

Linking Data Across International Survey Programs

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The views expressed in this presentation are those of the presenter and do not necessarily represent the position of the U.S. Bureau of Economic Analysis or the U.S. Department of Commerce.

** Presenting author*

- Background and motivation
- Data and methods
- Key findings
 - All services traders (*by industry*)
 - By firm type (*by partner countries, trade activities*)
- Future plans
- More information

International transactions in services

(“trade in services”)

- Financial services; insurance services; and charges for the use of intellectual property and selected services
- Lots of detail on transactions
- Very little detail on the U.S. transactors

Activities of multinational enterprises

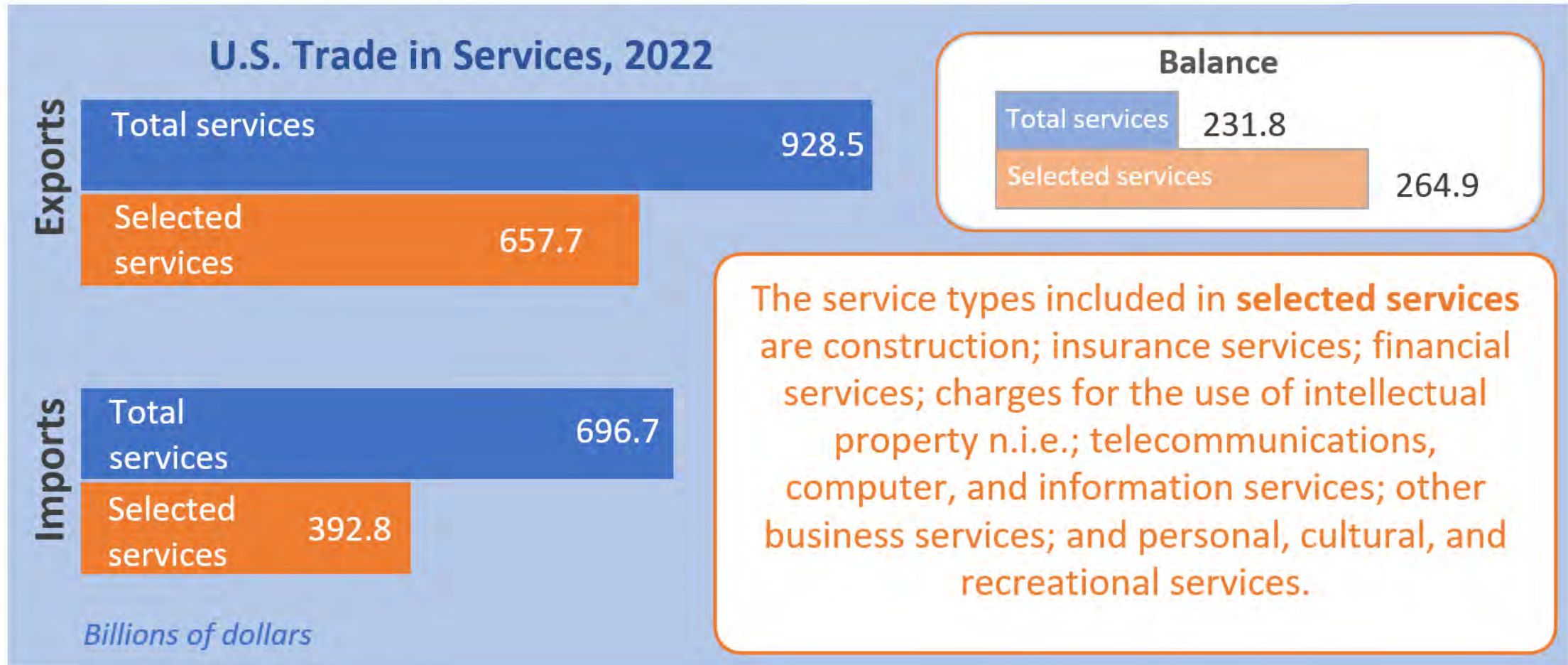
(“AMNE”)

- U.S. parents and their foreign affiliates
- Foreign-owned U.S. affiliates
- Covers many aspects of the firm’s finances and operations

Each of BEA’s trade in services and AMNE surveys is conducted as a distinct collection system. To use these data together, a bridge is needed

- AMNE surveys can provide more information about services traders than is available from the services surveys alone. By linking the survey data, BEA can:
 - Expand its offerings of *Services Trade by Enterprise Characteristic (STEC)* statistics and allow international comparisons
 - Complement U.S. statistics on goods trade by enterprise characteristics (TEC)
 - Better understand trade in services
 - Enable new research and insights based on linked firm-level data
 - Improve the quality of BEA's trade in services and AMNE statistics

Defining *Selected Services*: In-scope services for statistics on firm characteristics

