

# GTAP Advisory Board Report 2018

## World Trade Organization

The World Trade Organization (WTO) has significantly raised its capacity to do in-house CGE-analysis in the last year. Together with the GTAP Center, the WTO Global Trade Model was developed. Together with DG Trade, the WTO is also working on a project to split up services trade by mode of supply. Furthermore, publications on various CGE-topics have been released.

### **Global Trade Model**

Compared to the facelift GTAP model, the GTM contains a series of additional features. First, the model is recursive dynamic, thus featuring endogenous capital accumulation. Second, the model features iso-elastic factor supply of land and natural resources. Third, it allows for changes in spending shares (for example changes in import shares or the share of labor income in total factor income) employing the twist-parameter approach developed by Dixon and Rimmer (2002) and a generalization of this approach. Fourth, price and quantity indices in the model are defined using the "ideal" index approach. Fifth, the model contains various options for the allocation of global savings, in particular rate-of-return sensitive investment allocation, investment allocation based on initial capital shares, fixed foreign savings, and fixed relative foreign savings. Sixth, the model will allow for the integration of margin services in final consumption. Seventh and finally, the model is flexible in its trade structure, allowing for a perfect competition setting with Armington preferences, but also for a setting with monopolistic competition, either with homogeneous firms (Ethier-Krugman) or with heterogeneous firms (Melitz), following the approach in Bekkers and Francois (2018) to nest the different structures in a general model.

The model has been applied in a dynamic study with scenarios on the impact of new digital technologies, as presented at the current GTAP-conference. Also studies on the effects of a potential trade war are conducted as well as on the effect of structural change in China.

### **Trade in services by mode of supply (TISMoS)**

The goal of this project, funded by the European Union, is to create an analytical dataset at the global level for the period of 2005 to 2015. Data will follow the sector structure as defined in EBOPS 2010. It will cover nearly 200 economies. It will be regularly updated against the joint data set produced by ITC, UNCTAD and WTO, using the established methodology. For establishing the methodology of this dataset, expertise of all stakeholders, that is, international organizations, data compilers and academics is leveraged. Newly arriving country case studies and pilot projects will be worked in and replace current estimates.

### **Planned CGE-Work**

Upcoming studies will be about the future of agricultural trade, a more thorough development of baseline projections, services trade, and short-run policy studies related to agricultural trade and trade policy in general.

In various applications the model will be further extended, especially the dynamics. The development of the baseline will involve extensions related to among others structural change, changing preferences over time or a more flexible utility function, other trade balance closures, and the use of the monopolistic competition model in dynamic projections. The studies of agricultural trade will involve among others an extended production structure, an extended modelling of energy, and endogenous land supply.

## Publications

### *Long run trends in international trade. The impact of new technologies*

We use the WTO Global Trade Model (GTM) to generate long-term projections on international trade and examine the potential impact of the development of digital technologies on trade. We examine the impact of three trends related to technological change: a reallocation of tasks because of robotization and digitalization, a larger use of ICT-services by other sectors (servicification), falling trade costs because of digitalization. We develop a core and convergence scenario for each of the three trends. Combining the three trends we find that they: (i) raise trade growth above growth in the baseline; (ii) weaken the baseline trend of catch-up of the developing countries in the core scenario; and (iii) have a limited impact on measures of the organization of global value chains such as imported intermediates in gross output.

### *The Welfare Effects of FTAs in Quantitative Trade Models: A Comparison of Studies about TTIP* Eddy Bekkers and Hugo Rojas-Romagosa (CPB). Forthcoming *World Economy*

We compare different methodological approaches to predicting the welfare effects of trade policy experiments. We focus on studies that estimate the economic effects of the Transatlantic Trade and Investment Partnership (TTIP). Methodologically the studies can be divided into those employing computable general equilibrium (CGE) models and structural gravity (SG) models. We compare and critically discuss differences in the estimated trade cost reductions and in the economic models employed, and how these can explain the relatively wide range of economic effects found in the different TTIP studies. We conclude that reasonable estimates of the welfare effects for the TTIP partners are between 0.5% and 2%.

### *A Parsimonious Approach to Incorporate Firm Heterogeneity in CGE-Models* Eddy Bekkers and Joseph Francois (WTI). Under review.

This paper proposes a parsimonious and intuitive way to incorporate Melitz-type firm heterogeneity in a CGE-model based on the conventional Armington trade structure. The Armington trade structure is extended with demand, supply, and trade cost shifters. Each sector can be modelled as either Melitz, Ethier-Krugman, or Armington, depending on the specification chosen for the shifters. The trade structure of the model can be calibrated based on two estimable parameters: the trade or tariff elasticity and the shape parameter of the size distribution of firms. With this setup fixed and iceberg trade costs are calibrated jointly based on observed import shares. The structure is incorporated within the standard GTAP model and changes to the GEMPACK code are discussed in detail. Changes in both trade values and welfare are decomposed. Experiments with global reductions in iceberg and fixed trade costs are simulated in a medium-size model with 11 countries, 11 sectors, and 6 production factors. The experiments show that the welfare effects are largest under Melitz, followed by Ethier-Krugman and Armington, although differences are modest.

### *The welfare effects of trade policy experiments in quantitative trade models: the role of solution methods and baseline calibration.* Eddy Bekkers. Under review

This paper compares the solution methods and baseline calibration of three different quantitative trade models (QTM): computable general equilibrium (CGE) models, structural gravity (SG) models and models employing exact hat algebra (EHA). The different solution methods generate identical results on counterfactual experiments if baseline trade shares or baseline trade costs are identical. SG models, calibrating the baseline to gravity-predicted shares, potentially suffer from bias in the predicted welfare effects as a result of misspecification of the gravity equation, whereas the other methods, calibrating to actual shares, potentially suffer from bias as a result of random variation and measurement error of trade flows. Simulations show that fitted shares calibration can generate large biases in predicted welfare effects if the gravity equation does not contain pairwise fixed effects or is estimated without domestic trade flows. Calibration to actual shares and to fitted shares based on gravity estimation including pairwise fixed effects display similar performance in terms of robustness to the different sources of bias.