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Toward U.S. Trade in Services by State: Exploratory Results of a Survey-Based Approach for Selected Services and Intellectual Property

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Abstract

BEA produces statistics on U.S. international trade in services at the national level and is working to produce state-level estimates. This paper presents an initial look at responses to BEA survey questions asking companies to report the top three states or territories, and the associated shares, for their sales to (purchases from) foreign persons. The estimation of trade in services by state presents both conceptual and practical challenges. This paper presents information about the data, estimation method, and results for a subset of services, referred to as "selected services (excluding financial and insurance services)." This paper is the first installment of a BEA initiative to produce a complete set of statistics on trade in services by state; future installments will cover other service types.

Keywords International trade, international transactions, services exports, services imports, state level statistics, survey data, trade in services

JEL codes C81, C82, C83, F10

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1. Introduction

A. Background and Motivation

The U.S. Bureau of Economic Analysis (BEA) publishes statistics on U.S. international trade in services that are included in the broader set of U.S. International Transactions Accounts (ITAs) and in the National Income and Product Accounts, including U.S. gross domestic product (GDP). In 2024, the United States exported $1.2 trillion and imported $0.8 trillion in services. In the same year, it exported $2.1 trillion and imported $3.3 trillion in goods.[1] The U.S. Census Bureau has primary responsibility for compiling statistics on U.S. exports and imports of goods and publishes them at both the national level and by U.S. state.[2] BEA has primary responsibility for statistics on U.S. exports and imports of services and publishes them at the national level, but not yet by state.

This working paper is the first installment in a BEA initiative to produce a complete set of statistics on trade in services by state that would provide valuable information to policymakers at the national, state, and local levels about how exporting and importing affects state economies. The state-level statistics would also help business and academic communities assess emerging trends in the geography of U.S. trade in services. In addition, they could be inputs to BEA's efforts to estimate gross domestic product (GDP) by state on an expenditure basis,[3] which would require measures of state-level international trade transactions as well as trade between states. Currently, BEA measures state-level GDP using an income-based approach, which does not require directly measured international trade transactions.[4]

BEA uses a variety of data sources and methods to estimate the range of activities covered by trade in services at the national level. Because these methods vary substantially by activity, BEA is developing a series of tailored methodologies to estimate trade by state for different service types. This working paper focuses on a subset of statistics on international trade in services that is based on data collected

[1] The figures for trade in services are preliminary estimates as of June 24, 2025, and will change when BEA incorporates newly available and revised survey data with BEA's Annual Update release in June 2026. For the latest quarterly release of BEA's statistics on U.S. trade in goods and services, see U.S. Bureau of Economic Analysis, "International Transactions," released January 14, 2026.
[2] For data on U.S. trade in goods by state, see U.S. Census Bureau, "State and Metropolitan Area Trade Data," accessed September 8, 2025.
[3] To date, BEA has released one working paper estimating a component of state GDP using an expenditure approach. See Christian Awuku-Budu, Kyle K. Hood, and Kun Li, "Developing Federal Government Consumption Expenditures and Gross Investment Statistics by State," U.S. Bureau of Economic Analysis, December 2025.
[4] For more information on BEA's current estimation methodology for GDP by state, see U.S. Bureau of Economic Analysis (BEA), "Gross Domestic Product by State: Concepts and Methods," (Suitland, MD: May 2025).

by BEA for "selected services and intellectual property," which cover many service types included in BEA's trade in services statistics. Table 1.1 in Subsection 1C lists the service types covered by overall BEA reporting and specifies which are in scope for this working paper.[5] Future installments in the series will address other types of services.

B. Existing Works

Several academics, think tanks, and consulting firms have produced estimates of U.S. exports of services by state or have measured potential local exposure to trade in services. To date, no studies have produced estimates of imports. Several national statistical agencies have also produced estimates of subnational trade in services in their countries. Overall, estimation of trade in services at the subnational level is challenging, and only certain groups have developed relevant estimates. For the United States, most estimates are from earlier years and are no longer in production, with the last active source available only to paid subscribers. This working paper presents the first published effort by BEA to produce official statistics on trade in services by state and the first method directly based on firm-level data.

To estimate services exports from the **United States** at the local level, Jensen and Kletzer (2005) developed a method using localized imbalances in industry-level supply and demand to assess whether services in a given metropolitan statistical area could potentially be traded internationally. The authors used BEA's published Input-Output tables to impute local demand for certain industries' output and used worker-level occupation data from the 2000 Decennial Census of Population Public Use Micro Sample to estimate local supply. Concentrations in industry-level employment exceeding local demand were taken as indicators of potential services exports, although the authors acknowledged that this method could not reliably differentiate between clusters of employment selling internationally and those focused on selling to other parts of the United States. Jensen and Kletzer (2010) followed up by using data from the U.S. Department of Labor's O*Net to account for variable tradability in job-specific tasks.[6] This was done to screen out occupations that may be clustered locally but are less tradable across borders. Jensen (2011) adopted a related method using data including worker-level information from the American Community Survey. Gervais and Jensen (2019) also used imbalances between local supply and demand to estimate tradability of services. They combined local industry demand estimates generated from BEA's Input-Output tables with a gravity-like measure of distance derived from the U.S. Census Bureau's and U.S. Bureau of Transportation Statistics' (BTS') Commodity Flow Survey. They then

[5] The different service types and data sources will be discussed further in the subsection titled "BEA Trade in Services Data."
[6] U.S. Employment and Training Administration, *O*Net Online*, updated August 26, 2025.

compared these results to local industry supply estimates based on establishment-level data from the 2007 Economic Census to estimate how much certain industries are geographically concentrated in excess of local demand and, by extension, how likely they are to sell to other parts of the United States and/or other countries.