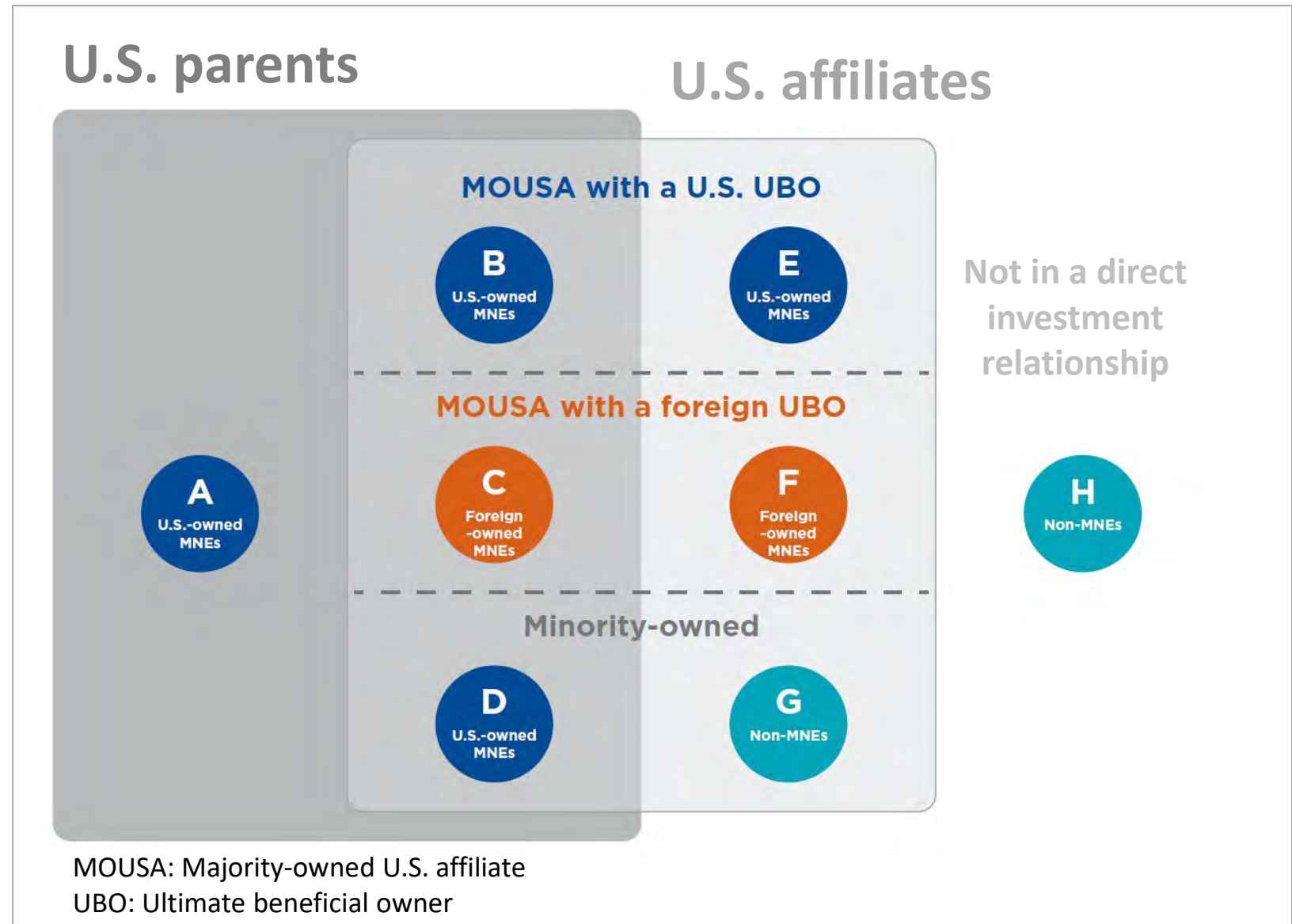


n.i.e. Not included elsewhere

Note. The service types that are not included in selected services are maintenance and repair services n.i.e., transport, travel (for all purposes including education), and government goods and services n.i.e.

Data: Defining firm types

- U.S. units of ultimately U.S.-owned MNEs (“**U.S.-owned MNEs**”)
- U.S. units of ultimately foreign-owned MNEs (“**foreign-owned MNEs**”)
- U.S. business enterprises that are neither U.S. parents nor MOUSAs (“**non-MNEs**”)



Methods: Progress on linking BEA international surveys

2012

- Covered 2006-2009
- Simple linking method
- Separate links to U.S. parents and U.S. affiliates

2019

- Covered 2008-2017
- More advanced linking methods and automation
- Used text mining techniques to streamline variable standardization
- Web scraping to validate by address
- Linked among MNEs and reconciled those that are both parents and affiliates

2023

- Covered 2006-2022
- More link improvements
- Improved clarity on MNE overlaps

Match

- May be established between entities based on a common value of a particular variable, such as EIN, name, or address

