Mapping Global Value Chains

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Why focusing on GVCs?

• A value chain can be defined as “the full range of activities that firms and workers do to bring a product from its conception to its end use” (Gereffi and Fernandez-Stark, 2011).

• The fact that they are increasingly spread over several countries explains why value chains are regarded as “global”.

• The concept of GVC was introduced in the early 2000s and has been successful in capturing several characteristics of the world economy:
  – The increasing fragmentation of production across countries
  – The specialisation of countries in tasks and business functions rather than specific products
  – The role of networks, global buyers and global suppliers
Why mapping GVCs is important

1. Trade policy
2. Trade and employment
3. National competitiveness and growth
4. Moving up the value chain and innovation
5. Global systemic risk
• **Participation in GVCs**: to what extent are countries participating in GVCs
  – Import content (or foreign VA content) of exports
  – **GVC participation index**: imports and exports of inputs used in third countries (e.g., Koopman *et al.*, 2011)

• **Length of GVCs**: how many production stages in GVCs
  – Average propagation length (APLs)
  – **Index of the number of production stages** (Fally, 2011)

• **Position of countries in GVCs**: where are countries positioned in GVCs
  – VA as a percentage of gross output
  – **Distance to final demand index** (Fally, 2011)
New data available at the OECD

- Bilateral Trade Database by Industry and by End-Use (BTDIxE)
- OECD inter-country input-output tables
- OECD ORBIS firm-level data
The OECD Inter-Country Input-Output tables

<table>
<thead>
<tr>
<th>Interindustry transactions</th>
<th>Total intermediate</th>
<th>Components of final demand</th>
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</thead>
<tbody>
<tr>
<td>Country 1 Industry 1</td>
<td>Use of domestic inputs</td>
<td></td>
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<tr>
<td>Country 1 Industry 2</td>
<td>Use of foreign inputs</td>
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<td>...</td>
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<tr>
<td>Country 2 Industry 1</td>
<td>Use of foreign inputs</td>
<td>Use of domestic inputs</td>
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<td>Country 2 Industry 2</td>
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<td>Value-added</td>
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<td>Gross output</td>
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- Three global input-output matrices estimated for the years 1995, 2000 and 2005
- Based on national input-output tables harmonised by the OECD
- Cover 56 countries and 37 industries
- Linked internationally using the Bilateral Trade by Industry and End Use (BTDIXE) database and estimates of bilateral services trade flows.
Participation in GVCs

- The import content of exports (or foreign VA content of exports) only looks backward: countries at the beginning of the value chain do not seem to participate in GVCs.

- Following Koopman *et al.* (2011) the GVC participation index adds the foreign value-added in exports and the share of domestic VA in exports of intermediate inputs used for exports in third-countries.

- The GVC participation index for country $i$ and industry $k$ is:

$$GVC_{Participation}^{ik} = \frac{FV^{ik}}{E^{ik}} + \frac{IV^{ik}}{E^{ik}}$$

where $FV$ is the foreign VA embodied in gross exports $E$ and $IV$ the domestic VA embodied in third countries’ gross exports (IV).
GVC participation index in OECD countries, 2005

Source: OECD ICIO model, indicator based on Koopman et al. (2011)
GVC participation index in selected non-OECD countries, 2005

Source: OECD ICIO model, indicator based on Koopman et al. (2011)
• Following Fally (2011), we calculate an index measuring the number of production stages as:

\[ N_i = 1 + \sum \mu_{ij} N_j \]

where \( \mu_{ij} \) is the value of inputs from industry \( j \) used to produce one dollar of goods in industry \( i \).

• With one equation for each industry, we solve this system of linear equations (that has a unique solution) to calculate \( N_i \).

• As we use an international I/O table, we can decompose \( N_i \) into its domestic and international component.
Average length of GVCs (2005)

Source: OECD ICIO model, indicator based on Fally (2011)
Length of GVCs, by industry (2005)

Source: OECD ICIO model, indicator based on Fally (2011)
• Second indicator proposed by Fally (2011).

\( D_i \) reflects the number of production stages between the production of a good \( i \) and final demand. The index is calculated as:

\[
D_i = 1 + \sum_j \varphi_{ij} D_j
\]

where \( \varphi_{ij} \) is the fraction of production from industry \( i \) used as an intermediate in industry \( j \).
Distance to final demand, by economy, 1995 and 2005

Source: OECD ICIO model, indicator based on Fally (2011)
GVC participation and distance to final demand: motor vehicle industry

Source: OECD ICIO model, indicator based on Koopman et al. (2011), Fally (2011)
GVC participation and distance to final demand: computer services

Source: OECD ICIO model, indicator based on Koopman et al. (2011), Fally (2011)
Trade network of intermediate inputs: motor vehicle industry

Source: OECD BTDixE database
Main findings

1. Increasing importance of GVCs
2. Larger versus smaller countries
3. Not only Asia, but also NAFTA and EU
4. Emerging economies integrating GVCs and specializing in inputs
Issues and next steps

• Improving the methodology, refining the indicators
  – Aggregation and homogeneity bias
  – Identification of trade in services
  – Conciliating trade statistics with national accounts across different countries
• Time lag in the data, updating
• More case studies and network analysis