World Bank Agency Report to GTAP Consortium Board

The following reports outline key aspects of GTAP-related work by users of GTAP models and/or data at the World Bank:

Calvin Zebaze Djiofack

For the "Mexican Fiscal Challenges" project, we are using a GTAP SAM (from 2007) to calibrate a Mexican CGE model. The Mexican CGE model allows to assess the likely consequences of proposed tax reforms focusing on macroeconomic as well as sectoral aspects. The particular reforms chosen for analysis—including an introduction of uniform VAT rate and the introduction of the VAT rate for all goods except unprocessed foods—have been proposed with an eye towards selecting reform actions which are most likely to have substantial revenue and growth effect. Thanks to GTAP CO_2 emissions data, we have also been able integrate an environmental module allowing us to simulate different carbon tax options.

For the ongoing Honduran Country Economic memorandum (CEM), we are using a SAM extracted from GTAP to build a CGE model allowing to simulate various growth scenarios. The Honduran CGE model, a recursive-dynamic model, allows us to assess the effect of public interventions in addressing the following constraints to growth identified by the CEM: Human capital development, public expenditures inefficiency, and gap in energy and transports infrastructures. Effects of interventions are captured not only in terms of growth, but also in terms of poverty reduction and shared prosperity using the micro-simulation approach.

Finally, for our ongoing trade report on the "New Trade Environment and Opportunities for the Poor in the Caribbean" we are planning to rely on the GTAP data framework to build a Caribbean (regional-wide) model allowing to assess the effect of trade policies and trade logistics. Caribbean countries face a rapidly changing trade environment, which presents opportunities and challenges for economies highly dependent on external markets. The proposed model should allow us to estimate the effect of relative prices change generated by the increasing economic influence of the new growth poles (e.g. BRICs), and the proposed redesign of the CARICOM regional trade agreement which aims to optimize competitiveness gains from the ongoing implementation of the Caribbean Single Market Economy (CSME) and to implement a number of preferential trade agreements with regional neighbors.

Calvin also ran a well-attended training course on CGE analysis.

Delfin Sia Go

i) Structural change in a dynamic world - is a global exercise using double or multiple calibration of GTAP data at different points in time and using the maximum entropy method to recover parameters such as productivity or share parameters by key regions/countries and sectors, This is to understand how the interactions of the 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. This work will likely involve Maryla Maliszewska, Hans Timmer, Dominique van der Mensbrugghe (FAO), Sherman Robinson (IFPRI), and others.

ii) The gains of migration revisited - aims to extend the World Bank global model at DECPG for a forward-looking economic analysis of policies towards the relaxation of barriers to the international movement of labor. This exercise will provide a regionally differentiated quantitative assessment of the incremental economic benefits resulting from an easing of existing restrictions on international migration flows, and to throw new light on the linkages between migration and trade flows. This work will likely involve Dirk Willenbockel (Institute of Development Studies at the University of Sussex), Maryla Maliszewska, Hans Timmer, and Dilip Ratha.

iii) R23 Model - The proposed project will develop a simple global computable general equilibrium (CGE) model by providing a global dimension (such as trade flows) to the 1-2-3 model with an up-to-date database for about 244 countries. It will be ideal for quick analysis of the impact of macroeconomic policy and external shocks in developing countries, including low-income countries with severe data constraints. By simplifying the structure and enhancing the macroeconomic variables in the GTAP data, it will add some 130 additional countries, which otherwise are grouped in various regional aggregates. This work will involve Scott McDonald Scott (Oxford Brookes University), Karen Thierfelder (US Naval Academy), and Terrie Walmsley (Center for Global Trade Analysis (GTAP), Purdue University and The University of Melbourne, Australia)

David Tarr

Ed Balistreri, Jesper Jensen, Hidemichi Yonezawa and David Tarr have initiated work on a global multi-region CGE model than can assess the impact of trade costs in sub-Saharan Africa, with a focus on Kenya and Tanzania. They are using GTAP 8 for this project. They decompose trade costs into three categories: costs that can be lowered by **trade facilitation; non-tariff barriers;** and the quality and costs of **business services.** They are building on the new release of the DECTI services database to estimate the ad valorem equivalents of barriers to services trade. This research extends our SOE framework to a global model by incorporating foreign direct investment in services and endogenous productivity effects from additional varieties of imperfectly competitive goods and services, via the Dixit-Stiglitz variety mechanism. They shall also assess efforts to reduce trade costs through the Tripartite free trade area being negotiated among the East African Customs Union (EAC), the Common Market of East and Southern Africa (COMESA) and South African Development Community (SADC).