From 2010 to 2018, the Brookings Institution published estimates of U.S. goods and services exports by county and state.[7] For most service categories, Brookings produced these estimates by linking BEA's published service categories to industries and allocating services exports in proportion to a county-level percentage of national output in the relevant industry.[8]

In 2019, the U.S. Chamber of Commerce and Google published a report on exports by small businesses with 500 or fewer employees.[9] Their report was based on a survey conducted by Brunswick Insight and Trade Partnership Worldwide. The report included tables of the percentage of small businesses in each state that reported they exported, as well as estimated impacts on output and employment. However, the state results did not present a breakdown of goods versus services and did not include estimates for trade value.

Trade Partnership Worldwide publishes estimates of U.S. goods and services exports by state and congressional district,[10] although their data are accessible only to paid subscribers. They begin their services exports estimation process with the baseline assumption that services exports in a given industry are distributed across states in proportion to value-added output as measured by Moody's Analytics. They link BEA's published exports by service type to industry-level data using internally generated tables. They then calculate state-industry location quotients by dividing the state share of value-added in a given industry by the national share of value-added in the same industry. Finally, they adjust state services exports estimates by the amount of the location quotients.[11]

The following **national statistical offices** have published estimates of subnational trade in services for their countries. BEA has identified two (Australia and the United Kingdom) that publish these statistics regularly and for all sectors of the economy.

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[7] Nick Marchio and Joseph Parilla, "Export Monitor 2018," Brookings Institution, April 30, 2018.
[8] Different methods were used for royalties, travel and tourism, and education. See Brookings Institution, "Brookings export database methodology," updated May 2015.
[9] U.S. Chamber of Commerce Technology Engagement Center and Google, "Growing Small Business Exports: How Technology Strengthens American Trade," October 30, 2019.
[10] Trade Partnership Worldwide, LLC, "CDxports and CDxjobs," updated October 2024.
[11] Trade Partnership Worldwide, LLC, "CDxports and CDxjobs Databases: Sources and Methodology," updated October 2024.

- The Australian Bureau of Statistics publishes services exports and imports by state.[12] They base estimates for many service types on service-specific sources of information, while allocation for many others "is primarily based on the location of the business reporting the information, which serves as a proxy for the state of provision/consumption of that service."[13]
- The U.K. Office for National Statistics publishes estimates of services exports and imports by U.K. region.[14] The estimates are created primarily via allocating firm-level trade data by establishment in proportion to employment.[15]
- Statistics Canada publishes data on provincial exports of environmental and clean technology services based on specific survey questions.[16]
- The Indian Ministry of Commerce and Industry has published one statistical release on services trade by state and union territory.[17]
- Statistics Netherlands published estimates for 2020 of services exports and imports by Dutch region. Their statistics were based on a link between services trade reporting and establishment-level data from the Dutch General Business Register.[18]

C. BEA Trade in Services Data

BEA statistics on trade in services are based on a variety of data sources and methods. Significant amounts of data come from three major sets of benchmark (conducted once every 5 years) and quarterly enterprise-level surveys on international services and transactions in intellectual property—the BE-120 Benchmark and BE-125 Quarterly Survey of Transactions in Selected Services and Intellectual Property with Foreign Persons, the BE-140 Benchmark and BE-45 Quarterly Survey of Insurance Transactions by U.S. Insurance Companies with Foreign Persons, and the BE-180 Benchmark and BE-185 Quarterly Survey of Financial Services Transactions Between U.S. Financial Services Providers and Foreign Persons.[19]

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[12] Australian Bureau of Statistics, *"*International Trade: Supplementary Information, Calendar Year," April 29, 2025.
[13] Australian Bureau of Statistics, *"*International Trade: Supplementary Information, Calendar Year methodology," April 29, 2025.
[14] U.K. Office for National Statistics, *"*Subnational trade in services," August 6, 2025.
[15] U.K. Office for National Statistics, *"*International trade in UK nations, regions and cities QMI," June 28, 2023.
[16] Statistics Canada. Table 38-10-0031-01 "Revenues from environmental and clean technology goods and services exports, Canada and regions (x 1,000)," accessed August 26, 2025; Statistics Canada, "Survey of Environmental Goods and Services, 2024," April 17, 2025.
[17] Indian Ministry of Commerce and Industry, *"*Centre formulates 'Action Plan for Champion Sectors in Services' to give focused attention to 12 identified Champion Services Sectors," Press Information Bureau, February 10, 2023.
[18] Dennis Dahlmans, Marjolijn Jaarsma, Janneke Rooyakkers, and Iryna Rud, "International trade in services," in *Dutch Trade in Facts and Figures 2022: Exports, imports, and investment* (The Hague/Heerlen/Bonaire: Statistics Netherlands, 2021).
[19] For more detail see U.S. Bureau of Economic Analysis (BEA), *"*U.S. International Economic Accounts: Concepts and Methods" (Suitland, MD: BEA, September 2025), 94–96.

This working paper focuses on certain service types covered by the BE-120 and BE-125. Table 1.1 lists the broad service type categories included in BEA publications and identifies those covered in this working paper.

Table 1.1: Service Types Covered by This Working Paper

Service type	Covered?
Maintenance and repair services not included elsewhere (n.i.e.)	No
Transport	No
Travel (for all purposes including education)	No
Construction	Yes
Insurance services	No
Financial services	No
Charges for the use of intellectual property n.i.e. - *Franchises and trademarks licensing fees* - *Licenses for the use of outcomes of research and development* - *Licenses to reproduce and/or distribute computer software* - *Licenses to reproduce and/or distribute audiovisual products*	Yes
Telecommunications, computer, and information services - *Telecommunications services* - *Computer services* - *Information services*	Yes
Other business services - *Research and development services* - *Professional and management consulting services* - *Technical, trade-related, and other business services*	Yes
Personal, cultural, and recreational services - *Audiovisual services* - *Artistic-related services* - *Other personal, cultural, and recreational services*	Yes
Government goods and services n.i.e.	No

For a detailed list of BEA's service type categories, see U.S. Bureau of Economic Analysis, "Table 2.1. U.S. Trade in Services, by Type of Service," released July 3, 2025.

