

2013 Agency Report

Inter-American Development Bank (IDB) Integration and Trade Sector (INT)

The Inter-American Development Bank (IDB) is committed to support regional integration in Latin America and the Caribbean as one of the five strategic mandates set by the Governors of the Bank in the context of the latest General Capital Increase. The Integration and Trade Sector of the IDB (IDB-INT) is responsible for coordinating and carrying out the CGE modeling activities of the IDB.

In 2012: IDB-INT worked in three fronts: (i) the CGE model and databases; (ii) the capacity building program; and (iii) the CGE regional network.

(1) Upgrade of the CGE model and update of the database

New IDB-INT CGE Model for Energy-Climate Change

In 2012 INT has developed a new CGE model to respond to the most urgent policy questions related to the energy and climate change agenda. The new model is based on the IDB-INT global, multi-region, dynamic recursive CGE model and has been extended to accommodate an energy-related module. The extension allows to account for the carbon emissions of productive activities and to analyze climate change adaptation and mitigation policy options. It comprises 15 sectors¹ and 16 regions² (countries), with the full disaggregation of 11 Latin American regions. As such it is the most complete model available to explore climate change issues in Latin American countries. The model is benchmarked to 2007 and its dynamic specification allows to project policy outcomes to 2025.

The most significant extension is its use of multi-stage, nested structure in production process to capture energy-related substitutions at different stages. Production is modeled with a series of nested CES functions, allowing for different degree of substitutability among inputs. To ensure that capital and energy are complements in the short-run, but substitutes in the long-run, elasticity of substitution between capital and energy composite is set smaller than that of the value-added and energy composite.

The model incorporates an energy module.³ The aggregate level of CO₂ emissions for each country and region in the model is estimated on the basis of CO₂ emission coefficients, which are fixed coefficients with respect to energy demand. The emission coefficients are estimated at the sectoral levels for each energy source (coal, crude oil, natural gas, refined oil and electricity) in intermediate input demand in production activities and consumptions in final demand accounts. The model considers autonomous energy-efficiency improvements (AEEI). As energy consumption per unit of output tends to decline over time due to improvements in production technologies, technological changes, innovations and shifts in energy mix, energy consumption also changes. The AEEI parameters are estimated for each energy source for each industry over time, and held fixed in each period. In essence, the parameter estimates are based on baseline

¹ The sectors in the model are: 5 energy-related sectors-coal, crude oil, gas, refined oil and electricity-plus crops; livestock; forest and fishery; food products; light manufactures, chemical and metals; vehicles and machinery; construction; transport; and other services.

² Countries and regions in the model are: United States; EU 27; Japan; China; Mexico, Central America, Bolivia-Ecuador; Colombia, Peru, Venezuela, Argentina; Brazil; Chile; Paraguay-Uruguay; Caribbean, and rest of World.

³ Among the GHGs, this study only deals with CO₂ emissions from the consumptions of fossil fuels (coal, natural gas and crude and refined oil).

projections on economic growth and energy consumptions rather than historic trends on overall energy-efficiency improvements. In order to match CO₂ emissions from different energy sources with projected targets, energy-specific CO₂ emission adjustment factor is endogenized in the baseline, but all of these variables are held fixed in the policy simulations.

Main Data Sources and References

The energy-climate change CGE model was built on Social Accounting Matrices (SAMs) with base year 2007. Its database greatly rely on GTAP (Global Trade Analysis Project) database version 8 (2007 base year) for data such as trade flows, intermediate transactions, final demands and other sectoral data. In order to complete SAMs and key macroeconomic projections up to 2025, however, the following official data sources and references were used. Base year GDP is based on the World Development Indicators 2011 (World Bank). LABORSTA (labor force statistics database, ILO, 2010) is used for demographic statistics. Docquier and Marfouk (2004, 2005) and Docquier and Lowell and Marfouk (2008) dealing with the global labor statistics are used to disaggregate labor force and aggregate employment by skill category (low, mid, high). The Government Finance Statistics 2011 (IMF) are employed to update government fiscal receipts and expenditures, the current account and the balance of payment statistics. In addition, Country Profile and Country Report (Economic Intelligence Unit, 2011) are used in order to incorporate country-specific data and information for greater accuracy. For carbon dioxide (CO₂) emissions from each economic activity, the GTAP-E energy data (2007) is used to estimate the sectoral emission coefficients, which are then fully reconciled with the national carbon emissions in each country reported by the US Energy Information Administration (EIA, 2011). The aggregate CO₂ emissions for each country over 2025 are also due to the US EIA projections by energy source.

