Use of GTAP data base and model at the World Bank 2019/2020

A. Global studies

1. COVID-19

The virus that triggered a localized shock in China is now delivering a significant global shock. This study simulates the potential impact of COVID-19 on gross domestic product and trade, using a standard global computable general equilibrium model. It models the shock as underutilization of labor and capital, an increase in international trade costs, a drop in travel services, and a redirection of demand away from activities that require proximity between people. A baseline global pandemic scenario sees gross domestic product fall by 2 percent below the benchmark for the world, 2.5 percent for developing countries, and 1.8 percent for industrial countries. The declines are nearly 4 percent below the benchmark for the world, in an amplified pandemic scenario in which containment is assumed to take longer and which now seems more likely. The biggest negative shock is recorded in the output of domestic services affected by the pandemic, as well as in traded tourist services. Since the model does not capture fully the social isolation induced independent contraction in demand and the decline in investor confidence, the eventual economic impact may be different. This exercise is illustrative, because it is still too early to make an informed assessment of the full impact of the pandemic. But it does convey the likely extent of impending global economic pain, especially for developing countries and their potential need for assistance.

Maliszewska, Maryla; Mattoo, Aaditya; Van Der Mensbrugghe, Dominique. 2020. *The Potential Impact of COVID-19 on GDP and Trade : A Preliminary Assessment (English).* Policy Research working paper; no. WPS 9211; COVID-19 (Coronavirus). Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/295991586526445673/The-Potential-Impact-of-COVID-19-on-GDP-and-Trade-A-Preliminary-Assessment

2. Trade tensions

Should the China-U.S. trade agreement prompt relief because it averts a damaging trade war or concern because selective preferential access for the United States to China's markets breaks multilateral rules against discrimination? The answer depends on how China implements the agreement. Simulations from a computable general equilibrium model suggest that the United States and China would be better off under this "managed trade" agreement than if the trade war had escalated. However, compared with the policy status quo, the deal will make everyone worse off except the United States and its input-supplying neighbor, Mexico. Real incomes in the rest of world would decline by 0.16 percent and in China by 0.38 percent because of trade diversion. China can reverse those losses if, instead of granting the United States privileged entry, it opens its market for all trading partners. Global income would be 0.6 percent higher than under the managed trade scenario, and China's income would be nearly 0.5 percent higher. By creating a stronger incentive for China to open its markets to all, an exercise in bilateral mercantilism has the potential to become an instrument for multilateral liberalization.

Freund, Caroline; Maliszewska, Maryla; Mattoo, Aaditya; Ruta, Michele. 2020. *When Elephants Make Peace : The Impact of the China-U.S. Trade Agreement on Developing Countries (English).* Policy Research working paper; no. WPS 9173. Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/925591583252308139/When-Elephants-Make-Peace-The-Impact-of-the-China-U-S-Trade-Agreement-on-Developing-Countries

3. Regional integration

This paper assesses and compares economic impacts of four actual and potential free trade agreements in the Asia-Pacific Region; Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP, sometimes also called TPP-11), the original Trans Pacific Partnership (TPP-12), the Regional Comprehensive Economic Partnership (RCEP), and the Free Trade Area of the Asia-Pacific (FTAAP). FTAs with a larger scale and wider membership are expected to produce higher aggregate gains in terms of increased GDP and trade flows. U.S. withdrawal from TPP-12 reduced estimated GDP gains for the TPP-11 countries by about half. For countries belonging to CPTPP and also negotiating RCEP, the potential gains from an agreement with both China and Korea are substantial, but not as large as if the United States were to re-join TPP-12. On a sectoral basis, significant structural shifts are observed for such sectors as food processing, wearing apparel, textiles, and transport equipment.