The selected services that are in scope for this paper include substantial portions of international services traded between businesses and accounted for 50 percent of total U.S. services exports and 40 percent of imports in 2022. This paper does not cover insurance services or financial services, which are primarily based on data collected from other BEA surveys. Information on the composition of trade in these service types by state based on relevant questions on the 2023 BE-140 and 2024 BE-180 will be presented in future installments of this working paper series.[20] Other service types that are out of scope for this working paper are mainly based on source data other than BEA-administered surveys.[21] These service types are maintenance and repair services n.i.e., transport, travel (for all purposes including education), and government goods and services n.i.e. Methods to develop estimates of trade in services by state for these categories are under development and will be presented in future installments in this series. This paper will refer to in-scope service types as "selected services (excluding financial and insurance services)."[22]

D. BEA Methods Under Development

The current research effort is not the first time that BEA has explored the feasibility of developing statistics on state-level trade in services. An unpublished 2008 BEA study concluded that feasibility varied by service type, reflecting the variety of sources and methods used to compile BEA's statistics. Lacking its own information on the location of services production and consumption, BEA's proposal focused on identifying existing data from other sources for state allocation. This early study provided a theoretical and practical framework for estimating state exports of services based on linked U.S. Census Bureau data. This allocation method leverages the detailed geographic granularity of establishment-level Economic Census data to allocate BEA's enterprise-level services exports data to U.S. states. BEA has applied this method to estimate services by state for 2007, 2012, and 2017. Results using the linked data allocation approach will be presented in a future installment in this series.

BEA later developed the approach presented in this paper: allocation based on BEA survey data. For this approach, BEA has added questions on trade in services by state to its 2022 benchmark survey of

[20] In addition, payments for financial services and insurance services collected on the BE-120 and BE-125 will be included in that report.

[21] Certain types of services that are collected on the BE-120/125 are not treated as in scope for this paper because they are included in statistics for service categories that are predominantly based on external data. For example, maintenance services (included in maintenance and repair services) are not in scope for this paper but will be covered in a future installment.

[22] The grouping of "selected services (excluding financial and insurance services)" is based on the "selected services" covered in Jennifer Bruner and Alexis Grimm, "A Profile of U.S. Services Traders, 2006–2022," *Survey of Current Business*, May 31, 2024. The difference is that this working paper does not cover financial and insurance services. Due to the qualifications listed in this paragraph, this is also a different grouping from the "selected services" collected on the BE-120 and BE-125 surveys.

transactions in selected services and intellectual property (BE-120), 2023 benchmark survey of insurance transactions (BE-140), and 2024 benchmark survey of financial services transactions (BE-180).[23] The new questions ask U.S.-resident[24] firms to report the top three states in which the firm performed services for foreign persons (exports), along with each of the three states' shares of the firm's total services exports. The survey also asks firms to report the top three states in which the firm consumed services performed by foreign persons (imports) and the associated shares of total services imports. This method has the benefits of covering both exports and imports and of being based on direct input from the firms. However, it also introduces challenges related to survey non-response, respondent burden, and potential measurement issues from firms reporting that less than 100 percent of trade came from the top three states.

After careful evaluation, BEA has determined that for survey-based measures of trade in services, allocation based on direct collection on BEA surveys is more viable than allocation based on linked Census data. This decision reflects practical considerations such as the timeliness and availability of data, disclosure requirements, and institutional resource constraints. While future work will focus on refining and expanding the BEA survey-based method, BEA plans to present the results based on the allocation using linked U.S. Census Bureau data to provide additional context for BEA's decision.

The estimation of trade in services by state presents a set of interconnected conceptual and practical challenges. A firm's exports or imports could be conceptualized as belonging to (1) the state in which revenues or expenses are booked; (2) the state(s) where the services are performed or consumed; (3) the state in which the establishment selling or purchasing the service is resident; or (4) the state in which the employees involved in performing or consuming the service are resident. For example, say that employees from a company's Missouri office are resident in Kansas and Missouri. Now, say that the employees from the Missouri office travel to New York to perform services for an international client and that the company books revenues at its headquarters in Minnesota. It would be conceivable to allocate the services export to Minnesota, where revenue was booked; to New York, where services

[23] Results based on adding the state questions to the 2022 BE-120 are presented here; similar analysis of state questions on the 2023 BE-140 and 2024 BE-180 is forthcoming.

[24] The state questions on the BE-120 ask about transactions with "foreign persons," which per form instructions refer to "any person resident outside the United States or subject to the jurisdiction of a country other than the United States." See BEA, "2022 Benchmark Survey of Transactions in Selected Services and Intellectual Property with Foreign Persons: Form BE-120," January 2023, 9–10; 26. For the purposes of the international accounts, BEA defines residency as "the economic territory with which [an institutional unit] has the strongest connection, expressed as its center of predominant economic interest." See BEA, *U.S. International Economic Accounts: Concepts and Methods*, 36.

were performed; to Missouri, the place of residence of the establishment conducting the activity; or to a mix of Kansas and Missouri, where the employees were resident.

On one hand, using the place of residence (either the third or fourth approach) is most consistent with BEA's current practice for international trade statistics. BEA uses the countries of residence of both parties to a transaction to determine whether the transaction should be considered a U.S. export, import, or neither.[25] Similarly, BEA uses employees' state of residence as the basis to allocate personal income by state.[26]

On the other hand, the place of residence may often be difficult to ascertain for trade in services. Where a project involves employees in multiple states across establishments in multiple states, the allocation of trade based on residency can be highly complex, potentially exceeding the amount of detail readily available.