(2) Capacity building program

In 2012, IDB-INT continued its CGE capacity building program on two Latin American countries, Peru and Nicaragua. In the first case, the 2012 activity represents the third phase of the program oriented to six different governmental agencies, the Ministry of Economy and Finance (MEF), the Ministry of Foreign Trade and Tourism (Mincetur), the Ministry of Production (Produce), the Ministry of Agriculture (Minag), the Ministry of labor (Mintra), the National Institute of Statistics (INEI), and the Central Bank (BCR). In Nicaragua, two CGE capacity building activities were delivered and congregated around fifteen officials from the Ministry of Promotion, Industry, and Trade.

(3) The research network

The Fourth Regional Conference on General Equilibrium Models was held in Guayaquil, Ecuador, on April 19-20, 2012. The meeting brought together researchers and experts from international organizations and universities from Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Uruguay, as well as Australia, France, Spain, and the United States. The participants had the opportunity to deepen their knowledge of CGE modeling, analyze its importance for public policy, and discuss cutting-edge analytical issues. Approximately 25 research projects were presented, covering the areas of international trade, regional integration, and climate change and environmental policies for sustainable development, as well as methodological approaches to modeling. The event was organized by the Integration and Trade Sector (INT) of the Inter-American Development Bank (IDB) and the Economic Commission for Latin America and the Caribbean (ECLAC), in collaboration with the ESPAE Graduate School of Management of the Escuela Superior Politécnica del Litoral from Ecuador.

In 2013, the IDB-INT will work in three areas of intervention, namely the upgrade of the CGE model and databases, the release of new empirical publications, and the capacity building program on modeling techniques.

(1) Upgrade of the CGE model and update of the database

In order to provide technical assistance in evaluating trade and integration policies, there are three geographic groups where CGE simulations can shed light on the potential impact of major policy developments that have been proposed or are in relatively advanced stages of negotiation. In each of these cases, the fundamental characteristic is one of convergence: superimposing broader trade agreement architecture on a group of countries that have many FTAs already in place that cover subsets of the participants. Full evaluations for each trade agreement would be made from the viewpoint of Latin America. These are:

1. Trans-Pacific Partnership (TPP)
2. Transatlantic Trade and Investment Partnership (TTIP)
3. Pacific Alliance (Mexico-Chile-Colombia-Peru)

The basic concept follows the INT trade-focused model (recursive dynamic), with 15 sectors, 32 regions (17 countries and regions for LAC). The 2007 SAM database is fully constructed on the basis of GTAP database version 8.2 (2007 base year). In order to examine comprehensive packages of trade agreements, the model is designed to accommodate five policy variables: (i) applied tariffs; (ii) NTBs for merchandise trade; (iii) ad valorem equivalents for services trade barriers; (iv) trade facilitation; and (v) rules of origin (tentative).

Data sources for each policy variable are: (i) GTAP database for tariffs; (ii) NTBs estimations are based on World Bank's NTB dataset for merchandise (Looi Kee, H., Nicita, A. and Olarreaga, M. (2009)); (iii) Services barriers estimations are based on CEPII working paper (Lionel Fontagné, L., Guillin A., and Mitaritonna, C., (2011) (iv) GTAP database for trade wedges between CIF and FOB; and (v) Petri et al. (2011) or compliance cost approach, which is under consideration.

(2) Capacity building program

In year 2013, the Bank will provide technical assistance to fifteen officials from the Ministry of Promotion, Industry, and Trade of Nicaragua to build institutional capacity to perform quantitative evaluations of the economic and poverty effects of trade reforms. This activity represents the third phase of the program.