Use of GTAP data base and model at the World Bank

I.   GTAP Model and Data Base Usage

A. Global studies

1. Belt and Road Initiative

The Envisage model and GTAP data v. 10 have been used to analyze the economic and environmental implications of the Belt and Road Initiative. The goals of the analysis were to (i) study the impacts of infrastructure improvements on Belt and Road Initiative and non–Belt and Road Initiative countries' trade flows, growth, emissions and poverty; and (ii) suggest policies that would help maximize gains from the Belt and Road Initiative–induced trade cost declines. For details see Maliszewska and van der Mensbrugghe (2019) below. It was a background paper to the flagship report on the BRI (https://www.worldbank.org/en/topic/regional-integration/brief/belt-and-road-initiative).

2. Trade tensions

The GLOBE model in combination with the GTAP database v. 9 were used to study the best response of developing countries in case trade tensions between the United States and certain trading partners escalate into a full-blown trade war. For details see Devarajan et. al. (2019) below.

The Linkage model and GTAP data base v. 9 have been used in the analysis of the trade tensions. The analysis appeared in the MTI Practice note (link below) and the Trade Post blog (https://blogs.worldbank.org/trade/how-are-trade-tensions-affecting-developing-countries) and several briefs to the management. For details see Freund et. al. (2019) and Constantinescu et. al. (2019) below. The World Bank, WTO and the IMF also held a modeling workshop on Modeling Trade Tensions using DSGE and CGE models in April 2019.

3. Multi-regional FTAs

The Linkage model and GTAP database v. 9 have been used to evaluate the trade, growth, poverty and income distribution implications of various mega-regional free trade agreements such as Comprehensive and Progressive Trans Pacific Partnership (CPTPP), Regional Comprehensive Economic Partnership (RCEP) and Free Trade Area of the Asia-Pacific (FTAAP). For details see Maliszewska, Olekseyuk and Osorio-Rodarte (2018) below. Similar study has also been conducted for Indonesia and its publication is forthcoming.

B. Regional studies

1. AFCFTA

The Envisage model and GTAP v. 10 database are being used to evaluate the implications of the Africa Continental Free Trade Area for the members and their trading partners. The top-down approach using

CGE simulations and microsimulations based on the Global Income Distribution Dynamics model are applied to study the implications of reductions in tariffs, NTMs in goods and services and trade facilitation measures on trade, growth, output, as well as employment of female and male workers, their wages, poverty and income distribution.

2. Morocco

The standard GTAP Model and GTAP database v. 10 have been used to estimate the effects of the adoption of the ECOWAS Common External Tariff by Morocco for the policy note on "Should Morocco join the Economic Community of West African States (ECOWAS)?".

3. Sub-Saharan Africa

The teams have been using GTAP SAMs to

- Build a CGE model for Namibia (as part of the forthcoming Systematic Country Diagnostics)
- Compute multipliers of mining GDP for a number of Southern Africa and comparator countries (as part of a regional study on mining in Southern Africa)

4. Kingdom of Saudi Arabia

The project used GTAP 9 data to inform a dynamic global CGE model, ENVISAGE over 2015-2030. In collaboration with the GTAP team, the World Bank updated the KSA data in the original GTAP data base using the KSA 2015 IO table provided by authorities. The project aimed to assess the risks of external impacts of climate response measures (understood as the policy-induced component of a low-GHG emissions transition) and quantify the hedging value of national policy choices. Scenarios assessed included: i) Change in administered prices for fuels for each (intermediates and final) consuming sector ; ii) Change in the quotas of natural gas to each consuming sector; iv) Vertical industrial policies in selected sectors (picking winners) to reduce costs, increase multifactor productivity and support exports of selected products/sectors. Two stylized diversification policies (horizontal industrial strategies) were also simulated as different ways of re-investing resource rents in the economy.

5. Central America

The report Unleashing Central America's growth potential studies the growth performance and factors that have affected Central America in the past, documents how current global trends and domestic initial conditions interact to shape future opportunities and challenges and proposes domestic and regional policy options to respond to them. The project uses the GDyn model and database to estimate the impacts of different policy experiments among which trade policy reform; productivity growth; economic diversification; improvement in human capital and insertion of women in the labor market.

6. Brazil

Brazil Trade Reform Support. The GTAP Database V9 was adjusted with the latest trade flow and protection data, as well as with latest IO tables for Argentina and Brazil. The database was disaggregated to 80+ sectors, to allow for careful analysis of particular subsectors of interest for these countries and the benchmark year was updated to 2015. The work aims to support the Ministry of Industry, Foreign Trade and Services of Brazil for different trade liberalization scenarios.

7. South Asia

Labor Migration as a Sustainable Driver for Growth in South Asia. International migration for temporary employment is a critical component of South Asia's development, from both the jobs and remittance flows perspectives, and represents a major flow of trade-in-services. This project uses the GMig model and database to carry out an economic simulation analysis of counterfactual policy reform scenarios within the region. The various scenarios focus on the economic impact of greater diversification of migrant destinations beyond GCC countries.

