The World Input-Output Database (WIOD) project

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The World Input-Output Database: General structure

EU project funded within the 7th framework programme

www.wiiod.org

Project started in May 2009; prospective end in April 2012

Construction and applications

- Construction of intercountry SUT/IO tables:
- Data become publicly available at end of project
- Applications
  - Socioeconomic issues
  - Environmental issues
  - (Policy) Modeling
Partners involved

- RUG (NL): University of Groningen (coordinator)
- IPTS (ES): Institute for Prospective Technology Studies
- wiiw (AT): The Vienna Institute for International Economic Studies
- ZEW (DE): Zentrum für Europäische Wirtschaftsforschung
- WIFO (AT): Österreichisches Institut für Wirtschaftsforschung
- HTWG (DE): Hochschule Konstanz
- TCBE (NL): The Conference Board Europe
- CPB (NL): Netherlands Bureau for Economic Policy Analysis
- ICCS (GR): Institute of Communication and Computer Systems
- CRSA (FR): Central Recherche SA
- OECD: not (yet) formally
The World Input-Output (WIOD) Database: Overview
Data coverage

Data are collected by partners based on various datasources

- Intercountry Supply-Use and Input-Output tables
- 1995-2006
- 40 countries included
  - 27 EU countries
  - 26(+/4) OECD members (accession/enhanced engagement)
WIOD country coverage
Data coverage

Data are collected by partners based on various datasources

- Intercountry Supply-Use and Input-Output tables
- 1995-2006
- 40 countries included
  - 27 EU countries
  - 26(+3/4) OECD members (accession/enhanced engagement)
- Sectoral classifications
  - 60 products
  - 40 industries (NACE)
- Plus satellite accounts
- Attempts to create deflated tables
WIOD database: Core

- Harmonized Supply and Use (Make) tables and national IO tables
- Import tables
  - Import USE tables
  - Import IO tables
- Dataset of trade in goods (product level) and services (BOP codes)

Note: Coverage of SUT, IO and Import tables vary across countries and years (various sources, ...)

Robert Stehrer, wiww
WIOD: Constructions and applications
WIOD database: Satellite accounts

- Socioeconomic indicators
  - TFP, educational intensity, capital stock (ICT and Non-ICT), etc.
    (KLEMS type data)
  - Other: Intangible capital, etc.
  - FDI, Foreign affiliates, ...

- Environmental indicators
  - Energy use (various energy carrier)
  - Water use
  - Emissions
  - Others (waste)

- Might not have full coverage

Note: Coverage varies across countries and years (various sources, ...)
Applications

- Socioeconomic analysis
  - Factor content of trade
  - Effects of outsourcing on labor markets
  - Trade in value added, value added chains, ...

- Environmental analysis

- Modeling
  - CGE modeling
  - Dynamic IO-based modeling
The World Input-Output (WIOD) Database:

Construction issues
(1) Balanced SUT system consistent with NA ...

**Table 1.3: A simplified supply and use framework**

<table>
<thead>
<tr>
<th>Products</th>
<th>Industries</th>
<th>Final uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>Intermediate consumption by product</td>
<td>Final uses by product and by category</td>
</tr>
<tr>
<td>products</td>
<td>and by industry</td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industries</td>
<td>Output of industries by product</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value added</td>
<td>Value added by component and by</td>
<td></td>
</tr>
<tr>
<td></td>
<td>industry</td>
<td></td>
</tr>
<tr>
<td>Imports</td>
<td>Total imports by product</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Total supply by product</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total output by industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total final uses by category</td>
<td></td>
</tr>
</tbody>
</table>

Source: Eurostat Manual of Supply, Use and Input-Output Tables
... (2) with import use tables ... 

**Table 7.1: Use table for imports**

<table>
<thead>
<tr>
<th>No</th>
<th>INDUSTRIES (NACE)</th>
<th>INDUSTRIES (NACE)</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>FINAL USES</th>
<th>TOTAL USE AT BASIC PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agriculture</td>
<td>Industry</td>
<td>Construction</td>
<td>Trade, hotel, transport</td>
<td>Finance, real estate, business</td>
<td>Other service activities</td>
<td>Total</td>
<td>Final consumption expenditure by households</td>
<td>Final consumption expenditure by non-profit organisations</td>
<td>Final consumption expenditure by government</td>
<td>Gross fixed capital formation</td>
<td>Changes in valuables</td>
<td>Changes in inventories</td>
</tr>
<tr>
<td>1</td>
<td>Products of agriculture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Products of industry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Construction work</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Trade, hotel, transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Financial, real, business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Other services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Total at basic prices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

