Norway

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1. Overview

This document describes the Norwegian input–output table (IOT) constructed for GTAP version 10. As an overview, the submitted IOT was based on the 2014 Norwegian data submitted by the Norwegian Statistical Agency (SSB) to Eurostat[1] and based on the European System of Accounts 2010 (ESA). The 2002 and 2007 IOTs were used to provide some additional information. Finally, some adjustments were made to make the table conform to the GTAP format.

2. Data Source

The base table is the 2014 Norwegian IOT[2] in the ESA format (European Communities 2008).[3] The table has 64 commodities plus main final consumers: households, government, capital, changes in stocks, and exports. The commodity classification is CPA64, which is an aggregation of CPA2008 level 2 from Eurostat.[4] The table is presented as an industry-by-industry table "provided that industry-by-industry is a good approximation of product-by-product". The table is valued in basic prices and the flow tables for domestic and imported products were provided separately. While Supply and Use Tables (SUT) are available, only the symmetric IOT was used.

Earlier tables are industry-by-industry, so using them to disaggregate commodity-by-commodity tables requires the assumption that the industries are good approximations of commodities. The commodity classification used by SSB does not match that used by GTAP, requiring both aggregation and disaggregation.

3. Disaggregation

The major effort in constructing the Norwegian IOT for the GTAP database was transforming SSB's table into the GTAP classification. The GTAP classification is more detailed in several sectors and either the Norwegian IOT must be disaggregated or the GTAP sectors aggregated.

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[1] Statistical Office of the European Communities, http://ec.europa.eu/eurostat
[2] http://www.ssb.no/english/subjects/09/01/nr_en/input-output.html
[3] http://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-02-13-269
[4] http://ec.europa.eu/eurostat/web/cpa-2008/overview

The following sectors in the Norwegian IOT were disaggregated using a disaggregated version of the Norwegian IOT from 2002 (Yamakawa and Peters 2009)[5] & 2007:

1. GTAP sectors 15-18 (coal; oil; gas; minerals nec.) are aggregated as CPA64 RB. These were partially disaggregated using the 2007 table: oil and gas could not be disaggregated.
2. GTAP sectors 27-29 (textiles; wearing apparel; leather products) are aggregated as CPA64 R13_15. These were disaggregated using the 2007 table.
3. GTAP sectors 40-41 (electronic equipment; machinery and equipment nec.) are mixed between the three CPA64 sectors R26-R28. These were disaggregated using the 2007 table.
4. GTAP sectors 32-33 (petroleum, coal products; chemical, rubber, plastic prods) are separate in the CPA64 classification (as R19-R21), but are aggregated for confidentiality reasons into R21. The 2002 table was used to disaggregate these.
5. Taxes less subsidies on products were not differentiated between domestic and imports. The 2002 IOT was used to separate taxes on domestic products and imported products.

Disaggregation of the IOT was based on a simple share distribution. This distribution was applied across the rows and columns and then for the intersection of the rows and columns. After disaggregation, the balance of the rows and columns remains consistent in all sectors.

The simple share method of disaggregation of *change in inventories* sometimes caused problems where subsectors have different signs. In such cases we have disaggregated *change in inventories* using total use (excluding *change in inventories*) instead.

The following sectors in GTAP were aggregated:

1. CPA64 R01 was mapped to GTAP 01-12 (*Agriculture*)
2. Part of CPA64 RB was mapped to GTAP 16-17 (*Oil and gas*)
3. CPA64 R10-12 were mapped to GTAP 19-26 (*Food and beverages*)
4. CPA64 R24 was mapped to GTAP 35-36 (*Metals*)
5. CPA64 RD was mapped to GTAP 43-44 (*electricity; gas manufacture, distribution*)

4.   *Removal of negatives*

There was also a negative value in the capital formation for *Motor vehicles and parts*. This negative value was relocated to changes in stocks to conform to GTAP requirements.

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[5] The disaggregated 2002 IOT was used for research purposes and is not available for public use.

5. Removal of re-exports

The Norwegian IOT contains re-exports (a column of exports in the final consumption of imports).

The re-exports were subtracted from the exports. To keep the IOT balanced, this means that the supply of these exports must be reduced. In the case of some commodities, current-year imports were insufficient to have supplied re-exports, so re-exports must have at least partially come from stocks (imports in earlier years). So we first increase changes in stocks (from negative values towards zero) in preference and if possible, and then any remaining re-exports are taken from the imports matrix in proportion to use. That is, the column of residual re-exports was transposed to represent the use of imports. The use of imports in each sector was reduced as a share of the percent of re-exports in the total use of imports.

This method conforms to the approach recommended by the GTAP.

6. Mapping to the GTAP classification and balances

After all these steps the data is mapped to the GTAP classification as described in Step 2 and put in the required GTAP format. Various checks and balances are performed to ensure consistency.

Two pieces of information were crudely estimated:
1. AI14 – *Employment of Capital*, is estimated as the total of *Consumption of Fixed Capital* and *Net Operating Surplus* (European Communities 2008)
2. AI15 – *Employment of Land*, is left as zero

Various minor changes were made to remove rounding issues. Imbalances from the disaggregation process were absorbed in *Changes in Stocks*.

7. Tax data

The ESA tables contain the commodity taxes on domestic and imported products and the taxes on production. All taxes are allocated to the producing sectors (essentially value added components). However, the ESA tables do not distribute the taxes cell-by-cell. The taxes were distributed cell-by-cell in proportion to use.

SSB provided some commodity tax data for final consumption split between households, government, and capital. This data does not distinguish between domestic and imported consumption. It is also uncertain if this tax data provides full coverage. These data were used as a first estimate for commodity taxes on final consumption.

The tax data are only first-order estimates.

8. Submission

The submission is in an EXCEL data book with the following sheets:

1. 2014 IOT Domestic/Imports: The original IOTs submitted to ESA
2. GTAP Norway: The modified IOT after disaggregation, sign checks and balancing
3. Concordance: The mapping used between the ESA and GTAP classifications
4. Tax (SSB): Some tax rate estimates for final consumption
5. GTAP_Tax: The tax data in GTAP format
6. GTAP_UF: The GTAP new format
7. GTAP_UP: The GTAP old format

References

European Communities (2008). Eurostat Manual of Supply, Use and Input-Output Tables. Eurostat Methodologies and Working Papers. Luxembourg.

Yamakawa, A. and G. P. Peters (2009). "Using time-series to measure uncertainty in Environmental Input-Output Analysis." Economic Systems Research 21: 337-362.