8. Pakistan

Pakistan: Trade Strategy Development The Ministry of Commerce of Pakistan commissioned the economic analysis of different tariff reform scenarios and their impact on Pakistan. The analysis relied on the LINKAGE CGE model and the GTAP pre-release 10 database.

9. Sri Lanka

The study of Sri Lanka is based on Linkage and GTAP data base v. 9. The analysis focuses on para-tariff liberalization and free trade agreements with selected trading partners. The CGE-GIDD approach is extended to analyze the impacts of trade reforms on employment of female workers as well as employment at the sub-national level. The study is forthcoming.

II Publications

Constantinescu, Cristina; Mattoo, Aaditya; Ruta, Michele; Maliszewska, Maryla; Osorio-Rodarte, Israel. 2019. Global Trade Watch 2018 : Trade Amid Tensions (English). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/549841559120768022/Trade-Amid-Tensions

Global trade growth slowed in 2018 amid a weakening of economic growth in China and the Euro Area and rising trade protectionism. The volume of trade grew by 3.8 percent, down from 5.4 percent in 2017, but has shown signs of reviving in the first quarter of 2019. However, the U.S. tariff increases implemented in early May and China's response might change the outlook. Trade policy developments are mixed. Restrictive trade measures imposed during 2018 affected 3.8 percent of world merchandise trade, nearly three times the share affected in any of the years since the global financial crisis of 2009. Tit-for-tat tariffs between the United States and China alone affected 2.0 percent of world merchandise trade in 2018. Ongoing trade tensions affected importers in United States and China significantly. While trade fell in targeted products, prices at the border did not change as compared with non-targeted products. Even though trade in stickier inputs tends to be relatively resilient in the short term, if trade tensions are not resolved, existing global value chains are likely to be disrupted in the longer term. It is in the long-term interest of industrial and developing countries for trade tensions to be resolved through a multilateral approach and World Trade Organization reforms.

Devarajan, Shantayanan & Go, Delfin Sia & Lakatos, Csilla & Robinson, Sherman & Thierfelder, Karen E., 2018. "Traders' Dilemma : Developing Countries' Response to Trade Disputes," Policy Research Working Paper Series 8640, The World Bank.

If trade tensions between the United States and certain trading partners escalate into a full-blown trade war, what should developing countries do? Using a global, general-equilibrium model, this paper first simulates the effects of an increase in U.S. tariffs on imports from all regions to about 30 percent (the average non-Most Favored Nation tariff currently applied to imports from Cuba and the Democratic Republic of Korea) and retaliation in kind by major trading partners': the European Union, China, Mexico, Canada, and Japan. The paper then considers four possible responses by developing countries to this trade war: (i) join the trade war; (ii) do nothing; (iii) pursue regional trade agreements (RTAs) with all regions outside the United States; and (iv) option (iii) and unilaterally liberalize tariffs on imports from the United States. The results show that joining the trade war is the worst option for developing countries (twice as bad as doing nothing), while forming RTAs with non-U.S. regions and liberalizing tariffs on U.S. imports ("turning the other cheek") is the best. The reason is that a trade war between the United States and its major trading partners creates opportunities for developing countries to increase their exports to these markets. Liberalizing tariffs increases developing countries? competitiveness, enabling them to capitalize on these opportunities. The GLOBE model in combination with the GTAP database were used.

Freund,Caroline; Ferrantino,Michael Joseph; Maliszewska,Maryla; Ruta,Michele. 2018. Impacts on Global Trade and Income of Current Trade Disputes . MTI pratice note,no. 2. Washington, D.C. : World Bank Group.
https://hubs.worldbank.org/docs/ImageBank/Pages/DocProfile.aspx?nodeid=30274470

Global trade tensions have worsened and developing countries stand to see depressing investments as global uncertainty grows. On July 6, the United States implemented a first round of tariffs on 34 billion dollars of imports from China, as part of 50 billion dollars in announced tariffs; China retaliated with tariffs on an equivalent amount of imports from the United States. Both countries have announced the potential for additional tariffs. The new tariffs will depress bilateral trade, disrupt global supply chains, and increase demand for substitutes from other countries. Because both countries are large, there will also be terms of trade effects. The biggest effects of tariff escalation on developing countries are likely to come from depressed investment, as firms delay investments because of uncertainty over market access. This note assesses the implications of tariffs between China and the United States on developing countries, using a Computable General Equilibrium (CGE) Model, under three scenarios. The analysis shows that a US-China tariff escalation could reduce global exports by up to 3 percent (674 billion dollars) and global income by up to 1.7 percent (1.4 trillion dollars) with losses across regions

Laborde, David & Lakatos, Csilla & Martin, William J., 2019. "Poverty Impact of Food Price Shocks and Policies," Policy Research Working Paper Series 8724, The World Bank.

