Accounting for Firm Heterogeneity within U.S. Industries: Extended Supply-Use Tables and Trade in Value Added using Enterprise and Establishment Level Data

James J. Fetzer, Tina Highfill, Kassu Hossiso, Thomas F. Howells III, Erich H. Strassner, and Jeff Young

OECD WPIA and WPTC Workshop on Multinational Production
November 12, 2018

The views expressed in this paper are those of the authors and should not be attributed to the Bureau of Economic Analysis or the U.S. Department of Commerce
Outline

• Motivation

• Data sources

• Methodology of extended SUTs

• Results: Firm heterogeneity in domestic and foreign content (imported content in this paper) of exports
  – U.S. MNEs account for bulk of domestic and foreign content in goods industries
  – Non-MNEs account for about two-thirds of domestic and foreign content in service industries
  – Foreign-MNE domestic production concentrated in a few industries

• Conclusion and next steps
Motivation

Fragmentation in production

Intraindustry heterogeneity in the literature

U.S.  Japan

China  Germany

The Productivity Sorting Model

Theory: Melitz (2003)
## Dimensions of firm heterogeneity

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Export orientation</th>
<th>Import orientation</th>
<th>Firm size class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Large</td>
</tr>
<tr>
<td>Foreign-owned MNE</td>
<td>Non-Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Large</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Large</td>
</tr>
<tr>
<td>Domestic-owned MNE</td>
<td>Non-Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Large</td>
</tr>
<tr>
<td></td>
<td>Non-Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Large</td>
</tr>
<tr>
<td></td>
<td>Non-Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Large</td>
</tr>
<tr>
<td></td>
<td>Non-Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Large</td>
</tr>
<tr>
<td>Non-MNE</td>
<td>Non-Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Large</td>
</tr>
<tr>
<td></td>
<td>Non-Exporter</td>
<td>Importer</td>
<td>Small</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Exporter</td>
<td>Non-Importer</td>
<td>Large</td>
</tr>
</tbody>
</table>

Data for extended SUTs

• BEA SUTs based mainly on
  – Economic Census data
  – Census and BEA trade data

• BEA AMNE data for MNE classification

• Experimental tables (2005 and 2012)
  – Combines SUTs and AMNE data at the industry level

• Microdata linking
  – Combines underlying firm level AMNE, establishment level Census of Manufactures, and firm level trade data
Incorporation of AMNE data

- Two types of AMNE data
  - U.S. parent firms
  - Majority-owned U.S. affiliates of foreign parent firms

- Overlap between U.S. parents and U.S. affiliates removed

- Employment based enterprise to establishment conversion matrix

- Non-MNE calculated as a residual
Input-output accounting

• Converted use table from purchaser prices to basic prices
• Converted ESUTs to input-output tables
• TiVA indicators using Leontief inverse
• TiVA indicators
  – Typically decompose trade or final demand on a value added basis
  – Focus on import content and domestic value added in exports
Firm heterogeneity in imported content

Imported content in exports

- All industries
- Goods
  - 2005
- Services
- All industries
- Goods
  - 2012
- Services

Share of exports

- Non-MNE
- U.S. MNE
- Foreign MNE
Source of content: goods vs. services
Foreign MNE content concentrated in a few industries

Source of content in exports of goods and services-2012

- Foreign MNE domestic value added
- U.S. MNE domestic value added
- Non-MNE domestic value added
- Imported content
Summary

• Accounting for heterogeneity by ownership looks most promising and is theoretically grounded

• Better understanding of role of MNEs in global and domestic value chains in the U.S.
  – U.S. MNEs account for the bulk of domestic and foreign content in goods industries
  – Close to two-thirds of domestic and foreign content in service industries is from non-MNEs
  – Foreign-MNE domestic production is concentrated in a few industries
Next steps

• Enhancements to supply-use tables
  – Consider publication of SUT sub-matrices used in TiVA calculations

• Incorporate establishment-level AMNE data

• Work with other countries to reconcile bilateral asymmetries in source data

• APEC initiative and North America Regional SUTs