Link

- A match that has been validated via additional checks beyond the shared value of the matching variable

Bridge

- A set of *links* between reporters on two sets of survey data

Data preparation

- Standardize all text fields
- Use text mining to identify common terms
- Leverage all available information

Match on key variables

- Stronger to weaker identifiers
- Names, employer identifier numbers, email addresses, phone numbers

Validation and refinement

- Check alternative identifiers
- Score matches to facilitate evaluation
- Checks across surveys

Methods: Deterministic matching procedure

Began with earliest year and worked forward

Several matching rounds for each year

After each matching round, validation procedures were applied

Prior year links were brought forward if valid reporters were still in the data

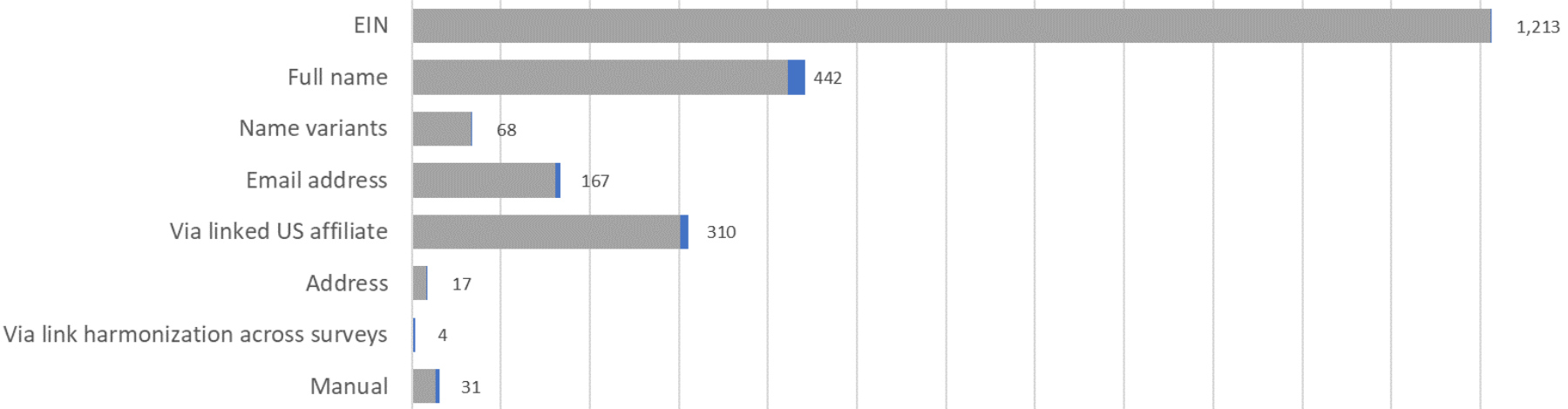
Any services reporter without a valid prior year link was eligible for matching each year

Note:

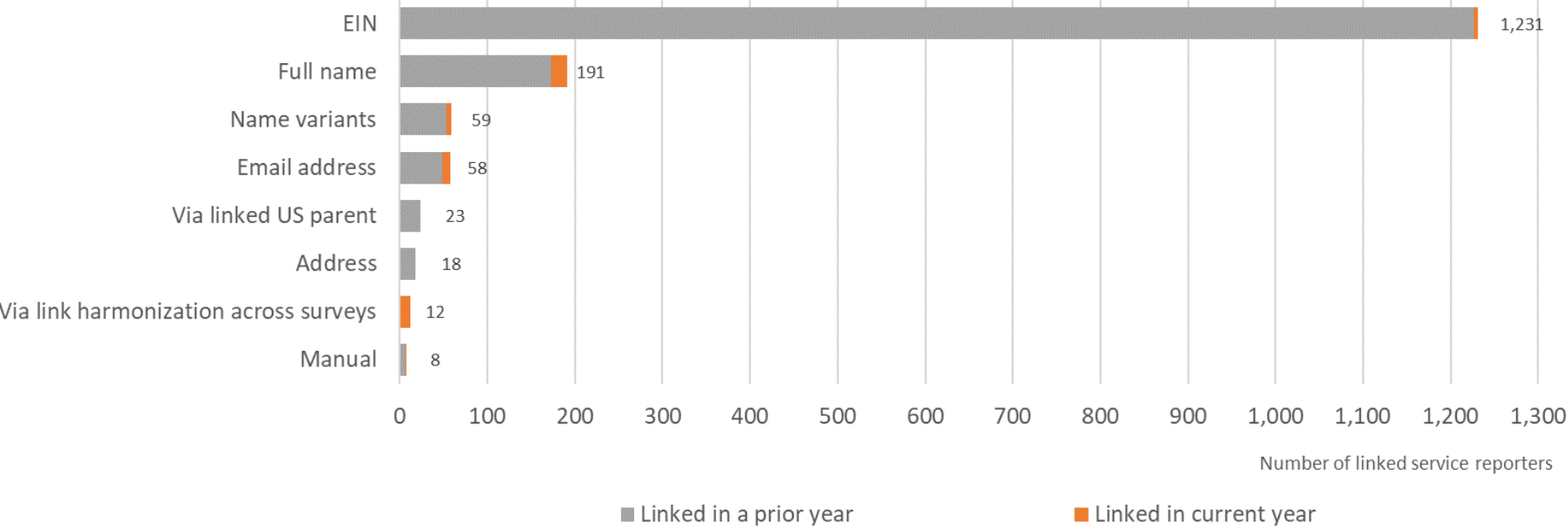
- *Each services reporter may link to only one MNE, but an MNE may link to multiple service reporters.*
- *Once a services reporter linked to an MNE, it was no longer eligible for matching in later rounds.*