This paper instead uses the second option from the above list—the place where services are performed or consumed. From a practical standpoint, identifying the location of services production and consumption remains inherently complex given the intangible nature of services. In many firms (especially larger firms), production of exported services could be shared across multiple locations. The same is true of imported services; for example, imported intellectual property rights could be used across multiple production sites. The survey questions address this issue by asking exporters to provide the locations in which "the largest percentage of your company's sales to foreign persons were performed" and importers to provide the locations in which "the largest percentage of your company's purchases from foreign persons were consumed."[27]

The next section presents the underlying data and method used in this paper. Section 3 then presents the exploratory results, and Section 4 concludes and outlines potential next steps.

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[25] BEA, *U.S. International Economic Accounts: Concepts and Methods*, 35–38.
[26] BEA, *State Personal Income and Employment: Concepts and Methods*, 5.
[27] This approach relies on reporting firms to address the complexities of allocating trade in services by state. If the respondents are "unable to determine where the services were performed" (consumed), "or if the services were not performed" (consumed) "in the United States," the survey instructs respondents to "attribute sales" (purchases) "to the location where the revenues" (payments) "were recognized in your accounting records." See BEA, "2022 Benchmark Survey of Transactions in Selected Services and Intellectual Property with Foreign Persons: Form BE-120," 9–10.

2. Data and Method

This section will first establish the scope of the data collected and will then introduce the survey measure used. Next, it will present measurements of missing data. It will then look for patterns in the reported data that could be used to refine the measures in the future by estimating values for the missing data. It will do this by comparing reported services trade data to (1) state GDP; (2) the location of headquarters; and (3) data from BEA's surveys on the activities of multinational enterprises (AMNE).

A. Scope

The scope of this analysis is limited to the following data:

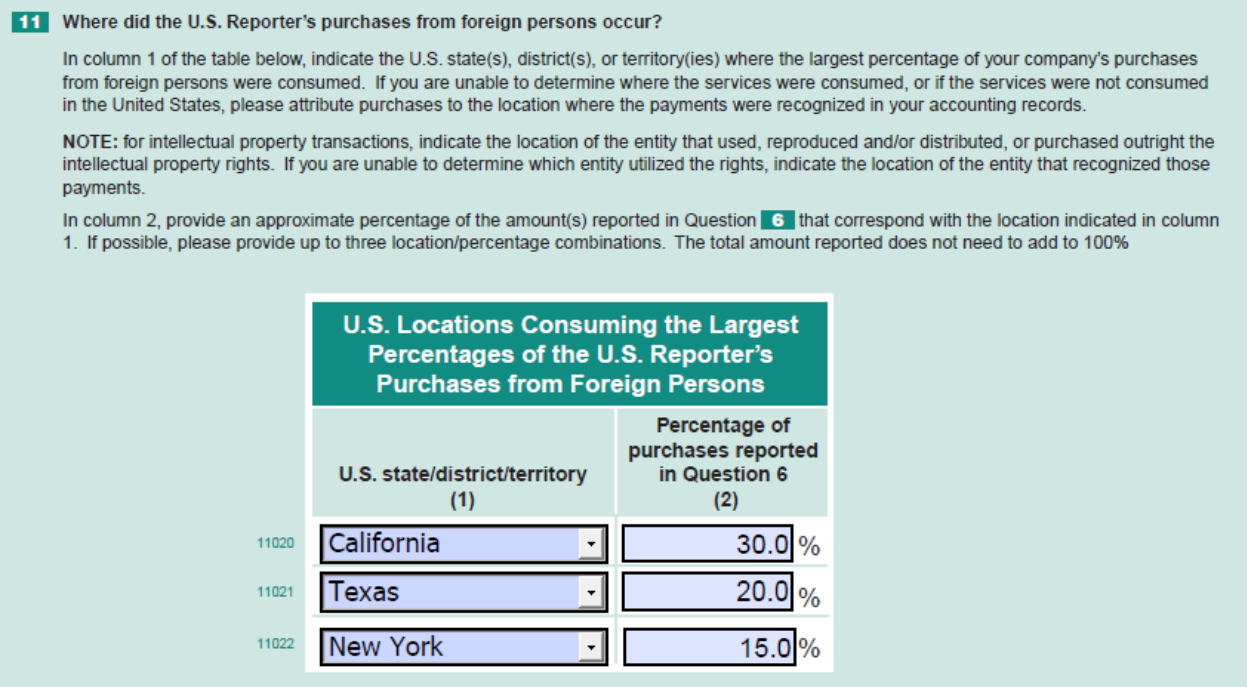
- *Years covered:* data covering transactions that occurred in 2022, the first year for which questions on the composition of trade by state were included on a BEA trade in services survey.
- *States and territories covered:* The survey allowed firms to report trade from any of the 50 states plus the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and U.S. Offshore Oil and Gas Sites. An "Other U.S. Areas" option was also available for respondents with operations in other U.S. territories.[28]
- *Service types covered:* This paper is limited to selected services (excluding financial and insurance services). (See Subsection 1C for further details.)
- *Firms covered:* Analysis in this section is limited to U.S.-resident firms that responded to the BE-120 state questions and to selected major firms for which values were estimated based on publicly available information.
- *Countries covered:* This paper presents total exports to and imports from all countries. It does not disaggregate services trade by partner country.

B. Method

On the 2022 BE-120, respondents were asked to indicate up to three states that accounted for the largest shares of services exports and imports. They also provided the percentages of total exports and imports reported on the survey associated with the top three states. Chart 1 illustrates the format of the question and how a hypothetical company might respond to the relevant question for imports.

[28] Other U.S. territories include American Samoa, Guam, and the Northern Mariana Islands.