Ferrantino, Michael Joseph; Maliszewska, Maryla; Taran, Svitlana. 2019. *Actual and Potential Trade Agreements in the Asia-Pacific : Estimated Effects (English)*. Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/171731585114146413/Actual-and-Potential-Trade-Agreements-in-the-Asia-Pacific-Estimated-Effects

B. Regional studies

1. Impact of COVID on Sub-Saharan Africa

A computable general equilibrium model is used to evaluate the impact of the COVID-19 pandemic on sub-Saharan Africa relying on three scenarios: (i) a rapid and effective policy response in sub-Saharan Africa means that new COVID-19 cases disappear by early July 2020; (ii) a slow and ineffective policy response prolongs the pandemic through 2021;(iii) the same assumptions as in scenario 2, but in addition a closure of borders within the region reduces intra-regional trade to practically zero. The decline in regional GDP in 2020 relative to a reference scenario (where the pandemic never occurs) would range from 5.7 percent in the relatively optimistic scenario to 7.6 percent in the pessimistic (the crisis lasts into 2021). Among the four sub-regions considered in this study, Central Africa is the most affected, due to the presence of several oil exporters and the countries' relatively low preparedness for an epidemic. The pandemic would lower revenues from taxes and fees, while raising the need for expenditures, leading to a substantial deterioration in the fiscal deficit. Household income would plummet, as labor force participation would fall. The poor would be particularly affected, as many are employed in the agricultural or services sectors, where output would fall sharply. The reduction in agricultural production and decline in food imports would greatly increase food insecurity.

"Zeufack, Albert G.; Calderon, Cesar; Kambou, Gerard; Djiofack, Calvin Z.; Kubota, Megumi; Korman, Vijdan; Cantu Canales, Catalina. 2020. Africa's Pulse, No. 21, Spring 2020 : An Analysis of Issues Shaping Africa's Economic Future. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/33541 License: CC BY 3.0 IGO."

2. The African Continental Free Trade Area: Economic and distributional effects

This study quantifies the long-term economic and distributional implications of AfCFTA. It assesses the implications for economic growth, international trade, poverty, and employment implications—including for female and male workers. It quantifies the short- and long-term implications for tariff revenue. The study uses a global computable general equilibrium (CGE) model and a microsimulation

framework to quantify the agreement's impact. The CGE model is calibrated to the most recent database produced by the Global Trade Analysis Project (GTAP). The GTAP database is supplemented by additional data that quantifies other barriers to trade. To date, studies on the economic implications of Africa's regional integration have mainly focused on tariff and non-tariff barriers (NTBs) in goods. Our study extends the analysis to cover NTBs in services and trade facilitation measures. Most importantly, we extend the analysis to investigate the implications of AfCFTA for poverty, impacts on unskilled workers, and women.

3. Effects of Ebola Crisis in DRC and Neighboring countries

The current Ebola virus disease (EVD) in Democratic Republic of the Congo (DRC) is having a terrible cost in lives and illnesses. This tenth outbreak afflicting the country, one of the poorest and most fragile in the world (nearly 72 percent of the population is living on less than US$1.9 per day), is the second largest globally after the 2014-16 crisis in West Africa and the worst experienced by the DRC to date. The economic impact of the Ebola outbreak on DRC GDP would be insignificant if the crisis is rapidly contained and moderate if it spreads to three other DRC provinces and neighboring countries with subsequent border closures. The Ebola crisis would adversely affect all sectors of DRC's economy in the long-term. The magnitude of real GDP loss for DRC neighboring countries would vary depending on the degree of exposure of each country to the epidemic, including the contribution to GDP of their respective provinces that would be affected in case of regional spread. The impact of the Ebola outbreak on the DRC's fiscal framework would be modest if the crisis is rapidly contained but the fiscal situation could significantly deteriorate should the epidemic spread to three other provinces and neighboring countries. Under the optimistic scenario, tax revenue declines would be as low as US$18 million – less than 0.1 percentage point of GDP in 2020 – resulting in a slight worsening of the fiscal deficit in 2020, from -0.1 percent of GDP to -0.2 percent of the GDP. A spread of Ebola to countries neighboring the DRC would have a substantial negative impact on their fiscal situation. The loss of tax revenue in 2020 would be larger for Uganda (US$163 million), Tanzania (US$106 million), and Rwanda (US$104 million), but smaller for Burundi (US$24 million).