Composition of services links by type of match, 2022

Links to U.S. parents

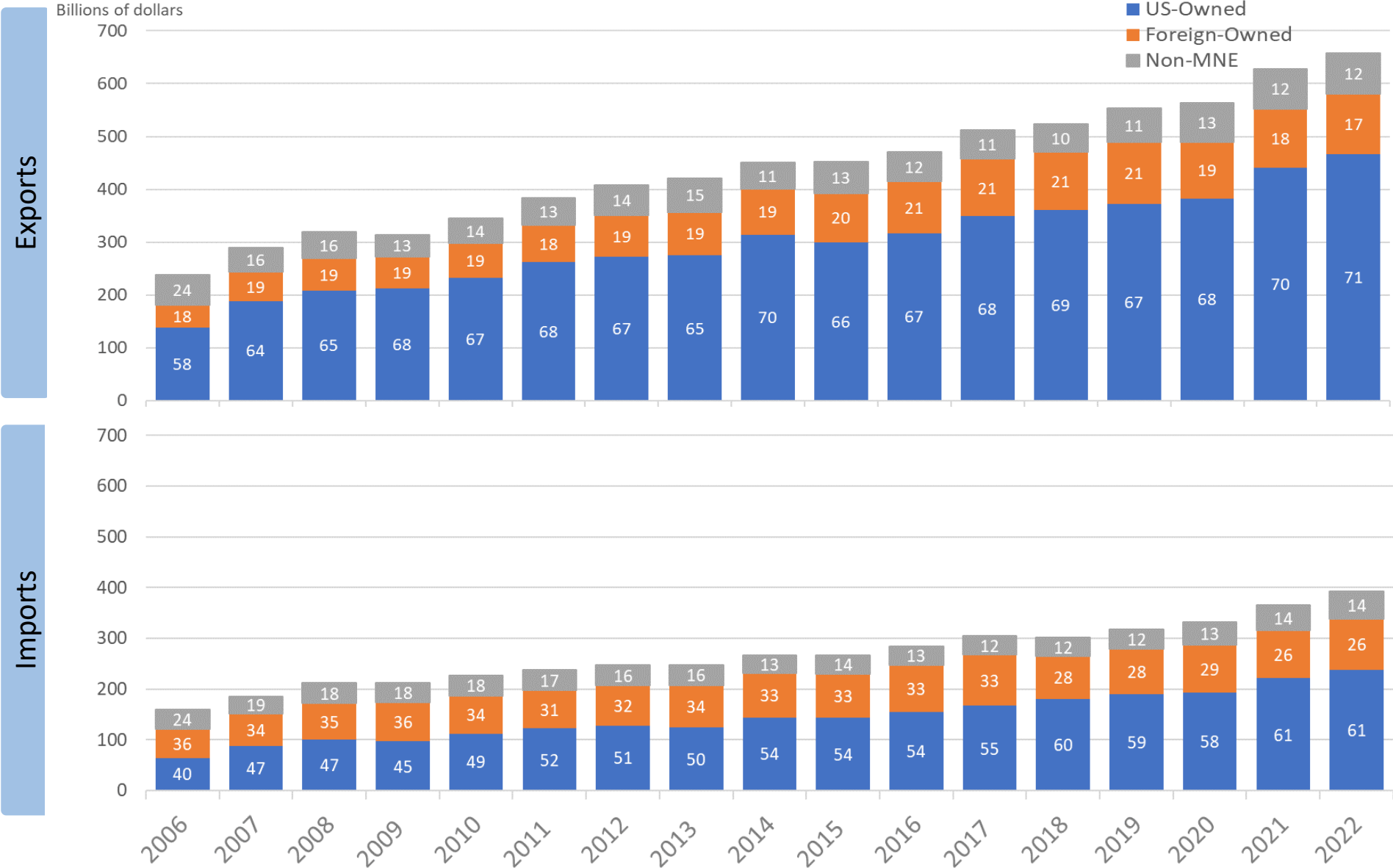


Links to U.S. affiliates



- By industry sector, finance and insurance accounts for the largest share of both exports and imports of services.
- MNEs have accounted for most of both exports and imports of services for many years.
- Country patterns in services trade vary by firm type.
- A substantial share of services trade by MNEs, especially U.S.-owned MNEs, is by firms that are both exporters and importers.