Chart 1: Survey Response Example



11 **Where did the U.S. Reporter's purchases from foreign persons occur?**

In column 1 of the table below, indicate the U.S. state(s), district(s), or territory(ies) where the largest percentage of your company's purchases from foreign persons were consumed. If you are unable to determine where the services were consumed, or if the services were not consumed in the United States, please attribute purchases to the location where the payments were recognized in your accounting records.

NOTE: for intellectual property transactions, indicate the location of the entity that used, reproduced and/or distributed, or purchased outright the intellectual property rights. If you are unable to determine which entity utilized the rights, indicate the location of the entity that recognized those payments.

In column 2, provide an approximate percentage of the amount(s) reported in Question **6** that correspond with the location indicated in column 1. If possible, please provide up to three location/percentage combinations. The total amount reported does not need to add to 100%

U.S. Locations Consuming the Largest Percentages of the U.S. Reporter's Purchases from Foreign Persons

	U.S. state/district/territory (1)	Percentage of purchases reported in Question 6 (2)
11020	California	30.0 %
11021	Texas	20.0 %
11022	New York	15.0 %

This hypothetical company reported percentages summing to less than 100, indicating that some imports were consumed in states other than the listed top three. The possibility of trade beyond the three states listed on the survey presents a source of missing data beyond unit or item non-response. On the other hand, some companies reported all trade from one or two states.

For selected major services-trading firms that did not respond to the state-level questions, the composition of trade by state was estimated by BEA using publicly available information. These firms accounted for 17 percent of exports and 9 percent of imports of selected services (excluding financial and insurance services). These estimates are not included in figures presented in Subsections 2C and 2D, which focus on response rates. However, they are included in Subsections 3A and 3B, which feature exploratory results of trade in services by state for selected services (excluding financial and insurance services).

C. Missing Data

There are two sources of missing data for the BE-120 trade in services by state questions: (1) unit or item non-response; and (2) for respondent firms, trade outside the top three states collected on the

survey. In practice, non-response[29] presents a larger challenge than lack of coverage by the top three states. Approximately 74 percent of surveyed exporters and 73 percent of surveyed importers[30] responded to the new questions with at least one state and an accompanying percentage allocation. These firms accounted for around 65 to 75 percent of trade value in each direction in 2022. The response rates to the trade in services by state questions are similar to those of other questions about company operations that appear only on BEA's benchmark trade in services surveys.[31] Response rates to such questions are typically lower than for questions, such as the value of sales to, and purchases from, affiliated and unaffiliated foreign persons by service type and by country, that also appear on BEA's quarterly trade in services surveys.

Among respondents, missing data due to trade outside the top three states was a limited issue, as services trade was highly concentrated. Table 2.1 lists the percentages of exports and imports attributed to the top three states by responding firms.

Table 2.1: Percentage of Reported U.S. Trade in Selected Services (Excluding Financial and Insurance Services) Attributed to the Top Three States on the 2022 BE-120

Top States[32]	*Exports*	*Imports*
State 1	86%	77%
States 1 and 2	92%	87%
States 1, 2, and 3	94%	90%

Among firms that responded to the state questions, states reported on the survey accounted for 94 percent of total exports and 90 percent of total imports. Trade was substantially concentrated in the top state, which accounted for 86 percent of exports and 77 percent of imports.

Because firms reported relatively little trade outside the top three states, the primary cause of missing data was unit or item non-response. Response rates varied systematically by trade value—with the exception of the largest traders, larger traders were on average more likely to respond to state-level questions. Response rates also varied by whether trade was reported between affiliated parties of a

[29] For the purposes of this report, a firm is defined as having responded to the state-level questions if it provided at least one state and an accompanying percentage value for a given direction in trade. The response rates' denominator is limited to firms that reported nonzero trade in a given direction.
[30] Response rates apply only to the set of companies that reported in-scope service categories mentioned in the introduction.
[31] BEA's benchmark surveys often include questions on emerging topics and the initial release of new questions.
[32] In this table, State 1 refers to the state from which the firm reported the most trade, while State 2 and State 3 are the states from which the firm reported the second- and third-highest values (if applicable).

multinational enterprise or between unaffiliated parties. The following sections summarize variation in response rates across these dimensions.

The figures presented in Section 2 are based only on values reported by respondents. There is a possibility that these values could be skewed toward large states, as states with larger economies are more likely to appear among firms' top three trading states, leaving smaller states less likely to be covered in the data. BEA is currently evaluating methodologies to estimate the distribution of services trade by state for non-reporting firms for which values have not been estimated using publicly available information. The new methods will take into account a possible skew toward large states in the reported values. In the future, as BEA fills these gaps in its data, the distribution of trade across states may change noticeably.