4. Mozambique and Malawi reducing trade costs

Applying Envisage and GTAP data base v. 10, we analyze the impact of removing non-tariff barriers and reducing trade costs in Malawi and Mozambique, as part of a broader analysis of targeted corridors in both countries. Results show that reducing trade costs and non-tariff barriers has a significant impact on both countries, in terms of real exports and real imports, real GDP, and welfare. Neighbor countries do not receive significant spillovers: only Tanzania and Zimbawbe increase their exports to the region.

5. Sustainable growth in Mongolia

Structural changes from policy reforms or external shocks have many indirect and complex repercussions on the economic activity of different sectors and on different segments of the population. The CGE model used for this analysis is the World Bank's dynamic global model, ENVISAGE. ENVISAGE is a flexible framework that has been successfully applied in numerous countries. The model is based on the GTAP 9 database, which contains a consistent set of Social Accounting Matrices (SAM) for 141 regions and 57 economic sectors; it is the standard database for global CGE models. The original GTAP database is aggregated for this analysis. The goal is to evaluate the potential impact in the Mongolian economy of structural changes in China and the impact of the Covid-

19 pandemic. In addition to our baseline (or reference scenario), we consider two sets of scenarios. In the first set of scenarios (1 to 4), we consider a series of structural changes in China. In particular, changes in the level and pattern of growth in China (i.e. a Chinese slowdown and rebalancing, respectively), a global transition to low carbon that affects the Chinese demand for Mongolian thermal and coke coal (used in electricity generation and energy intensive manufacturing sectors, respectively), and the impacts of an improved railroad connection between both countries. In the second set of scenarios (5 and 6), we analyze the expected impact of the Covid-19 pandemic in Mongolia based on two different assumption regarding the overall duration of this crisis. In our first scenario, growth in China slows down and the economy rebalances towards more consumption and less investment. As expected, the Chinese economic slowdown is translated into lower Mongolian exports to China.In the second scenario we analyze the impact of COVID pandemic in Mongolia. Mongolia will experience a -2.8% change in GDP in 2020 when compared to the baseline values. In the scenario with a fast recovery, in 2021 GDP will decrease by 0.6%, but if the recovery is slower, then GDP will be almost 2% lower in 2021. Mongolian sectoral exports show a decline mainly in the non-mining sectors, with manufacturing and agriculture exports decreasing the most. At the global level, Mongolia still fares better than other Asian countries and the rest of the World when comparing real GDP and export reductions.

6. Ex-Ante Evaluation of Sub-National Labor Market Impacts of Trade Reforms in Sri Lanka

A macro-micro simulation framework that links a Computable General Equilibrium (CGE) with the survey-based Global Income Distribution Dynamics (GIDD) model can be used for assessing the economic and distributional effects of macroeconomic shocks and policies. The methodology is used to assess the economic and sub-national labor-market impacts of a series of stylized trade policy options for the Sri Lankan economy over a 10-year time period, namely the impact of unilateral para-tariff liberalization, free-trade agreements with China or India, and a full-reform scenario. Simulation results show that more ambitious trade reform can result in larger gains in GDP, poverty reduction and exports, particularly in sectors employing a higher proportion of women. In the absence of additional policies, growth is not equally distributed. In all scenarios in which the Sri Lankan economy grows, the distribution of gains is regressive. Increasing labor demand for skilled workers is translated into larger skill wage premium – up to 1.1 percent with respect to a baseline. Implementation of full-trade reform accelerates concentration of economic activity in the western regions of Colombo, Gampaha and Kalutara. Net employment gains in the western regions would increase from 111 to 136 thousand in the full reform scenario, by 2028 and with respect to baseline conditions.

