

Chapter 3

What's New in GTAP 11

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This is the eleventh release of the GTAP Data Base since the Project began in 1992. The Data Base cycle typically begins by updating the data base to a new reference year. For version 11, we expanded the time dimension of the GTAP Data Base by adding 2017 to the previous reference years of version 10: 2004, 2007, 2011 and 2014. The national data or input-output (I-O) tables are combined with international datasets on macroeconomic aggregates, bilateral trade, energy, and protection for the new reference years. Interim releases of GTAP are constructed as significant updated datasets become available. Improvements are also made in data sourcing, scope, and methodology. Part III of this volume provides detailed information on the sources and procedures employed in the construction of GTAP 11. This chapter provides a summary of the changes that have been made since the previous version.

3.1 Domestic Data

3.1.1 New and Updated Regions

In version 11, the new countries extracted from previous regional aggregates are: Afghanistan, Algeria, Central African Republic, Chad, Comoros, the Congo Republic, the Democratic Republic of the Congo, Equatorial Guinea, Eswatini, Gabon, Haiti, Iraq, Lebanon, Mali, Niger, Palestine, Serbia, Sudan, Syria, and Uzbekistan. References to the IOTs used for each of these new and updated countries are available on the GTAP website¹ and listed in Table 3.1.

In GTAP 11 we continue to match I-O tables' base year to their closest GTAP reference year. Table 3.2 shows the countries for which we have more than one I-O table for all five reference years. For the remaining countries in GTAP we still use a single I-O table. We look forward to more frequent contributions so we can capture structural changes over time.

For the GTAP Data Base, we collect a lot of non-I-O information at country-level. In earlier releases, prior to version 8, we had 226 standard GTAP countries, which were mapped to different numbers of GTAP regions (113 in version 7, for example). For GTAP 8 to 10, we

¹For new and updated country information included in version 11, please refer to https://www.gtap.agecon.purdue.edu/databases/v11/v11_doco.asp.

Table 3.1: New and updated national country IOTs in GTAP 11.

Country ^a	IO Year(s)	Country	IO Year(s)
Afghanistan*	2017	Korea	2015
Algeria*	2015	Laos	2017
Australia	2015, 2018	Lebanon*	2010
Azerbaijan	2016	Mali	2017
Bolivia	2014	Mexico	2013
Botswana	2016	Mongolia	2016
Brazil	2010, 2015	Mozambique	2015
Cameroon	2017	New Zealand	2013
Canada	2014	Niger*	2019
Central African Republic*	2017	Norway	2017
Chad*	2016	Pakistan	2017
Chile	2016	Palestine*	2011
China	2017	Panama	2016
Colombia	2014	Paraguay	2014
Comoros*	2017	Philippines	2018
Congo*	2016	Russian Federation	2016
Congo, D. R.*	2013	Serbia*	2015
Costa Rica	2017	South Africa	2017
Côte d'Ivoire	2015	Sudan*	2012
Cyprus	2010	Switzerland	2014
Ecuador	2019	Syrian Arab Republic*	2007
Equatorial Guinea*	2017	Thailand	2010, 2015
Eswatini*	2017	Ukraine	2017
Gabon*	2017	United Kingdom	2013
Haiti*	2012	United States of America	2012
India	2015	Uruguay	2016
Indonesia	2017	Uzbekistan*	2018
Iran	2012	Vietnam	2016
Iraq*	2011	Zimbabwe	2017
Kazakhstan	2017		

^aAn asterisk (*) is used to signal that the country is now separately identified.

Table 3.2: I-O Table base year allocation across GTAP reference years

Countries — Reference Years	2004	2007	2011	2014	2017
Australia	2005	2010	2010	2015	2018
Azerbaijan	2001	2001	2016	2016	2016
Bolivia	2004	2004	2014	2014	2014
Botswana	1994	2016	2016	2016	2016
Brazil	2005	2005	2010	2015	2015
Cameroon	2003	2003	2017	2017	2017
Canada	2003	2011	2011	2014	2014
Chile	2003	2003	2016	2016	2016
China	2002	2007	2010	2012	2017
Colombia	2003	2007	2007	2014	2014
Costa Rica	2002	2011	2011	2017	2017
Ecuador	2001	2007	2013	2013	2019
India	2003	2007	2007	2015	2015
Indonesia	2004	2004	2017	2017	2017
Iran	2001	2012	2012	2012	2012
Japan	2005	2005	2011	2011	2011
Kazakhstan	2004	2004	2015	2015	2017
Korea	2003	2007	2010	2014	2015
Laos	2002	2002	2017	2017	2017
Mexico	2003	2003	2013	2013	2013
Mongolia	2005	2005	2016	2016	2016
Mozambique	2007	2007	2015	2015	2015
New Zealand	2007	2007	2013	2013	2013
Norway	2004	2007	2011	2014	2017
Pakistan	2002	2011	2011	2011	2017
Panama	2016	2016	2016	2016	2016
Paraguay	2009	2009	2014	2014	2014
Philippines	2000	2006	2006	2018	2018
Russian Federation	2003	2003	2016	2016	2016
South Africa	2005	2005	2017	2017	2017
Sri Lanka	2000	2000	2011	2011	2011
Switzerland	2005	2008	2011	2014	2014
Thailand	2005	2005	2010	2015	2015
Turkey	2002	2002	2012	2012	2012
Uganda	2002	2007	2007	2007	2007
Ukraine	2004	2007	2013	2013	2017
United States	2002	2012	2012	2012	2012
United Kingdom	2010	2010	2010	2013	2013
Uruguay	1997	2016	2016	2016	2016
Vietnam	2003	2005	2016	2016	2016
Zimbabwe	1991	2017	2017	2017	2017