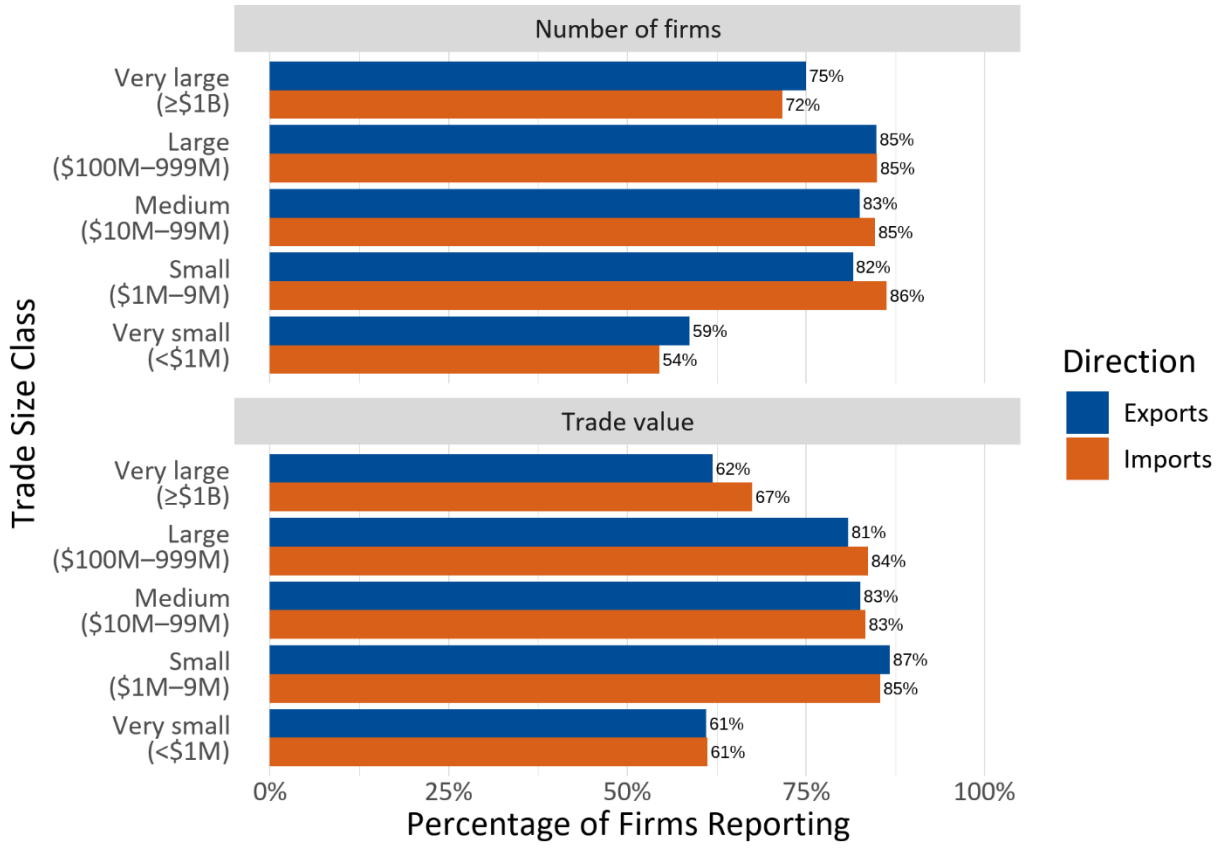
D. Trade Value Covered by the New Survey Questions

Response rates were positively correlated with trade value, with the exception of very large exporters (importers), meaning those firms with exports (imports) of at least $1 billion. This means that missing data due to non-response is a greater challenge among the smallest traders, as well as for a few very large traders with outsized impacts on aggregate estimates.

Chart 2 shows response rates to the state-level questions by direction of trade and trade size class, a grouping based on a firm's total exports (imports).[33] The top panel shows response rates by number of firms, while the bottom panel shows response rates weighted by trade value.

[33] Size class is specific to the direction of trade. So, a given firm may belong to a larger size class for exports than for imports, or vice versa.

Chart 2: Response Rates to Questions on Trade by State in Selected Services (Excluding Financial and Insurance Services) Among Services-Trading Firms by Trade Size Class on the 2022 BE-120



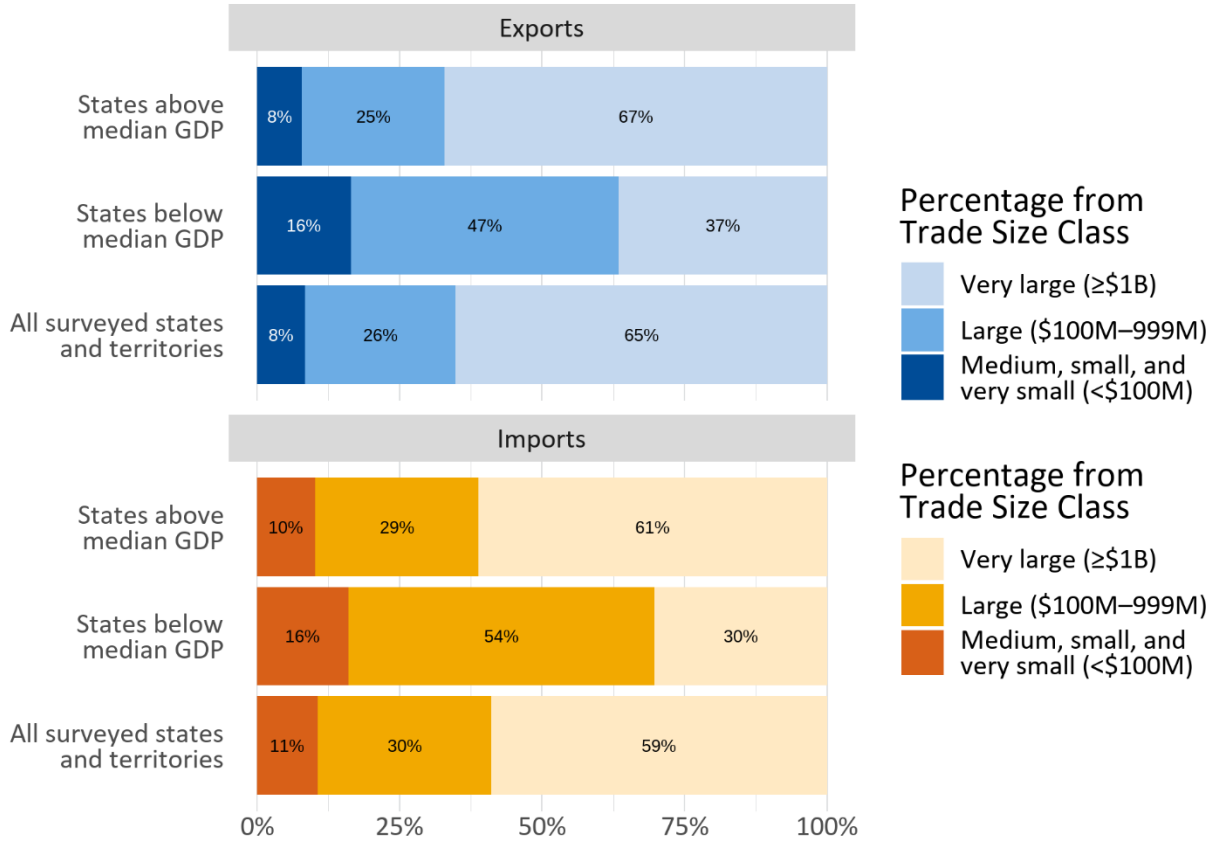
Note: Trade size classes are based on a firm's total services exports or imports. Some firms may appear in one size class for exports and another for imports.