U.S. Trade in Selected Services by Multinational Activity, 2006-2022

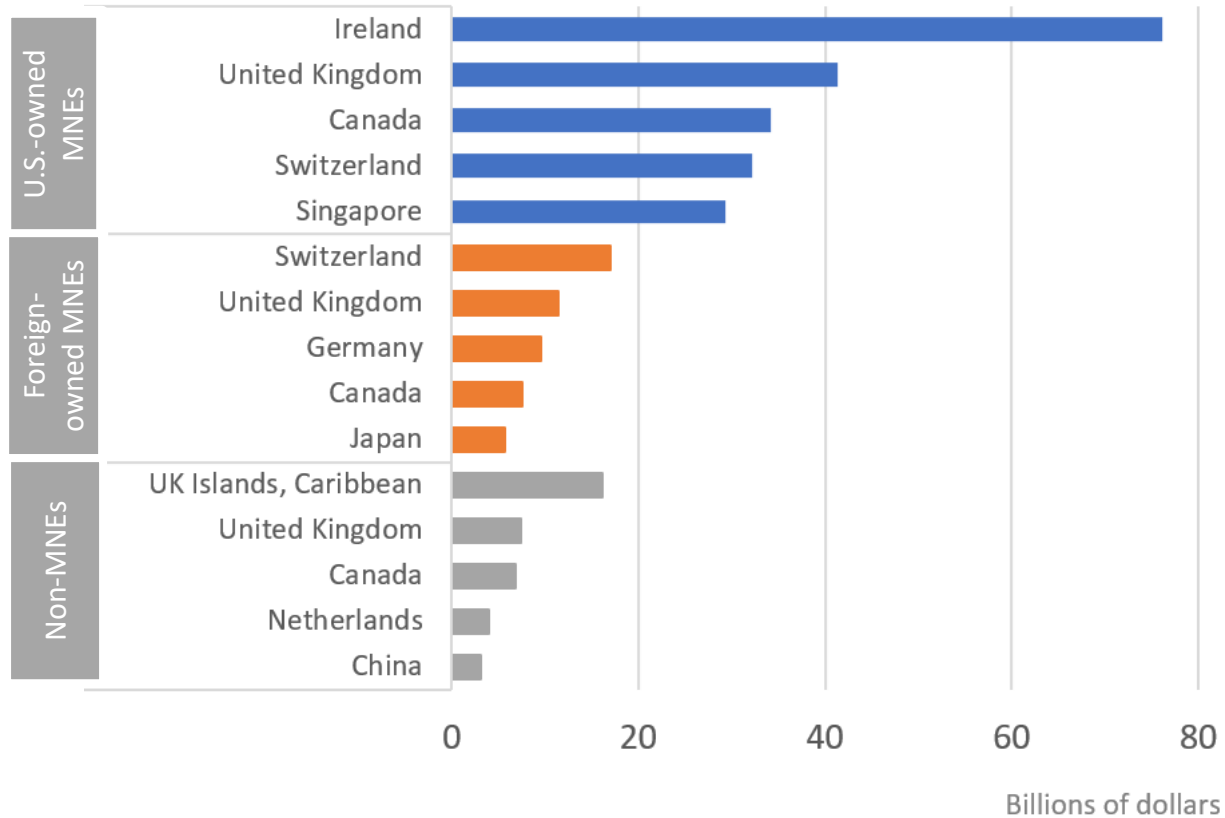


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