= Import vector of the supply table

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</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Industry</td>
<td>Construction</td>
</tr>
<tr>
<td>1 Products of agriculture</td>
<td>2 Products of industry</td>
<td>3 Construction work</td>
</tr>
<tr>
<td>4 Trade, hotel, transport</td>
<td>5 Financial, real, business</td>
<td>6 Other services</td>
</tr>
<tr>
<td>7 Total at basic prices</td>
<td>Intermediate consumption by industry</td>
<td>Final uses by category</td>
</tr>
<tr>
<td>Imported intermediates</td>
<td>Imported products for intermediate consumption at c.i.f. values</td>
<td>Imported products for final uses at c.i.f. values</td>
</tr>
<tr>
<td>Imported final uses</td>
<td>Imported total uses</td>
<td></td>
</tr>
</tbody>
</table>

Source: Eurostat Manual of Supply, Use and Input-Output Tables

(3) and bilateral trade data consistent with SUT/IO trade vectors
Construction of inter-country tables

Assuming (1) and (2) is satisfied; but (3) does not hold

- Trade data based approach
  - Fix (bilateral) trade data and adjust IO tables to them
    - Not considering trade in intermediate inputs
    - Considering trade in intermediate inputs
      (basically applying proportionality assumption)
Construction of inter-country tables

Assuming (1) and (2) is satisfied; but (3) does not hold

- Trade data based approach
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      (basically applying proportionality assumption)

- SUT/IO tables based approach
  - Use SUT/IO data from NSI sources and 'adapt' trade data
    - Benchmark to import (export) columns in SUT data
  - Use (bilateral) trade data to break down by country of origin or destination
    - Use end-use categories (BEC) to differentiate between ID and FD
Discussion: Trade data based approach

+ Balanced and reconciled trade data available (or routines)
+ Relies on Social Accounting Matrix (SAM) approach (CGE modeling literature)
+ Additional countries might be included rather easily
  
  Does not require to adjust bilateral trade data matrix
  
  – Intermediate trade in goods (if at all): proportionality assumption used
  
  – Changes in existing IO tables (e.g. RAS procedure)
  
  – Based on IO tables rather than SUT framework
Discussion: SUT/IO data based approach

+ Based on SUT framework (more flexibility)
+ Based on existing SUT/IO data (in some cases linked to NA data)
+ Trade figures at product level
+ Using industry of imported intermediate products is better measured
  - Adjustment of trade figures (balancing, overall constraints, ...)
  - Including additional country requires recalculation of trade data
    (change in bilateral trade flows if SUT/IO trade columns differ from trade data)
Discussion: SUT/IO data based approach

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... feasible approach for

- rather small and fixed set of countries
- and rather aggregated product/industry level
In practice:

- Construction/interpolation of SUT and import tables  
  [Requirements (1a), (1b) and (2)]
- Construction of internally consistent trade data  
  [Requirements (3a)]
- 2-way interaction between use of SUT/IO and trade data  
  [Exchange of information making/justifying assumptions]
- Construction will require (ad-hoc) assumptions and ’guesstimations’
  - Comparisons
  - Documentation
WIOD construction: Ongoing work
Data issues: WIOD supply and use tables

- Construction/Interpolation of missing tables
- Construction of inter-country SUT tables from benchmark tables
  - First use information from import SUT tables to ...
    - ... split imports into demand categories (II, final demand, ...)
    - ... to calculate use of imported products by industry for II
  - Use international trade data to split cells in import USE matrix by sourcing country
Data issues: Trade in goods

- Correspondence HS6 to NACE and HS6 to BEC
  \[ \Rightarrow \text{HS6-NACE-BEC} \]
- Alternative to BEC/Adaption of BEC?
- Balancing, reconciling and benchmarking with data from SUT/IO
  \[ \star \text{(Well-known) Data problems: Missing trade, confidenceials, re-exports and re-imports, mirror flows} \]
Data issues: Trade in services

- Bilateral service trade data from various sources
  - UN, IMF, Eurostat, OECD, WTO, (IIDE-TSD))

- Data problems
  - Coverage
  - Internal consistency and consistency across databases (Documentation)
  - Correspondence BOP to sector/product level

- Service exports and imports by country and WIOD sectors (though even aggregate)
  - Balancing and mirror flows
  - Construction of full bilateral data set (Gravity type model, RAS based approach,...)
Forthcoming events:
December 3-4, 2009: Internal project meeting, OECD, Paris, France.
Thank you for attention!

www.wiod.org

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