7. EU-Vietnam Free Trade Agreement

The EVFTA will bring significant benefits to the Vietnamese economy through higher growth, greater trade, and faster poverty reduction. Full implementation of the EVFTA could increase Vietnam's GDP by 2.4 percent, boost exports by 12 percent, and lift an additional 0.1 million to 0.8 million people out of poverty by 2030. It will also potentially help close the gender wage gap by 0.15 percentage points, particularly for households in the bottom 40 percent of income distribution. Further, if Vietnam simultaneously implements the EVFTA and CPTPP, its GDP could increase by up to 3.2 percent in the next decade. In addition to implementing trade agreements, if Vietnam adopts complementary domestic reforms to raise productivity, its GDP could increase further by 6.8 percent by 2030—4 percentage points more than the income gains *from the EVFTA alone.*

World Bank. 2020. *Vietnam : Deepening International Integration and Implementing the EVFTA (English).* Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/866871589557725251/Vietnam-Deepening-International-Integration-and-Implementing-the-EVFTA

8. Free trade agreements of Indonesia

As preferential trade agreements are growing in number and depth, assessment of their economic impacts has become more important to inform policy-makers facing a multitude of potential preferential trade agreements. This paper provides novel ex ante estimates of the impacts of two key preferential trade agreements currently negotiated by Indonesia, the largest economy in Southeast Asia. The paper then compares these estimates with those of other preferential trade agreements that Indonesia may negotiate in the future. To that end it, combines a dynamic, multi-country computable general equilibrium model and a microsimulation tool linking the macroeconomic results to household-level welfare. The results suggest that, among the preferential trade agreements considered, the European Union–Indonesia Comprehensive Economic Partnership Agreement (EU-CEPA) is expected to yield the largest gains for Indonesia in income, output, and exports. This result is due to a combination of large expected reductions in trade barriers and a high share of international trade between the partners. These macro effects translate into the highest expected income growth relative to the other preferential trade agreements at every point of the income distribution. However, the gains for the EU-CEPA are proportionately larger for richer households, unlike the other agreements considered. The regressive gains are mainly due to the increase in skill wage premia spurred by the additional demand for skill-intensive sectors, especially services.

Cali, Massimiliano; Maliszewska, Maryla; Olekseyuk, Zoryana; Osorio-Rodarte, Israel. 2019. *Economic and Distributional Impacts of Free Trade Agreements : The Case of Indonesia (English).* Policy Research working paper; no. WPS 9021. Washington, D.C. : World Bank Group. http://documents.worldbank.org/curated/en/926241569328187590/Economic-and-Distributional-Impacts-of-Free-Trade-Agreements-The-Case-of-Indonesia

C. Databases based on GTAP data or used in modeling

1. Updated the Export Value Added Database

The Export Value Added Database provides information on the domestic value added content of domestic output and exports using input-output tables from GTAP. Trade data is usually measured at transaction values, which are gross values, or value added plus domestic and foreign intermediate inputs. The measure of gross exports may undervalue (overvalue) the real contribution of a sector to trade if value added from this sector is embedded as inputs in other sectors' exports (or overvalue if exports embed other sector's value added inputs). Measuring trade on a value added basis, as achieved in the Export Value Added Database, overcomes this shortcoming. Thus this alternative measure to trade makes explicit the direct value-added contribution of a sector to domestic production as well as exports, as well as the linkages that the sector provides to all other sectors of the economy in terms of value added. This includes both forward linkages-the contribution of a particular sector as an input to others sectors' exports-and backward linkages- the contribution of all other sectors to a particular sector's exports

2. Gender Dissaggregated Labor Database

The Gender Disaggregated Labor Database (GDLD), jointly initiated with the forthcoming Trade and Gender report, contributes to fill in the gaps in cross-country comparable gender statistics on labor. By disaggregating employment and remuneration by activity, skill-level and gender at the 2-digit ISIC level, this database improves our ability to conduct analyses in support of the Jobs and Economic Transformation Agenda. The new data can be applied in various approaches e.g. descriptive statistics, econometrics, CGE models, and microsimulations. The GDLD builds on previous harmonization efforts of nationally representative household surveys and complements other data sets such as Global Jobs Indicators database.