considered 244 countries listed by the International Organization for Standardization (ISO) using three letter codes. For GTAP 11 we consider 251 countries, which expands the latest ISO list of 249 by considering Kosovo and Sark.²

3.1.2 Agricultural Production Targeting

Prior to GTAP 11, several OECD member countries were pre-adjusted to match agricultural production statistics by sector for each reference year to more accurately reflect domestic support payments. Starting with GTAP 11, we complement with the use of FAO data to target agricultural production for 193 countries, some of which are subsequently aggregated into regions (Chepeliev 2020). The following sub-sections explain other supplementary data.

3.2 International Datasets: Sources and Procedure Changes

3.2.1 Macroeconomic Data

Macroeconomic aggregates (GDP, private consumption, government consumption, and investment) are used in updating the input-output tables to common reference years 2004, 2007, 2011, 2014 and 2017. The primary source of macroeconomic data is the World Bank.

3.2.2 Trade Data

As in previous versions of the GTAP Data Base, reconciled bilateral merchandise trade data, based on data from COMTRADE, was contributed by Mark Gehlhar of U.S. Department of Interior. Documentation on the reconciliation procedure is available online. In terms of trade in services, GTAP 11 takes advantage of a dataset provided by the OECD and WTO called the Balanced Trade in Services (BaTIS) (Liberatore and Wettstein 2021), which provides an initial bilateralization that does not need to be reconciled. The starting point for BaTIS is the trade in services dataset developed jointly by the WTO and the United Nations Conference on Trade and Development (WTO-UNCTAD).

Using bilateral balanced data is convenient, however the sectoral coverage does not map perfectly to GTAP's 20 services sector. There are 4 services sectors that are not covered by BaTIS: electricity, gas distribution, water supply, and ownership of dwellings. As in previous versions, for these and other energy sectors including electricity and gas distribution, energy trade data is constructed using data from the International Energy Agency (IEA) as documented in Chepeliev 2022b. The two remaining sectors are assumed not to be traded.

²<https://www.iso.org/obp/ui/#search>

Some sectors in BaTiS are too aggregated for GTAP. In order to disaggregate the sectors in BaTiS, we use another recently developed dataset that focuses on services trade. This is called the Trade in Service data by Mode of Supply (TiSMoS), which provides more detailed information, but is not bilateral (Wettstein et al. 2021). TiSMoS is a dataset produced by the WTO and funded by the Directorate-General for Trade of the European Commission (Wettstein et al. 2021).³

3.2.3 Protection Data

Domestic Support

Domestic support data for 2004, 2007, 2011, 2014 and 2017 from the OECD PSE/CSE database are incorporated in GTAP 11. Five domestic support categories are considered- output subsidies, input subsidies, land-based payments, labor- based payments and capital-based payments. This data gives us the breakup of activity-specific, group-generic and activity-generic payments. For the EU, the JRC provided this data for 2011, 2014 and 2017. Hans Jensen (then at FOI) provided this data for all the EU-27 countries in 2007 and EU-25 countries in 2004. Domestic support data are now available for the following OECD countries: Australia, Canada, European Union (EU28), Iceland, Israel, Japan, Korea, Mexico, New Zealand, Norway, Switzerland, Turkey, and the United States. The non-OECD member economies covered in the domestic support dataset for all five years are: Brazil, China, Indonesia, Kazakhstan, Russia, Ukraine, South Africa, Chile, Colombia, Vietnam, Costa Rica, India, Argentina.

