

Norway

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1. Overview

This document describes the Norwegian input-output table (I-O) constructed for GTAP version 7. As an overview, the submitted I-O was based on the 2004 Norwegian data submitted to Eurostat¹ and based on the European System of Accounts 1995 (ESA). A disaggregated version of the 2002 I-O was used to provide some additional information. Finally, some adjustments were made to make the table conform to the GTAP format.

2. Steps

2.1. Step 1: The base table

The base table is the 2004 Norwegian I-O² in the ESA format (European Communities 2008)³. The ESA format has 60 industry sectors and main final consumers – households, government, capital, changes in stocks, and exports. Norway constructs the I-O 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 I-O was used.

The ESA format does not meet all the requirements for the GTAP data base. First, the GTAP prefers commodity-by-commodity tables. While it is possible to construct commodity-by-commodity tables using the SUT, this is not an avenue followed by Statistics Norway (SSB). Norway constructs industry-by-industry tables using the fixed product sales structure assumption (industry-technology assumption). By using the industry-by-industry tables directly in the GTAP data base it assumes that secondary-production is negligible. Second, the industry classification used by the GTAP is different to the classification used in the ESA⁴. The industry classification was converted to the GTAP format and disaggregation performed using a more detailed Norwegian I-O.

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://epp.eurostat.ec.europa.eu/pls/portal/url/page/PGP_DS_ESA_I-O/PGE_DS_ESA_01

⁴ General Industrial Classification of Economic Activities within the European Communities (NACE)

2.2. Step 2: Disaggregation

The major body of work in constructing the Norwegian I-O for the GTAP data base was transforming the ESA table into the GTAP classification. The GTAP classification is more detailed in several sectors and either the Norwegian I-O must be disaggregated or the GTAP sectors aggregated.

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)

The following sectors in the Norwegian I-O were disaggregated using a disaggregated version of the Norwegian I-O from 2002⁵:

1. In the Norwegian I-O, NACE 23 is confidential and is aggregated with NACE 24 (Chemicals). The 2002 table was used to disaggregate NACE23 and NACE24.
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 I-O 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 I-O was used to disaggregate these sectors.

The 2002 I-O also contained more detailed information on taxes and subsidies. The ESA tables only include “Taxes less subsidies on products” while the disaggregated 2002 tables separate taxes on domestic products and imported products.

Disaggregation of the I-O was based on a simple share distribution. This distribution was applied across the rows and columns and then the intersection of the rows and columns. After disaggregation, the balance of the rows and columns remains consistent in the non-modified sectors, but the disaggregated sectors did not balance. This seems to result from inconsistencies between the 2002 and 2004 I-O. For instance, in the disaggregated sectors, the 2002 I-O may contain the use of some products which is zero in the 2004 I-O, and vice-versa. The table could be rebalanced using RAS, however it was decided to allocate the “error” to the “Net operating surplus”.

2.3. Step 3: Removal of negatives

The 2004 I-O contained *small* negatives in

- NACE66 (Insurance) use of refined-petroleum
- NACE66 (Insurance) use of office machinery

These negatives were put to zero

⁵ The disaggregated 2002 I-O was used for research purposes and is not available for public use.

The gross capital formation use of manufactured transport equipment had a large negative (4 billion NOK). Changing this to zero represents a non-marginal change. Hence, the negative value was shifted to changes in stocks to retain the industry output.

2.4. Step 4: Removal of re-exports

The Norwegian I-O 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 I-O 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.

2.5. Step 5: Mapping to the GTAP classification

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 not provided

1. AI14 – Employment of Capital, however the value added component Consumption of Fixed Capital is included
2. AI15 – Employment of Land, however the Net Operating Surplus is included

2.6 Step 6: Tax data

The ESA tables contain the product 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. SSB provided some tax data which may assist the GTAP. SSB provided total product taxes on final consumption split between households, government, and capital. This data does not distinguish between domestic and imported consumption. Tax information on intermediate consumption and exports was not included.

3. Submission

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

1. GTAP Norway: The data in GTAP format
2. ESA Domestic 2004: The 2004 I-O domestic data from SSB. The 2002 data used to disaggregate some 2004 sectors is not shown.
3. ESA Import 2004: The 2004 I-O import data from SSB. The 2002 data used to disaggregate some 2004 sectors is not shown.
4. The mapping used between the ESA and GTAP classifications
5. Some tax rate estimates

References

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