TRADE IN VALUE-ADDED: WTO-OECD DATABASE

Courtesy of Sébastien Miroudot (OECD)
What is Trade in Value Added (TiVA)?

- A database containing estimates of the value that is added, by country and by industry, in producing goods and services.
- Reveals the source of income generated and the economic significance of both exports and imports.
- Based on national I-O or supply use tables, linked to bilateral trade flow data.
Some background

- A horizontal activity (STD/STI/TAD)
- A formal joint-initiative with WTO
- Collaborating with a number of ‘informal’ partners: USITC, IDE-JETRO, MOFCOM, WIOD etc
- With the assistance of a technical expert group.
What does the first release tell us?

Domestic Value-Added to Export Ratio, 2009, %

Typically smaller economies

Typically (natural) resource rich and/or large economies
Services matter

Services Value-Added: % of exports, 2009

- Foreign
- Domestic
Exports require imports

Transport equipment

Electronics

- Germany
- USA
- Other Europe
- Japan
- Other NAFTA
- France
- Korea
- UK
- China
- Spain
- Italy

- China
- Other Europe
- Korea
- Japan
- USA
- Germany
- Mexico
- Switzerland
- UK
- France
- Italy

$ Billion

- Foreign Content
- Domestic Content
And a significant share of total intermediate imports is used in exports.
And Value-Added often returns
SOURCES AND METHODS
ASSUMPTIONS AND CAVEATS
### OECD Inter-country I-O table

#### National I-O tables
- Production linkage
- Final expenditure
- Income (Value-added)
- Import procurement info

#### Bilateral Trade Database
- Industry and End-use (capital, intermediates, consumption goods)

57 economies + Row, 1995-2009, 37 sectors, consistent with SNA

<table>
<thead>
<tr>
<th></th>
<th>Country A</th>
<th></th>
<th></th>
<th>Country B</th>
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<th>Final Demand</th>
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<tbody>
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<td></td>
<td>Sector 1</td>
<td>Sector 2</td>
<td>Sector 1</td>
<td>Sector 2</td>
<td>Country A</td>
<td>Country B</td>
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<td>$NTF_{A}$</td>
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<td>International trade margin and insurance</td>
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<td>$TIZ_{2}^{A}$</td>
<td>$TIZ_{1}^{B}$</td>
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<td>Operating surplus</td>
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<td>$VO_{1}^{B}$</td>
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<td>Tax less subsidy on production</td>
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<td>Output</td>
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<td>$X_{2}^{B}$</td>
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</tbody>
</table>
Data sources for Inter-country I-O model (ICIO)

Data sources

Supply-use and Input-Output tables (National sources/ Eurostat / ADB)
Merchandise trade statistics (OECD ITCS/UN Comtrade)
National Accounts (UN/OECD /World Bank)
Balance of Payments (National source / IMF)

Intermediate analytical data products at OECD

Harmonised symmetric Input-Output tables
Bilateral Trade Database by Industry and by End-use (BTDIxE)
Adjusted National Accounts with BoP and re-exports

Components of Inter-country I-O

Update estimates for missing tables for reference years
Reconciliation of I-O and BTD figures with National Accounts
Estimated Bilateral Trade in Services by Industry(EBTSI)
Import coefficient approach (conventional)

- Preparation of data sources
- Separate import matrices by import trade coefficients
- Balance subject to total inputs = total output (not necessarily consistent with NA-based total exports and imports. Also total imports and exports of a good does not match)
- Less computational requirement

Numerical reconciliation approach

- Preparation of data sources
- Reconciliation procedures under different conditions, for example,
  - Total exports/imports of ICIO = total exports/imports f.o.b. reported in SNA
  - World total imports = world total exports
  - Some service exports/imports are derived by merchandise trade
- Heavy computational requirement (e.g. 10 hours / year service trade coefficients)
Indicators are expressed in simple matrix forms (but requires significant computing power)

- VA embodied in exports: \( EXGRVA = v_A B \ EX_A \)
- VA created by demand of D: \( FDDVA = v_A B \ F_D \)
- Services VA created by foreign demand: \( FDDVA_{SV} = vs_A B \ F_D \)