In the event of large swings in world food prices, countries often intervene to dampen the impact of international food price spikes on domestic prices and to lessen the burden of adjustment on vulnerable population groups. While individual countries can succeed at insulating their domestic markets from short-term fluctuations in global food prices, the collective intervention of many countries may exacerbate the volatility of world prices. Insulating policies introduced during the 2010-11 food price spike may have accounted for 40 percent of the increase in the world price of wheat and one-quarter of the increase in the world price of maize. Combined with government policy responses, the 2010-11 food price spike tipped 8.3 million people (nearly 1 percent of the world's poor) into poverty. The MIRAGRODEP model in combination with the GTAP database were used.

Maliszewska,Maryla; Engel,Jakob; Arenas,Guillermo Carlos; Kotschwar,Barbara R. 2019. Small African Economies in a More Uncertain Global Trade Environment : The Potential Impact of Post-AGOA Scenarios for Lesotho . Policy Research working paper,no. WPS 8861. Washington, D.C. : World Bank **Group.**
https://hubs.worldbank.org/docs/ImageBank/Pages/DocProfile.aspx?nodeid=31097007

This paper provides a forward-looking view of trade and its relevance for Lesotho's medium- and long-term development. It does this through computable general equilibrium analysis of potential impacts based on specific trade-related scenarios. The scenarios include the potential loss of American Growth and Opportunities Act preferences and preference erosion against competitors through, for example, a United States–Vietnam Free Trade Area. An immediate loss of American Growth and Opportunities Act preferences would have a significant economic impact that far exceeds that of a potential future United States–Vietnam Free Trade Area. If these preferences were suspended in 2018, Lesotho would face a loss of 1 percent in income by 2020, relative to the baseline, and exports of textiles and apparel would drop by 16 percent. The computable general equilibrium simulations stress the need to strengthen efforts to support structural transformation leading to diversification of export products and markets, improving backward and forward linkages, and lowering trade costs. The simulations also indicate that trade facilitation measures leading to an average decrease in trade costs of 2 percent per year would eliminate the negative consequences of the loss of American Growth and Opportunities Act preferences in terms of the loss of income. The changing external environment is likely to offer new opportunities to Lesotho's export industries in the medium term, including through regional integration under the Continental Free Trade Area.

Maliszewska, Maryla; Olekseyuk, Zoryana; Osorio-Rodarte,Israel. 2018. Economic and distributional impacts of comprehensive and progressive agreement for trans-pacific partnership : the case of Vietnam . Washington, D.C. : World Bank Group.
https://hubs.worldbank.org/docs/ImageBank/Pages/DocProfile.aspx?nodeid=29702508

Vietnam is evaluating the economic gains from deepening regional trade integration under free trade agreements. The two major new agreements include Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) to be signed in March 2018 following the US departure from the Trans-Pacific Partnership (TPP) in January 2017 and the Regional Comprehensive Economic Partnership (RCEP) in its 21st round of negotiations. At the cross-roads, this paper contributes to the ongoing discussion on further trade integration of Vietnam by evaluating the economy-wide and distributional implications supporting the continuation of CPTPP despite the US departure and following up with RCEP. The innovative use of a global dynamic computable general equilibrium model (CGE) linked with a top-down micro simulation model allow us to assess winners and losers within the country. This paper assesses economic and distributional impacts of Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP, sometimes referred to as TPP-11). The potential impacts of CPTPP are compared to those of Regional Comprehensive Economic Partnership (RCEP) and the original Trans Pacific Partnership (TPP-12) on Vietnam.

Maliszewska,Maryla; Van Der Mensbrugghe,Dominique. 2019. The Belt and Road Initiative : Economic, Poverty and Environmental Impacts . Policy Research working paper,no. WPS 8814.

China's Belt and Road Initiative aims to improve connectivity between China and more than 70 countries through infrastructure investment and regional cooperation. The initiative has the potential to accelerate significantly the rate of economic integration and development in the region, as trade costs decline. The goals of this paper are to (i) study the impacts of infrastructure improvements on Belt and Road Initiative and non–Belt and Road Initiative countries' trade flows, growth, and poverty; and (ii) suggest policies that would help maximize gains from the Belt and Road Initiative–induced trade cost declines. The analysis captures the trade costs reductions as a result of infrastructure improvements. The findings indicate that the Belt and Road Initiative would be largely beneficial. First, global income increases by 0.7 percent (in 2030 relative to the baseline). This translates into almost half a trillion dollars in 2014 prices and market exchange rates. The Belt and Road Initiative area captures 82 percent of the gain, with the largest percent gains in East Asia. Second, globally, the Belt and Road Initiative could contribute to lifting 7.6 million people from extreme poverty and 32 million from moderate poverty. Third, the initiative would lead to a modest increase in global carbon dioxide emissions, with a complex set of positive and negative outcomes at the national level for other types of emissions.