Firms in size classes above very small (reporting $1 million or more in trade) tended to respond to the state-level questions at higher rates, although the effect dropped off for very large traders. The lower response rates for very large traders were more pronounced when response rates were measured as a percentage of dollar value (the bottom panel) instead of number of firms (the top panel). The low response rates for the very large category were significantly driven by the largest non-respondents, especially those reporting $10 billion or more in exports (imports).

Smaller traders have a modest influence on total U.S. statistics but can have greater impacts on state-level statistics. Among firms that responded to the questions on trade by state, firms exporting less than $100 million (very small, small, or medium) accounted for 8 percent of U.S. exports, and firms importing less than $100 million accounted for 11 percent of U.S. imports. Within some states, though, these smaller traders have greater importance. Small traders play a proportionally greater role in many states

with smaller economies. Chart 3 illustrates trade by size class for exports to, or imports from, states below and above median state GDP.[34]

Chart 3: Percentage of Reported U.S. Trade in Selected Services (Excluding Financial and Insurance Services) by Trade Size Class and Relative State GDP on the 2022 BE-120



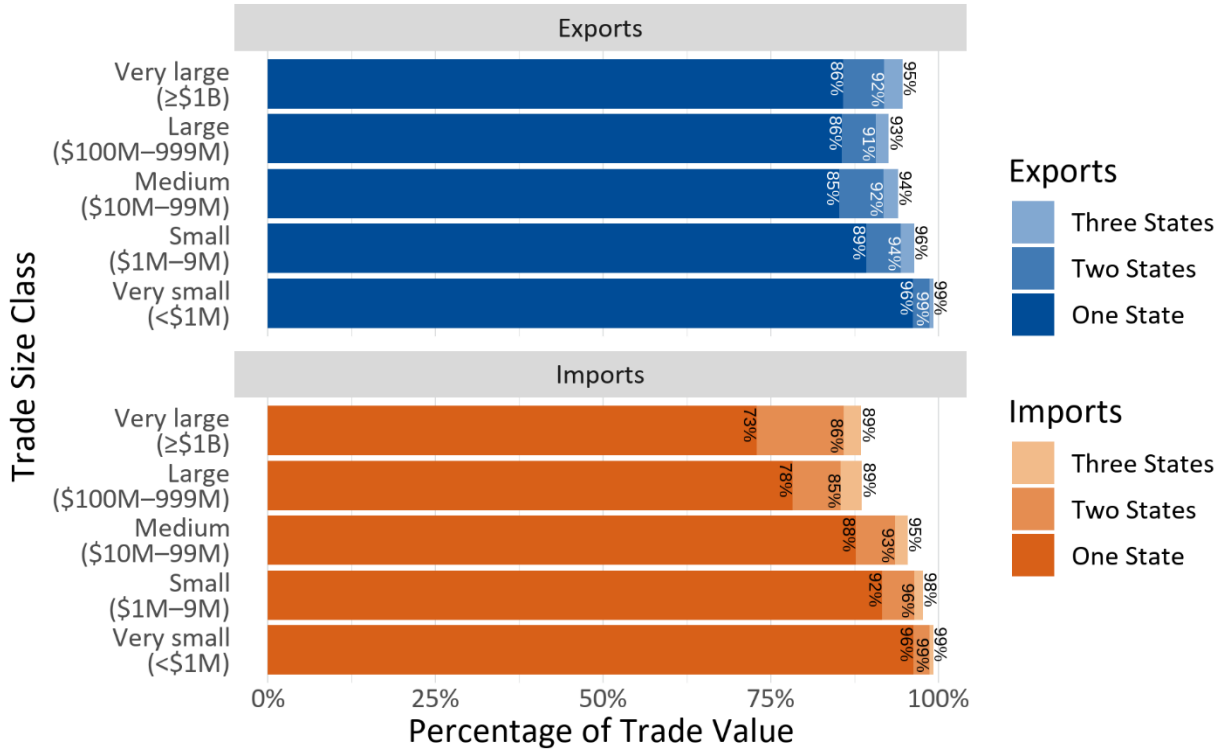
Note: Trade size classes are based on a firm's total services exports or imports. Some firms may appear in one size class for exports and another for imports.

Due to the significance of larger states to overall U.S. trade in services, the distribution by trade size class for states above the median GDP (righthand columns) was similar to that of the overall sample, with firms exporting (importing) $1 billion or more making up a majority of transactions. However, smaller traders were relatively significant in states with smaller economic output. Firms exporting (importing) less than $1 billion made up a majority of trade for states below the median GDP. For states below the median GDP, firms exporting (importing) less than $100 million accounted for 16 percent of both exports and imports, as compared to 8 percent and 10 percent in states with GDP above the median.

[34] Includes the fifty states; Washington, DC; Puerto Rico; and the U.S. Virgin Islands.

