

# Measuring U.S. Manufacturing Services Trade Using U.S. Customs Records: A Proposed Methodology

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## Overview

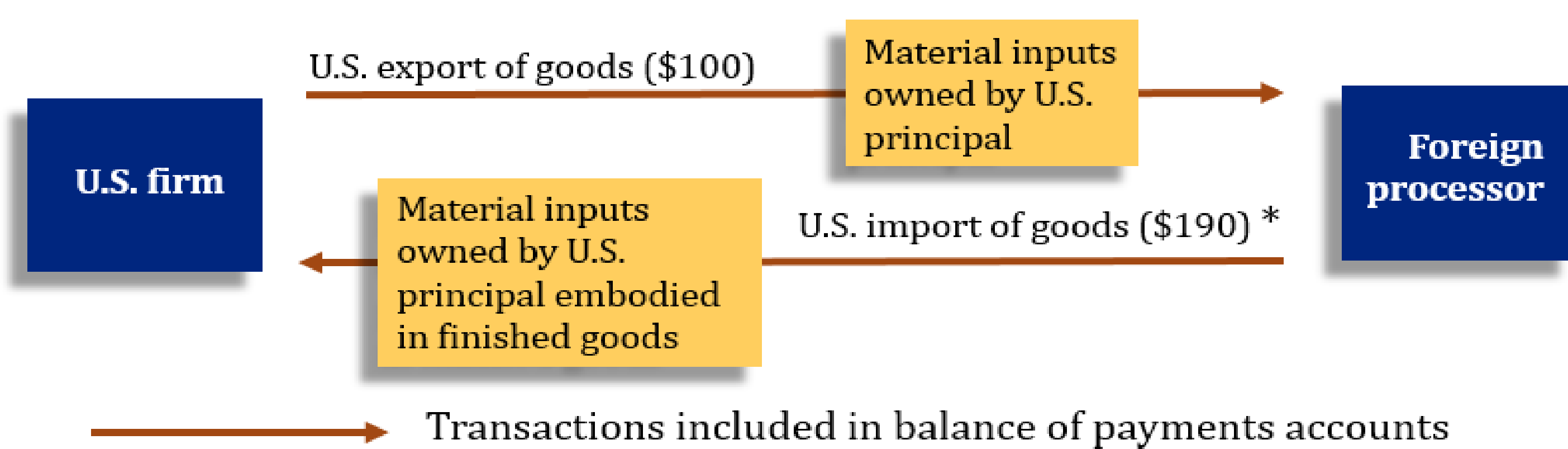
Comprehensive and reliable information on processing fees paid by U.S. firms for manufacturing services purchased from abroad are not available in the U.S. statistical system

- U.S. customs records do not identify processing trade
- Efforts to measure this with survey questions have yet to prove effective

This paper reports the preliminary findings of an ongoing project to estimate U.S. manufacturing services imports using U.S. Customs data and an indirect *profiling approach*

## Research Question

Consider a simple case of manufacturing services trade, which is also a *roundtrip trade* between the U.S. firm and the foreign country



When goods are sent abroad for processing with no change in ownership, BEA records trade in goods *as if* ownership changed. Instead, material inputs should be excluded from goods trade and processing fee should be included in imports of manufacturing services.

[Under the previous balance of payments accounting guidelines, a change of ownership was imputed for goods sent abroad for processing. In the latest guidelines, the imputation has been eliminated so that the balance of payments accounts exclude the associated trade in goods but include the associated trade in manufacturing (MFG) services.]

## Estimates by Other Industrial Countries

2012 Estimates of MFG Services Imports (MSI) Reported to IMF (mil US\$)

China	France	Germany	Italy	Japan	Netherlands
120	6,260	4,757	2,631	8,758	8,170

China has questions embedded in the customs form to collect information directly. The Netherlands rely primarily on surveys. France, Germany, Italy and Japan rely on a combination of tools that include surveys, certain administrative data, as well as information deduced from BOP and ITRS.

Overall, exports are larger than imports: especially true for China (also true for Belgium and France). Imports larger for Japan or Korea.