Elena Ianchovichina

Maros Ivanic and I have two things: a paper and a modification to version 8 GTAP Data base

Paper is titled "Turkey's Expanding Ties to the Middle East and North Africa: Who Benefits and by How Much?" The data base modification involves extending the country coverage of GTAP 8

and include 7 economies: Lebanon, Jordan, Syria, Iraq, WB&G, Algeria, and Libya. We also update the tariff information in GTAP to reflect the implementation of Euromed, Pafta, and bilateral preferences. This makes a particular difference for the tariff rates of Jordan, Lebanon, Syria, and Iraq.

Emiko Fukase and Will Martin

As part of a book project on "A Free Trade Area of the Democracies?" organized by Peterson Institute for International Economics, we work on a book chapter to analyze the economic implications of a potential FTA between India and the United States. Since both countries have been negotiating other FTAs such as the US-EU agreement, the Trans-Pacific Partnership (TPP), and India's agreement with the Association of Southeast Asian Nations (ASEAN) and the EU, we analyze the welfare effects of a US-India FTA, given the other FTAs are in place. Using the standard GTAP model, the paper illustrates mechanisms through which goods and services liberalization might cause welfare changes and quantifies trade creation vs. trade diversion consequences, terms of trade effects and the output effects under different policy scenarios.

Hans Lofgren

I am pursuing CGE analysis at the country level, mostly medium- to long-run strategy analysis addressing fiscal issues, sectoral issues (production and trade), and/or human development, such as performance in terms of MDG indicators. As part of the construction of databases for such analyses, I am frequently extracting data from GTAP SAMs, which serve as complements to other data, i.e. I do not use a GTAP SAM as is but may draw on specific pieces of information such as sectoral data or shares in value-added, factor incomes, exports or imports. This information may be for a specific country or to analyze cross-country patterns. In the latter context, GTAP data may be used to compute revealed comparative advantage indicators (using export data) or parallel indicators based on value added. (For more on this work, visit www.worldbank.org/mams.)

Maros Ivanic and Will Martin

Are undertaking a series of studies examining the implications of food price changes and other shocks for poverty. One study considers the short and the long-run implications of higher food prices using a database and associated model of households for over 30 countries. Another examines the extent of pass-through of higher food prices into domestic markets since 2006 and asks whether we are seeing a slow-evolving food crisis. A third considers the implications of technical changes in different sectors for poverty rates.

Maryla Maliszewska

We use the GTAP 8 data base to run our global models Linkage and Envisage. Most recently we completed our flagship Global Development Horizons "Capital for the Future: Saving and Investment in an Interdependent World". The modeling was used to support the analysis in all three chapters of the report creating a comprehensive analysis of the future paths of saving,

investment and capital flows in the global economy through 2030. The modeling was done in cooperation with Maurizio Bussolo. see www.worldbank.org/CapitalForTheFuture

Joint work with Shantayanan Devarajan, Delfin S. Go, Israel Osorio-Rodarte and Hans Timmer using the Linkage model focuses on "Stress-testing the recent growth and poverty performance of African countries". Our findings indicate that Africa's long-term growth is rather impervious to a prolonged recession in high-income countries. That record is, however, much more sensitive to a disruption of capital flows to the region, and to internal shocks, such as civil conflicts and drought, even if the latter are moderately designed according historical magnitudes. This paper will be presented at the upcoming GTAP conference.

Maurizio Bussolo

With Maryla Maliszewska, I have been engaged with the Brazil country team on their work with the government and have been preparing a background document on the future of Brazil China economic relationships using a global CGE model and GTAP data. With Denis Medvedev (now senior country economist for India) we are working on preparing a study on the outlook of inequality in light of the forthcoming 'favorable' demographic wave; the study is again based on a global CGE with a strong component of micro analysis based on household survey data;

Michael Toman

Organized a training course on Computable General Equilibrium (CGE) Modeling and Green Growth Analysis: State of the Art and Advances in Practice, December 13, 2012

Computable general equilibrium (CGE) modeling has played a key role in several Bank-supported "green growth" country studies, as well as in a variety of analytical work on clean energy, agricultural adaptation, water resource allocation, and other topics. As interest in and application of CGE methods increase, Bank staff need to have a solid understanding of what CGE can and cannot do, and how the state of the art is advancing over time. Thomas Hertel (Purdue, GTAP Secretariat) kicked off the discussion with an overview on the state of the art with CGE. Christoph Bohringer (Oldenburg) spoke on connecting bottom-up technology representations into CGE frameworks. Stefan Boeters (Netherlands Bureau for Economic Policy Analysis) addressed Modeling employment in CGEs. Thomas Rutherford (Wisconsin) wound up the presentations with comments on incorporating water into CGE frameworks.

