Working Paper 5673, June 2011 (Timilsina, Mevel and Shrestha).

“Under What Conditions Does a Carbon Tax on Fossil Fuels Stimulate Biofuels?” World Bank Policy Working Paper 5678, June 2011 (Timilsina, Csordás and Mevel)

“Impacts of Large Scale Expansion of Biofuels on Global Poverty and Income Distribution.” World Bank Policy Working Paper 6078. June 2012 (Timilsina and Cororaton).

A related blog regarding the potential future impacts of increased biofuels use is available at: <http://blogs.worldbank.org/developmenttalk/potential-future-impacts-of-increased-biofuels-use>

Services Trade

Aaditya Mattoo 's Services Trade Policy Restrictions database at DEC Trade and Integration (DECTI) will become public very soon and available via GTAP. Surprisingly little is known about policies that affect international trade in services. Previous analyses have focused on policy commitments made by countries in international agreements but these commitments do not in many cases reflect actual policy. The new Database collects and makes publicly available

information on services trade policy assembled in a comparable manner across 103 countries, 5 sectors (telecommunications, finance, transport, retail and professional services) and the key modes of service supply. It contains richly textured policy information as well as a preliminary quantification of policy measures. Researchers are encouraged to improve on the quantification methods, e.g. by estimating AVEs, so that the data can be used by modellers. The database is best seen as a first response to the strong demand for better information from policy-makers, negotiators, researchers and the private sector. Through feedback from various interested parties the database may evolve into a collectively created public good – along the lines of a “wiki-database.”

Two forthcoming Bank Policy Research Working Papers describe the contents of the database:

Ingo Borchert, Batshur Gootiiz, Aaditya Mattoo, 2012. “Guide to the Services Trade Restrictions Database.”

Ingo Borchert, Batshur Gootiiz, Aaditya Mattoo, 2012. “Policy Barriers to International Trade in Services: Evidence from a New Database.”

Food Prices

Will Martin, Maros Ivanic, and others at DEC Agriculture & Rural Development (DECAR) used the GTAP database in the following instances:

Maros Ivanic, Will Martin and Hassan Zaman, 2012. “Estimating the Short-Run Poverty Impacts of the 2010–11 Surge in Food Prices”. *World Development*, 2012

Background paper: “Food Prices, Nutrition, and the Millennium Development Goals.” First chapter in Global Monitoring Report 2012

“Analysis of long-run household responses to price changes” as a part of a validation exercise organized by PREM (P128237)

Background paper: *Food price watch* (April edition)

Aid for Trade

Berritella and Zhang apply a multi-country CGE model to measure the effectiveness of alternative aid for trade categories. Their findings show that aid for trade policies expand trade and alleviate international income inequalities across regions. The draft paper is available- “A Global Perspective on Effectiveness of Aid for Trade.”

Poverty Reduction and Economic Management – International Trade Department (PRMTR)

The PREM Trade anchor provides a training course on trade data and tools including an afternoon session introducing staff to GTAP and other trade CGE models. The course is offered to staff about twice a year.

Bernard Hoekman, Joe Francois and others have used GTAP in a paper on duty-free, quota-free access (for the G20/DFID):

Joseph Francois, Bernard Hoekman, Miriam Manchin, Alessandro Nicita and Marcelo Olarreaga “Opening Markets for the Poorest Countries: Assessing the Effects of Duty-free Quota-free Access to the G20” World Bank, mimeo.

Joe Francois is using the GTAP database in project to expand the Trade Department’s trade competitiveness diagnostic toolkit to include services.

Both projects have been affected by data problems and challenges that are well known to the GTAP community: ensuring that GTAP has a more comprehensive coverage of bilateral trade (tariff) preferences and further disaggregating the coverage of services trade.

South Asia Region

In the South Asia Region, GTAP database and GTAP model are used in two papers below:

Sahin S., Markandya A., Sagar A. and M. Muthkumar, 2012, "Estimating economy-environment linkages of urban pollution mitigation in an economy-wide model for India", accepted to the 15th GTAP conference -- Geneva, Switzerland and Volume II, in the World Bank study entitled " Diagnostic Assessment of Environmental and Natural Resources Degradation in India" (*under review*).

Sahin S., Powell A., Meisner C. and D. Meerbach, 2012, " An Economic Evaluation of Climate Change Impact on the Sava River Basin", presented at the UNECE 3rd Workshop on Water and Adaptation to Climate Change -- Geneva, Switzerland, April 25-26th, 2012.

Africa Region

David Tarr and others are involved in an upcoming project on East Africa where they will build a multi-region model using the new GTAP8 data. The model will be a multi-region model extension of the small open economy models they have developed previously that incorporates foreign direct investment in services with endogenous productivity effects. It will also attempt to estimate the impact of improved trade facilitation and reduction of non-tariff barriers. Finally, it will assess impacts of a union of COMESA, SADC and the East African Customs Union.

See also the regional study above by DECPG and the Africa region.

Latin America Region

See joint study on mobility in Latin America by DECPG and the Latin America region.