## Data Sources [Coverage year is 2012]

- Longitudinal Firm Trade Transactions Database (LFTTD): firm-level trade transaction (customs), at 6-digit Harmonized Schedule (HS) level
- BEA's 2012 benchmark I-O tables
- Antras-Chor-Fally-Hillberry (ACFH) (AER 2012) *upstreamness* index
- Kamal (2018 NBER-WP) Portrait of *Factoryless Goods Producers*

## Proposed Methodology

- Devise a set of profiling criteria to identify U.S. firms with roundtrip trades (i.e., both imports and exports) and the products in these roundtrip trades, where the following is a likely explanation: intermediate inputs are exported to a country and processed goods (with these inputs embedded) are imported back

- Construct three groups of firms

**Comp** *Comparison group*, where **all manufacturing firms**, and their trade transactions, with **positive firm-country level roundtrip trades** are included (irrespective of whether these trade transactions involve processing or not)

**Strict** *Strict profiling* criteria applied on single country trading partner firms (proof of concept)

**Manufacturing only firms + stringent restrictions on relative upstreamness of imports and exports + clerical screening**

**Main** *Generalized profiling* (replace the overly stringent criteria applied in **Strict**) + (Broader coverage with more refinements vis-à-vis **Comp**)

- ❖ Cover **MFG (NAICS 31-33) + (ISC) Information-scientific-technical services (NAICS 51, 54) + (FGP) Factoryless goods producers (Kamal, 2018)**
- ❖ Recognize **multi-country operations of firms**
- ❖ Identify **transaction related to processing**

## Generalized Profiling Criteria

Start with a set of firms that *may have* a global processing trade operation. Then apply a series of profiling criteria to arrive at a subset of firms, and a subset of their transactions, that are *likely to be* related to processing trade. **Firm being the unit of analysis, these criteria are applied at the firm level.**

- **Starting set of firms:** All firms with (firm-level positive roundtrip trade) + (50 or more employees) + (at least \$1 million in total imports)
  - ❖ **Industry coverage:** MFG, ISC and FGP firms are included (unlike **Comp**)
  - ❖ Firms trading with multiple countries are included (unlike **Strict**)
- **Top traders:** defining **TP=(exports-imports)**, firms below bottom 5th percentile and above top 95th percentile **TP** are excluded
  - ❖ Trading too dominant compared to processing (if any) for these firms
- **Relatedness:** using BEA 2012 Benchmark Use Table, identify and exclude export/import transactions not in any possible production chain
  - ❖ This replaces clerical screening of **Strict**
- **Upstreamness:** Apply the following criteria (less stringent than **Strict**)
  - ❖ **Criteria for transactions:** exclude,
    - Imports more upstream than the most upstream export item
    - Exports more downstream than the most downstream import item
  - ❖ **Criteria for firms:** exclude firm if,
    - Value weighted average upstreamness of imports > that of exports
    - Downstreamness weighted average value of exports > that of imports
- **Transformation of inputs:** Exclude firm if gap in upstreamness between imports and exports (i.e., estimated degree of transformation of inputs) is too small relative to the difference in value between imports and exports (estimated value of the transformation)

## Estimates and Discussions

	Comp	Strict	Main
Number of firms	5,300	50	---
Average number of trade partner countries	---	1	18
Total imports (mil USD)	249,000	---	---
Total exports (mil USD)	56,410	---	---
Estimated imports of downstream products (mil USD)	---	90	343,500
Estimated exports of upstream products (mil USD)	---	33	130,100
Estimated MFG services imports (MSI) (mil USD)	---	57	213,400
Estimated MSI as a share of downstream imports (%)	---	49	62
(Value weighted) average export upstreamness	2.01	2.69	1.99
(Value weighted) average import upstreamness	1.96	1.7	1.63
Average employment (number of domestic workers)	149	44	1,824
Average number of HS-6 products exported	---	---	17
Average number of HS-6 products imported	---	---	32

Cells with '---' have either not yet been disclosed or are not applicable.

- Degree of transformation very small (0.05) for **Comp** group, net imports as share of total imports (which is MSI for the profiled groups) is 77%
- For the **Strict** estimates, the firms are small, coverage is narrow and estimates small in magnitude
- In the **Main** estimates, the firms involved in MSI are relatively larger firms with extensive multi-country operations

## Future Extension

Key challenge: U.S. custom records do not record/identify goods for processing. We *proxy* for a lack of change in ownership with an indirect approach, i.e., with the following profiling criteria:

- ❖ **Relatedness + upstreamness + transformation of inputs**

A relatively more direct approach would be to bring in an additional dimension: Apply *Generalized Profiling Criteria* only on firm-country pairs with a related party tie (RPT)

- ❖ BEA's BE-11 & BE-15 can identify if a firm has RPT with a country
- ❖ Can also determine if the dominant activity of the firm in that country is production or retail/wholesale

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## Disclaimers

- The treatment of manufacturing services has implications for the measurement of trade in goods and trade in services, but not the overall goods and services trade balance.
- The opinions expressed are the author's own and do not reflect the views of the Bureau of Economic Analysis, the U.S. Department of Commerce, or the United States government.