Sebnem Sahin

Sebnem's GTAP related activities for FY13 are as follows. As usual, she will circulate these papers when finalized.

> ❖ Marinos Tsigas and Sebnem Sahin (2013), *An Evaluation of the EU-Turkey Custom's Union within A CGE analysis*, background paper (in progress) for the World Bank report commissioned by the EU.

The study examines the economic impact of (i) widening the customs union to cover EU trade with Turkey in agricultural products, and (ii) finalizing non-compliant FTAs where the EU FTA partner countries would extend duty-free access to imports of industrial products from Turkey.

> ❖ Sebnem Sahin and David Meerbach (2013), *An Economic Analysis of Urban Floods in the Sava River Basin (SRB) Countries*, (in progress) to be presented at the 4th UNECE Workshop on Water and Climate, Geneva 24-26 June, 2013.

The GTAP-CGE model is used to estimate the economic impact of foods in urban areas of SRB countries. Based on the outputs from the hydrological model developed for the SRB, statistics from EMDAT and the literature, different flood risk scenarios are developed. The economic impact of urban floods is evaluated (in terms of GDP) for the business as usual scenario and various scenarios with adaptation to climate change and/or risk mitigation measures.

> ❖ Sebnem Sahin (2013), *Economy-wide Impacts of Climate Change on Water and Agriculture in China*, (in progress), WB "Adaptation Economics in China in Water and Agriculture" study project.

The GTAP - CGE model is used to analyze the potential economic impact of the climate scenarios (2012-20) developed for China by the project team. This simulation exercise aimed to determine the direction of potential impact and give an order of magnitude in terms of trade, consumer prices, GDP, etc. The GTAP-CGE model is used to estimate the most pessimistic climate scenario's impact on the Chinese economy. The CMU and the client appreciated the CGE analysis.

> ❖ Within the framework of India vision 2030 report a CGE workshop was organized by the World Bank and the Madras School of Economics (MSE) in Chennai (December 16-17th, 2012). *Badri Narayan* accompanied the World Bank team. Badri presented the basics of the GTAP model and gave a hands-on training. *Sebnem Sahin* presented the GTAP model developed for the environmentally sustainable growth strategy paper for India and shared a simplified version of the developed GTAP model with the workshop participants. MSE Director/students, Government officials, distinguished academics (including Rajesh Chadha, Ganesh Kumar, Vijay Ojha) working on the Indian economy attended the workshop.

> ❖ Sebnem Sahin, Ferhan Salman (IMF), Cleo Kawasaki (ADB) and Dan Biller (2013), have started working on a WB_IMF_ADB joint paper on the "*Macro-Economic Impact of Energy Sector Reforms in Pakistan*". The GTAP standard model is used to estimate the macro-economic impacts of several projected reforms including energy mix diversification, price adjustments in natural gas sector and capacity increase in electricity sector. The preliminary results of the analysis were presented (and highly appreciated) during a meeting held in London between the Pakistani officials and IFIs in May 2013.

Will Martin, Peter Minor and Terrie Walmsley

The GTAP Center in cooperation with the World Bank and Bank of the Netherlands Partnership Program (BNPP) successfully concluded a 2 year project to improve CGE modeling and data in the Africa region by:

·   Training 10 African researchers in constructing IO tables for the GTAP database;

·   Developing a new GTAP based model (MyGTAP) and data tool for including multiple households, foreign aid and remittances for analysis of poverty;

·   Mentoring five African researchers to produce policy papers on the vulnerability of African countries to external shocks (recently presented at PEP meeting in Cape Town);

·   Augmenting the public-domain GTAP Africa database with five new African countries and updating outdated data for five more (total of 10 counties new or updated)

Many of the outputs from this project can be found at
https://www.gtap.agecon.purdue.edu/databases/Africa/v2/default.asp */