Agricultural Export Subsidies

Aziz Elbehri of the Food and Agriculture Organization of the United Nations (FAO), with inputs from David Laborde (IFPRI) and Hans Jensen, contributed agricultural export subsidy data for 2004, calculated from country notifications to the WTO and “Financial report on the European Agricultural Guidance and Guarantee Fund”. For 2017, Kayode Ajewole (ERS/USDA) contributed data based on WTO notifications. For 2011 and 2014, Jayson Beckman (ERS/USDA) contributed these subsidies using the same sources and procedures as before. For 2007, David Laborde contributed a much richer export subsidy data, based on a bilateral and disaggregated-sector-level monthly export subsidy and bilateral trade dataset, for 36 exporting countries, 15 GTAP sectors (in agriculture and manufacturing) and 230 importing countries. We continue to use a common agricultural export subsidy rate for the EU member countries.

MFA Export Tax Equivalents

Estimates of the export tax equivalent (ETE) of the export quotas on textiles and clothing (wearing apparel) exports under the Agreement on Textiles and Clothing (ATC) were provided by Joseph

³ Another possible data source is the International Trade in Services Statistics by the OECD, which is bilateral but with emphasis on OECD member countries.

Francois and Julia Wörz. For Canada and the EU15, the ETE estimates are for 2003 and for the USA, the ETE estimates are for 2004. For 2007, all of these ETE's are zero, given the phasing out of MFA quotas, but quotas on Chinese exports remain in US, Canada and EU. We extrapolated ETEs from 2004 data to 2007 for China, based on the extent to which the quotas for Chinese exports were allowed to grow in each of these countries.

Import Tariffs

For years 2007, 2011, 2014, and 2017 we obtained the tariff data in GTAP Data Base directly from the ITC MAcMap data base, which is compiled from primary national customs information. Its documentation is available from chapter 10.D of this documentation. For 2004, we continue to use the dataset contributed for version 7 by David Laborde through the joint efforts of ITC and CEPII.

3.2.4 Energy Data and Emissions

For version 11, the IEA energy volume, taxes and prices data has been incorporated for all five reference years. In addition, fossil-fuel consumption subsidies based on estimates from the International Monetary Fund (IMF) and IEA data are now integrated in the standard database following the approach developed in Chepeliev, McDougall, and Mensbrugghe 2018.

Several important modifications are introduced to the new treatment of energy data in GTAP 11, in part due to changes to the accounting of CO₂ emissions (Chepeliev 2022b). First, in addition to relying on the extended International Energy Agency (IEA) energy balances, we also utilize more aggregate energy balances reported by the UN (UN 2021) to represent countries not explicitly covered by the IEA.

Second, for a more consistent representation of the bilateral energy trade flows, we rely on data from British Petroleum (BP 2022) and the statistical office of the European Union (Eurostat 2022). In combination with the UN-COMTRADE trade flows, these are then used to bilateralize the unilateral trade data from IEA. These updates result in a more consistent representation of trade between key energy exporters and importers, and allow us to address the widely-recognized weakness of UN-COMTRADE in capturing energy trade (Bellora, Cotterlaz, and Thie 2022).

Third, while refining the GTAP CO₂ emission estimates, we introduce blast furnace gas and other recovered gases into the energy database. Finally, we discard the energy flows associated with flaring from the GTAP energy database, to be consistent with the IEA energy balance accounting as well as with the definition of fossil fuel combustion emissions from the Intergovernmental Panel on Climate Change (IPCC) (Chepeliev 2022a). This new treatment assures that flaring-related energy and emission flows are aligned with the corresponding estimates from international data sources.

3.2.5 Behavioral Parameters

The GTAP Data Base includes a parameters file that consists of the various behavioral parameters used in the standard GTAP Model. Armington elasticities and Trade elasticities in GTAP 11 Data Base are the same since version 9; as such, CDE (Constant Difference Elasticity) parameters were calibrated from expenditure elasticities that are calculated using parameters from the AIDADS model estimated using GTAP data, as reported in Reimer and Hertel (2004).

3.2.6 Other Features

As mentioned in chapter 2, we have five labor categories in this version of the data base. For GTAP 11, we updated Weingarden and Tsigas 2010 by using recently available and more detailed industry and occupation wage (respectively, by ISIC rev.4 and the International Standard Classification of Occupations—ISCO-08) from the ILO, to estimate imputed wages for the 2017 reference year.

Also, since version 6, we consider estimates of income taxes and factor taxes (payroll, land, etc.) based on data from the IMF Government Financial Statistics. Population data, in millions, is reported in the global flows data file (header POP). This may be useful for use in post-simulation calculations.⁴ Reconciled bilateral time series trade data for 1995 to 2017 based on COMTRADE from Mark Gehlhar (U.S. DOI) have been incorporated into the time series trade data.⁵

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⁴Population data is not read in by the current standard version of the GTAP Model file (TAB file).

⁵Since version 9 these data was distributed separately from the standard data base due to the increased size of the distribution file.

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