Norway

***Glen P. Peters*[1]**

1. Overview

This document describes the Norwegian input-output table (IOT) constructed for the GTAP 8 Data Base. As an overview, the submitted IOT was based on the 2007 Norwegian data submitted to Eurostat[2] and based on the European System of Accounts 1995 (ESA). A disaggregated version of the 2002 IOT was used to provide some additional information. Finally, some adjustments were made to make the table conform to the GTAP format.

2. The Base Table

The base table is the 2007 Norwegian IOT[3] in the ESA format (European Communities 2008)[4]. The ESA format has 59 industry sectors and main final consumers – households, government, capital, changes in stocks, and exports. Norway constructs the IOT using the fixed product sales structure assumption (industry-technology assumption with industry-by-industry tables). The table is valued in basic prices and the flow table for domestic and imported products was provided. Supply and Use Tables (SUT) are available, however, only the symmetric IOT was used.

The ESA format does not meet all the requirements for the GTAP database. First, the GTAP prefers commodity-by-commodity tables. While it is possible to construct commodity-by-commodity tables using the SUT, this is not recommended by Statistics Norway (SSB). Previous analysis has shown that in many European countries it is not possible to use the ESA format SUTs to construct the ESA format IOTs (Peters, Manshanden et al. 2007), probably since statistical offices work at different levels of detail to the submitted tables. Even though GTAP prefers commodity-by-commodity tables, the ESA industry-by-industry table is used for the GTAP submission as this is closest to the statistical source. By using the industry-by-industry tables directly in the GTAP database it assumes that secondary-production is negligible. Second, the industry classification used by the GTAP is different to the classification used in the ESA[5]. The industry classification was converted to the GTAP format and disaggregation performed using a more detailed Norwegian IOT.

3. Disaggregation

The major body of work in constructing the Norwegian IOT for the GTAP database was transforming the ESA 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.

The following sectors in the Norwegian IOT were disaggregated using a disaggregated version of the Norwegian IOT from 2002 (Yamakawa and Peters 2009)[6]:

1. NACE 23 is confidential and is aggregated with NACE 24 (Chemicals). The 2002 table was used to disaggregated NACE23 and NACE24.

---

[1] Center for International Climate and Environmental Research – Oslo (CICERO),
P.O. Box 1129 Blindern, N-0318 Norway, Phone: +47 2285 8780, E-mail: glen.peters@cicero.uio.no
[2] Statistical Office of the European Communities, http://ec.europa.eu/eurostat
[3] http://www.ssb.no/english/subjects/09/01/nr_en/input-output.html
[4] http://epp.eurostat.ec.europa.eu/pls/portal/url/page/PGP_DS_ESA_IOT/PGE_DS_ESA_01
[5] General Industrial Classification of Economic Activities within the European Communities (NACE)
[6] The disaggregated 2002 IOT was used for research purposes and is not available for public use.

2. NACE27 includes ferrous metals (GTAP 35), non-ferrous metals (GTAP 36), and casting of metals (included in both GTAP 35 and 36). The 2002 IOT was used to disaggregate ferrous metals, non-ferrous metals, and casting. Casting was split between ferrous and non-ferrous metals based on industry output.
3. NACE40 includes both electricity and steam and hot water supply. The 2002 IOT was used to disaggregate these sectors.
4. "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 following sectors in GTAP were aggregated:
1. NACE01 was mapped to GTAP 01-12 (Agriculture)
2. NACE11 was mapped to GTAP 16-17 (Oil and gas)
3. NACE15 was mapped to GTAP 19-26 (Food and beverages)
4. NACE70-74 was mapped to GTAP 54,57 (OBS and DWE)

4. Removal of Negatives

The gross fixed capital formation use of "Manufacture of Motor Vehicles" had a large negative (6 billion NOK). The negative value was shifted to changes in stocks to retain the industry output.

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 removed in two steps:
1. The re-exports were subtracted from the exports. This reduces the domestic output in many sectors.
2. To keep the IOT balanced, this means that the use of imports must be reduced. The imports were reduced proportionally based on the sectoral share of re-exports in the total use of imports. That is, the column of 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 the "Net Operating Surplus". The p_c sector had a negative net operating surplus and this was removed by putting it to zero and retaining the output balance by adding to the 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.

Submission

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

1. ESA Notes: The notes pages from the ESA submissions
2. IOT_2007_total, domestic, imported: The original IOT submitted to ESA
3. IOT_2007_domestic/imported (final): The modified IOT after disaggregation
4. Concordance: The mapping used between the ESA and GTAP classifications
5. GTAP Norway: The data in the old GTAP format
6. Tax (SSB): Some tax rate estimates for final consumption
7. GTAP_Tax: The tax data in GTAP format
8. GTAP_UF: The GTAP new format
9. 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.

Peters, G. P., W. Manshanden, et al. (2007). Technical report focusing on economic data sources for SUT/IO tables for EU25 and RoW, Report of the EXIOPOL project: Scoping report WP III.2.a and WPIII.3.a.

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