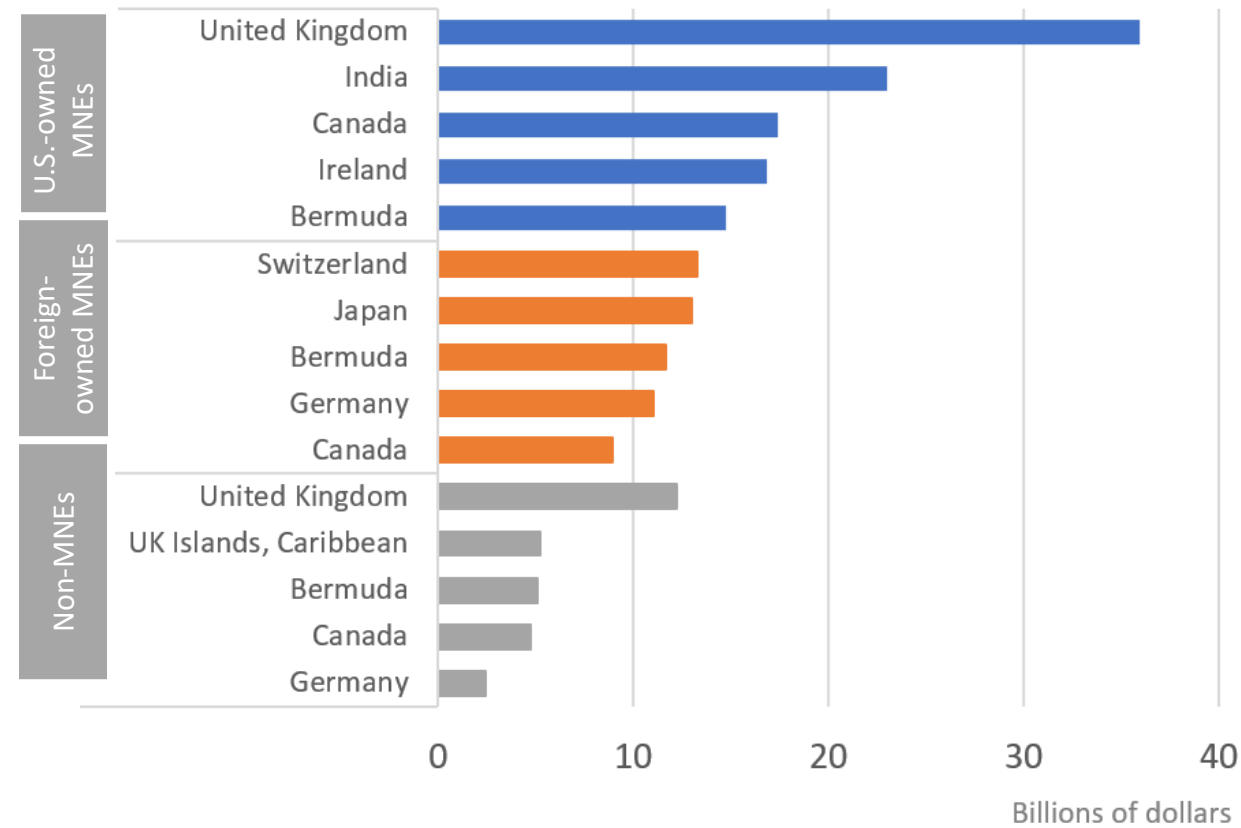
- The percent of total selected services trade for each firm type is displayed on the bars.

