The World Input-Output Database (WIOD): Construction, Challenges and Applications

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Who is in WIOD?

- University of Groningen (The Netherlands)
- Institute for Prospective Technological Studies (Spain)
- Wiener Institut für Internationale Wirtschaftsvergleiche (Austria)
- Zentrum für Europäische Wirtschaftsforschung (Germany)
- Österreichisches Institut für Wirtschaftsforschung (Austria)
- Konstanz University of Applied Sciences (Germany)
- The Conference Board Europe (Belgium)
- CPB Netherlands Bureau for Economic Policy Analysis
- Institute of Communication and Computer Systems (Greece)
- Central Recherche SA (France)
- OECD (France)
Experts and Stakeholders

➤ Committee of experts
  • Robert Feenstra (UC Davis)
  • Kyoji Fukao (Hitotsubashi)
  • Geoffrey Hewings (Illinois)
  • Rutger Hoekstra (Statistics Netherlands)
  • Dale Jorgenson (Harvard)
  • Robert McDougall (Purdue)
  • Jan Oosterhaven (Groningen)
  • Sherman Robinson (Sussex)
  • Colin Webb (OECD)

➤ Committee of stakeholders
  • European Commission (a.o. DG ECFIN, DG Research)
  • London Group on Environmental Accounting
  • Intergovernmental Panel on Climate Change
Data to be Delivered

- Time-series of input-output tables with supply broken down by origin: domestically produced or imported (by partner country)
- Satellite accounts (at identical level of industry detail):
  - Socio-economic (labour and capital input by type: skill levels, ICT capital vs. non-ICT capital)
  - Environmental (energy, emissions to air: GHGs, ozone depleting gases and acidifying emissions)

- Period from 1995 to 2006:
  - 27 EU countries and 13 other major countries
  - 35 industries and 59 products
- All results must be based on publicly available data
List of Countries

- EU-27
- plus 13 non-EU:

<table>
<thead>
<tr>
<th>Country</th>
<th>Country</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Russia</td>
<td>South Korea</td>
</tr>
<tr>
<td>United States</td>
<td>China</td>
<td>Taiwan</td>
</tr>
<tr>
<td>Brazil</td>
<td>India</td>
<td>Indonesia</td>
</tr>
<tr>
<td>Mexico</td>
<td>Japan</td>
<td>Australia</td>
</tr>
<tr>
<td>Turkey</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Countries selected on basis of quality of public data availability and economic importance
## National Supply and Use Table

<table>
<thead>
<tr>
<th>Product</th>
<th>Supply ( S^D )</th>
<th>Intermediate use (I)</th>
<th>Final use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Intermediate use (I)</td>
<td>Domestic final use (F)</td>
<td>Exports (E)</td>
</tr>
<tr>
<td>Rest of World</td>
<td>Imports (M)</td>
<td>Value added (VA)</td>
<td>Total output by industry (GO)</td>
<td>Includes use of imported products</td>
</tr>
<tr>
<td>Total supply by product (S)</td>
<td>Total input by industry</td>
<td>Includes secondary production</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Domestic supply \( S^D \):** Includes secondary production.
- **Imports (M):** Includes use of imported products.
National Input-Output (IO) Table
(industry by industry type)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Final use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value added</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest of World</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total supply</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Obtained from Supply and Use Table using “fixed product sales assumption”

Advantage: can be linked to socio-economic and environmental data, which are most often available at industry level.
## International Supply and Use Table

<table>
<thead>
<tr>
<th>Country</th>
<th>Product</th>
<th>Supply</th>
<th>Intermediate Use</th>
<th>Final Use</th>
<th>Total Use</th>
<th>Industry</th>
<th>Value Added</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country A</td>
<td>Product</td>
<td></td>
<td>Intermediate use</td>
<td>Domestic final use</td>
<td>Exports</td>
<td>Domestic final use</td>
<td>Re-exports</td>
<td>Total use of domestic output</td>
</tr>
<tr>
<td>Rest of World (RoW)</td>
<td>Product</td>
<td>Intermediate use of imports</td>
<td>Domestic final use of imports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country A</td>
<td>Industry</td>
<td>Domestic supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest of World (RoW)</td>
<td>Imports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total supply</td>
<td>Value added</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Advantage:** bilateral trade statistics are available at product level.

**Conversion to common currency:** exchange rates (IMF)
## World Supply and Use Table

<table>
<thead>
<tr>
<th>Product</th>
<th>Country A</th>
<th>Country B</th>
<th>Rest of World</th>
<th>Country A</th>
<th>Country B</th>
<th>Rest of World</th>
<th>Country A</th>
<th>Country B</th>
<th>Rest of World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply</td>
<td>Domestic</td>
<td>Imports</td>
<td>Imports</td>
<td>Domestic</td>
<td>Imports</td>
<td>Imports</td>
<td>Domestic</td>
<td>Imports</td>
<td>Imports</td>
</tr>
<tr>
<td>Industry</td>
<td>Output in A</td>
<td>Output in B</td>
<td>Output in RoW</td>
<td>Industry</td>
<td>Output in A</td>
<td>Output in B</td>
<td>Industry</td>
<td>Output in RoW</td>
<td>Output in RoW</td>
</tr>
</tbody>
</table>

- **Intermediate use**: Obtained as a residual
- **No information available**
# World input-output table (industry-by-industry type)

Not part of officially released data, estimated for analytical purposes.
# Dataflows and construction steps in WIOT

<table>
<thead>
<tr>
<th>Public statistics</th>
<th>National accounts (time-series)</th>
<th>Supply and use tables (infrequent)</th>
<th>International trade statistics (time-series)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Final demand by type</td>
<td>Supply (Basic price)</td>
<td>Imports and exports on bilateral basis - of goods - of services</td>
<td></td>
</tr>
<tr>
<td>Total Export/Import</td>
<td>Use (Purchasers’ price)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value added by industry</td>
<td>Valuation matrix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross output by industry</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### For each country

#### Harmonisation

#### Estimation

#### Time series for each country

#### Estimation

#### Time series

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**World input-output tables**
Key Construction Steps (I)

• Country-specific correspondence tables for products and industries (non-EU countries)

• Benchmark National SUTs in line with National Accounts aggregate totals: SUTRAS (Temurshoev and Timmer, *PapRegSci*, 2011)

• Projected National SUTs in line with National Accounts (SUTRAS)

• National SUTs both in basic prices and purchasers’ prices
  • Estimation of valuation matrices needed (net tax and margins)
Key Construction Steps (II)

- Split between use of domestic products and imported products based on:
  - Broad End-Use Categories (modified, at very detailed level, 5000 goods)
  - Imports by product in the supply table
- Split of imported use by country-of-origin (plus RoW) based on import shares from UNCOMTRADE (by end use)
- Bilateral trade in services assembled from OECD, Eurostat, IMF and WTO (originally in BoP codes)
Key Construction Steps (III)

- Socio-economic indicators mainly from EU KLEMS (plus WORLD KLEMS project)

- Environmental indicators mainly from IEA, UNFCC and CLRTAP (link with EXIOPOL, EC-sponsored project)
WIOD: What’s new?

- Time-series benchmarked on National Accounts data
- National supply and use tables as the basis
- Linked with bilateral international trade data
- Detailed accounts of trade in services
- Improved allocation of imports to use categories (mod. BEC)
- Socio-economic satellite accounts (labour by skill; capital by type)
- Constant price tables, PPP-conversion
- Based on official statistics with maximum of transparency in calculations

Data publicly available in April 2012 at the latest