\( v_A = \text{VA / output ratio vector of country A} \)
\( EX_A = \text{export vector of country A} \)
\( B = \text{Leontief Inverse} = (I-A_{ij}^{kl})^{-1} \)
\( vs_A = \text{services VA / output ratio vector of country A} \)
\( F_D = \text{final demand of vector of country D} \)

Technical documents are also available at stats.oecd.org
<table>
<thead>
<tr>
<th>ISIC Rev 3</th>
<th>Industry</th>
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<tbody>
<tr>
<td>1</td>
<td>01-05 Agriculture, hunting, forestry and fishing</td>
</tr>
<tr>
<td>2</td>
<td>10-14 Mining and quarrying</td>
</tr>
<tr>
<td>3</td>
<td>15-16 Food products, beverages and tobacco</td>
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<tr>
<td>4</td>
<td>17-19 Textiles, textile products, leather and footwear</td>
</tr>
<tr>
<td>5</td>
<td>20-22 Wood, paper, paper products, printing and publishing</td>
</tr>
<tr>
<td>6</td>
<td>23-26 Chemicals and non-metallic mineral products</td>
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<tr>
<td>7</td>
<td>27-28 Basic metals and fabricated metal products</td>
</tr>
<tr>
<td>8</td>
<td>29 Machinery and equipment, nec</td>
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<tr>
<td>9</td>
<td>30-33 Electrical and optical equipment</td>
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<tr>
<td>10</td>
<td>34-35 Transport equipment</td>
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<tr>
<td>11</td>
<td>36-37 Manufacturing nec; recycling</td>
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<tr>
<td>12</td>
<td>40-41 Electricity, gas and water supply</td>
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<tr>
<td>13</td>
<td>45 Construction</td>
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<tr>
<td>14</td>
<td>50-55 Wholesale and retail trade; Hotels and restaurants</td>
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<tr>
<td>15</td>
<td>60-64 Transport and storage, post and telecommunication</td>
</tr>
<tr>
<td>16</td>
<td>65-67 Financial intermediation</td>
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<tr>
<td>17</td>
<td>70-74 Real estate, renting and business activities</td>
</tr>
<tr>
<td>18</td>
<td>75-95 Community, social and personal services</td>
</tr>
</tbody>
</table>
Release of TiVA indicators

Coverage

34 OECD countries, 23 non-members and rest of the world
18 industries,

Indicators – for each country, by industry and partner:

1. Gross exports (with decomposition)
2. Domestic VA embodied in gross trade
3. Domestic VA embodied in foreign final demand
4. Related balances, ratios and % of GDP
5. Revealed Comparative Advantages (RCAs) in gross and VA terms

Other non-TiVA indicators using the same ICIOs will be available
(consumption-based CO2, Competitiveness and jobs)
<table>
<thead>
<tr>
<th>Country</th>
<th>Value-added embodied in exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>125962.3</td>
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<tr>
<td>Austria</td>
<td>93991.4</td>
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<td>Belgium</td>
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<td>Canada</td>
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<td>Germany</td>
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<td>Greece</td>
<td>41129.9</td>
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</tbody>
</table>

Direct Foreign Industry and Households

Indirect Import partners
Value-added embodied in foreign final demand

- **Domestic VA (Direct)**
- **Domestic VA (Indirect)**
- **Direct exports**
- **Foreign Customers (final consumption)**
- **Foreign VA**
- **Production networks abroad**
Intermediate Imports used in exports

- Intermediate imports (VA) / total exports
- Re-exported Intermediate imports / total intermediate imports

Export

Foreign customers

Domestic customers
Important to Emphasise

• Results are **estimates** designed to highlight 2 key issues
  – the need for policies to account for GVCs
  – the importance of capacity building & better statistics - **Mainstreaming**

• But require a number of assumptions and **improving data quality is essential**
  – Coherent estimates of trade in goods and services (WPTGS), and improvements in balancing methods
  – **A new approach to Supply-Use Tables (WPNA)**
    • More countries, more years, more timely.
    • With a focus on stages and trade rather than industries per se
  – Better capturing firm heterogeneity

• (WPTGS/WPGI – initiative).
Further information

- oecd/tiva
- MIWI