Trade by firm type and selected partner country, 2022

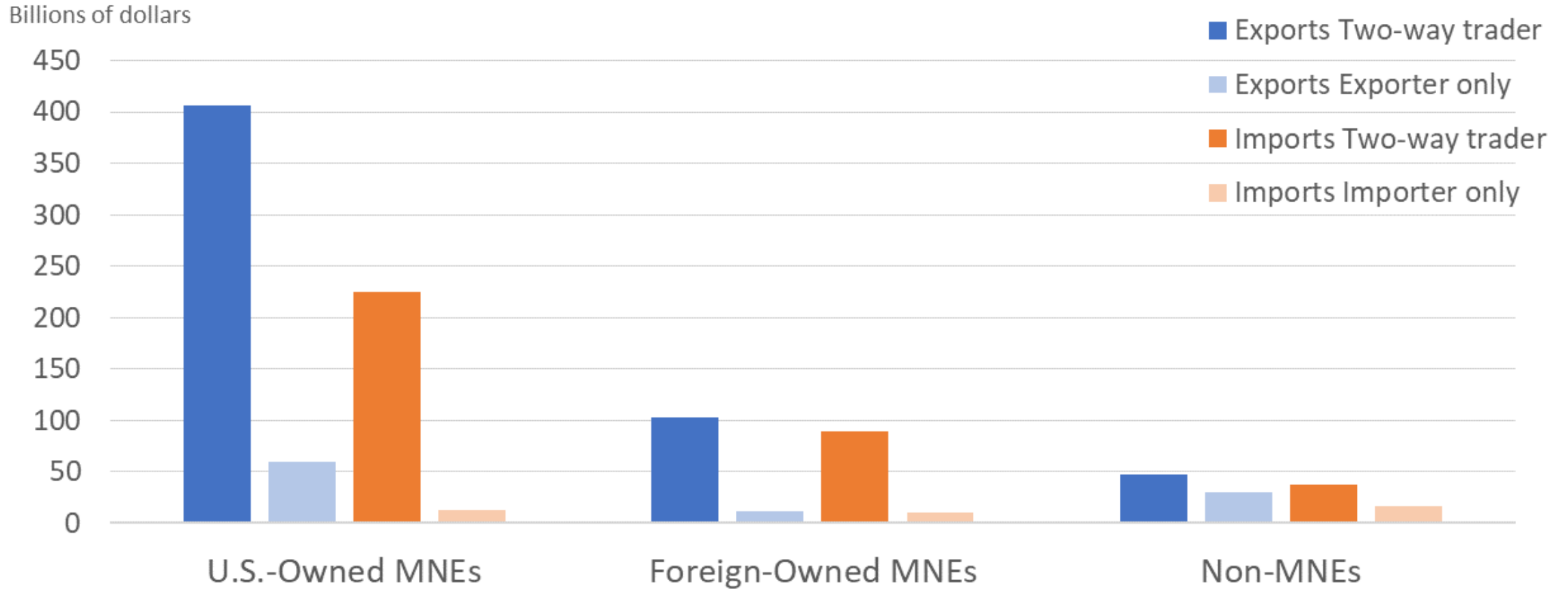
Exports



Imports



Trade by firm type and type of trade activity, 2022



Near term (2023)

- Begin to publish “Profile of U.S. Exporters and Importers of Services” statistics annually
- Continue to apply linking methods to other external data
 - Digital economy
 - Federal Financial Institution Examination Council

Longer term (2024 and beyond)

- Incorporate probabilistic matching into the linking procedure
- Further reduce need for analyst review
- Explore other applications to supplement and extend information from our surveys

More information: Analysis



The screenshot shows the BEA website's navigation menu. The 'News' dropdown menu is open, and an orange arrow points to the 'Survey of Current Business' option. The background shows a news article titled '2nd Quarter 2023' with a 'Current Release' button at the bottom.

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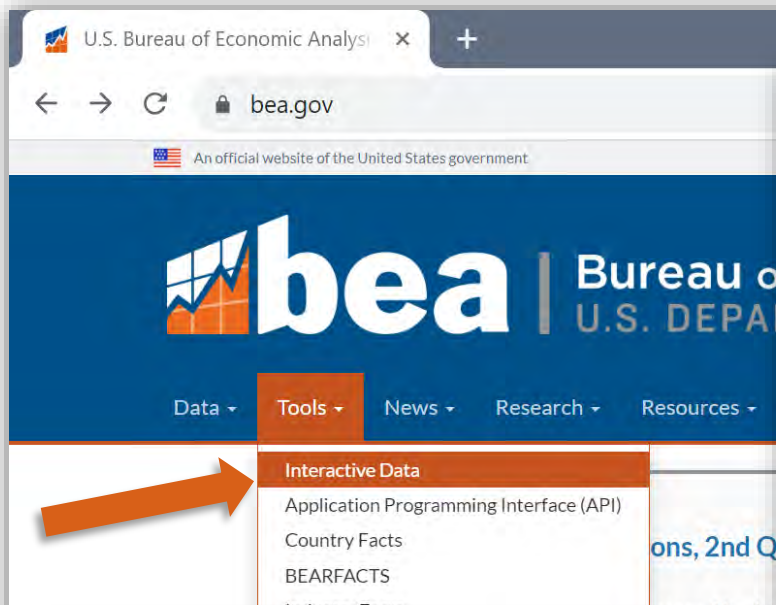
Sept
U.S.
The
perc
stat
The revised first-quarter deficit was \$214.5 billion. The second-quarter deficit was 3.2 percent of current-dollar gross domestic product, up less than 0.1 percent from the first quarter.

2nd Quarter 2023

ed by \$2.4 billion, or 1.1
quarter of 2023, according to
au of Economic Analysis (BEA).

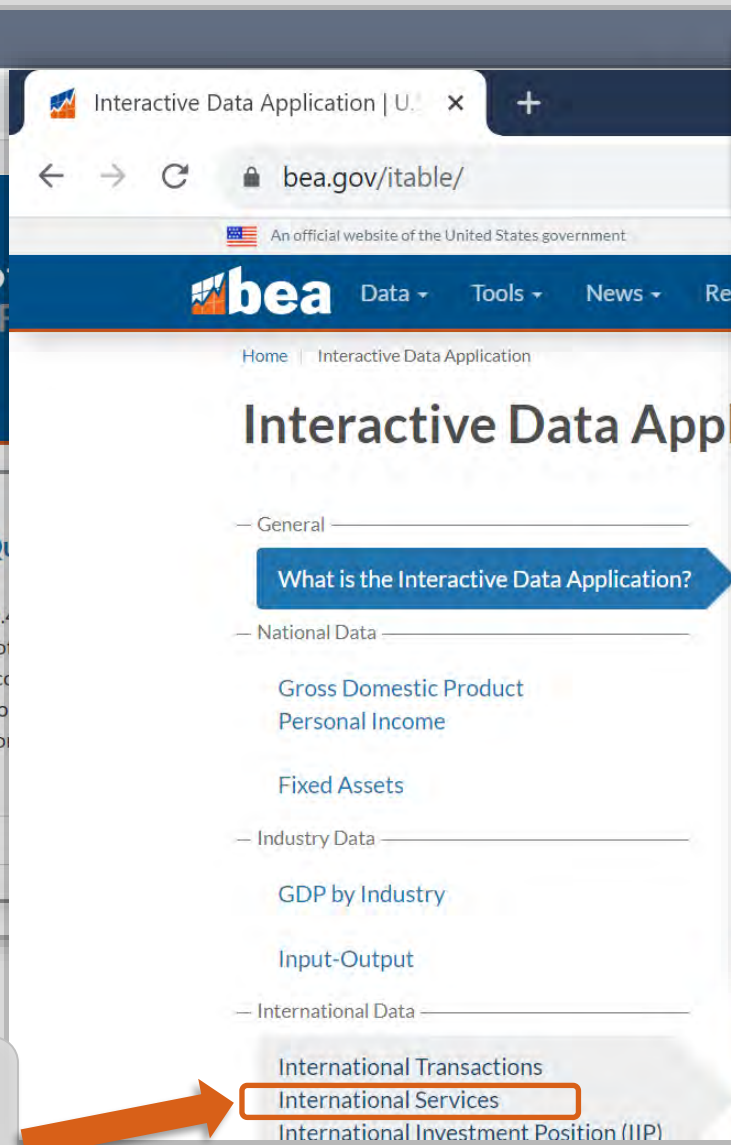
The report will be released later this year in the *Survey of Current Business*, the journal of the U.S. BEA. The *Survey* can be found under **News** on the BEA home page or directly via <https://apps.bea.gov/scb/>

More information: Data

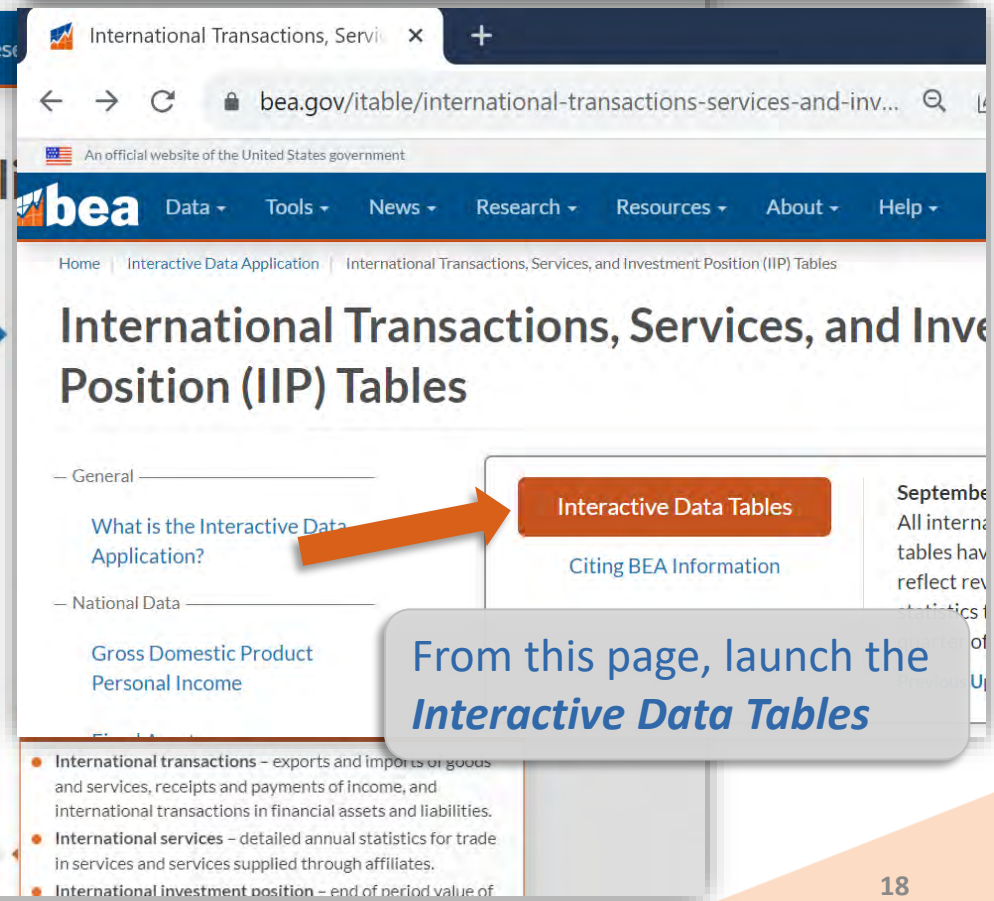


The new and revised data will be available via BEA's interactive data tables ("iTables") under **Tools** on the BEA home page. The data may also be accessed directly via [this link](#).

Then, navigate to **International Services**



Data on characteristics of firms that trade services are in tables 6.1 – 6.2 in the **International Services** iTables



From this page, launch the **Interactive Data Tables**

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