Chart 4 illustrates the share of services trade that firms reported from their top one, two, or three states. The share of trade reported from the top three states was negatively correlated with trade value:

Chart 4: Percentage of Reported U.S. Trade in Selected Services (Excluding Financial and Insurance Services) Attributed to the Top Three States by Trade Size Class on the 2022 BE-120



Note: Trade size classes are based on a firm's total services exports or imports. Some firms may appear in one size class for exports and another for imports.

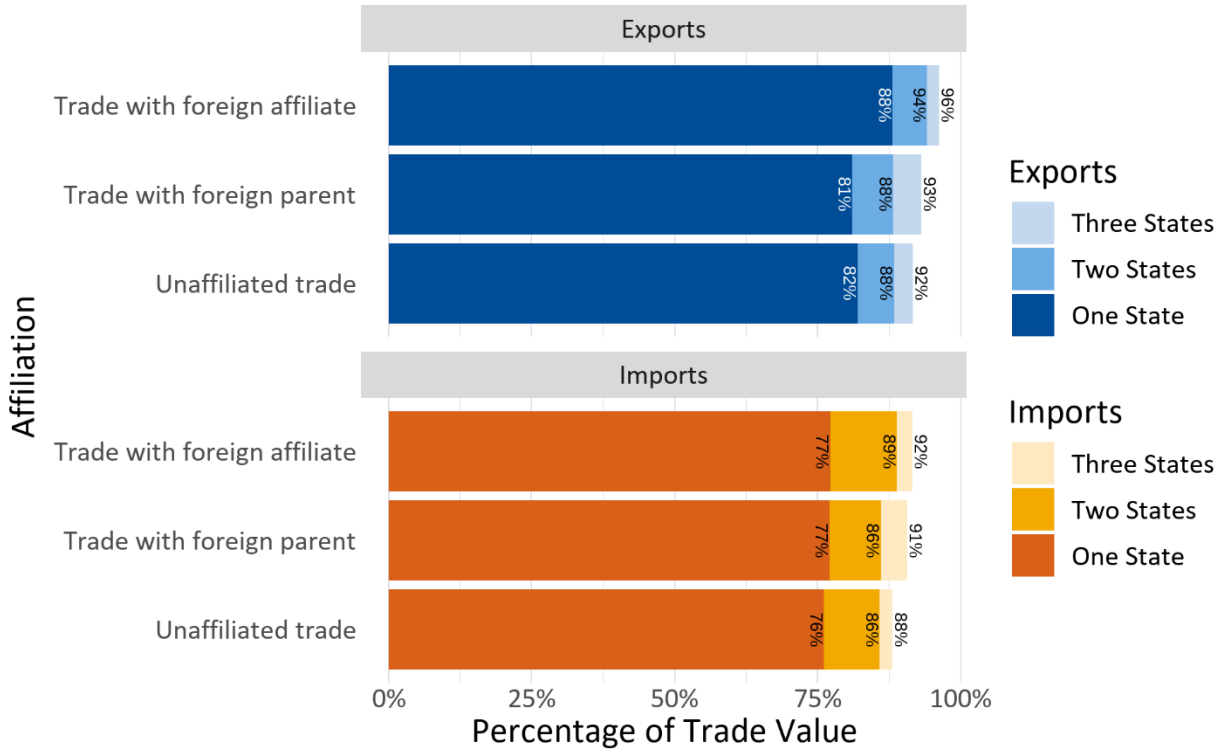
For firms in the very large trade size class, the top three states accounted for 95 percent of exports and 89 percent of imports. This is very close to the 94 percent of export value and 90 percent of import value attributed to the top states for all reporting firms, reflecting the relative weight of the largest traders. The negative correlation between trade value and reported share from the top three states is apparent but not overwhelming, as even the largest traders tended to report substantial majorities of their trade from the top three states.

Similar patterns appear when comparing affiliated versus unaffiliated trade. Response rates on the state trade questions were higher among firms reporting trade with foreign affiliates or foreign parents than among firms reporting only unaffiliated trade. Around 83 percent of surveyed exporters and 83 percent of surveyed importers reporting trade with foreign affiliates or foreign parents also responded to the

state questions; these figures were 68 percent and 65 percent, respectively, for surveyed exporters and importers reporting only unaffiliated trade. This pattern may reflect differences in trade value across affiliation categories. Multinational enterprises (MNEs), or business enterprises that are involved in a direct investment relationship with a foreign resident, are generally larger, and firms in larger trade size classes typically exhibit higher response rates. Firms in the very small class of traders, which had notably lower response rates, accounted for 36 percent of exporters reporting only unaffiliated trade but only 15 percent of exporters reporting at least some affiliated trade. These figures were 47 percent and 14 percent for importers.

However, unlike larger traders in general, firms reporting trade with foreign affiliates or foreign parents exhibited slightly higher concentration of trade in the top three states. For the purposes of this analysis, we assumed that the distribution of trade across states was the same for trade with all types of affiliated or unaffiliated parties. As a result, some firms appear in multiple categories in Chart 5 if they reported trade with multiple types of affiliated or unaffiliated parties.

Chart 5: Percentage of Reported U.S. Trade in Selected Services (Excluding Financial and Insurance Services) Attributed to the Top Three States by Affiliation on the 2022 BE-120



3. Exploratory Results of Trade in Services by State for Selected Services (Excluding Financial and Insurance Services)

This section presents exploratory results to date for trade by state in selected services (excluding financial and insurance services) for firms that have responded to BE-120 questions on the distribution of trade by state and for selected major non-reporting services-trading firms for which the composition of trade by state was estimated by BEA using regulatory filings, company-issued reports, and other publicly available information.[35] It presents the results first in the aggregate by state, and second in relation to several variables that could serve as the basis for future imputation methods for missing values.

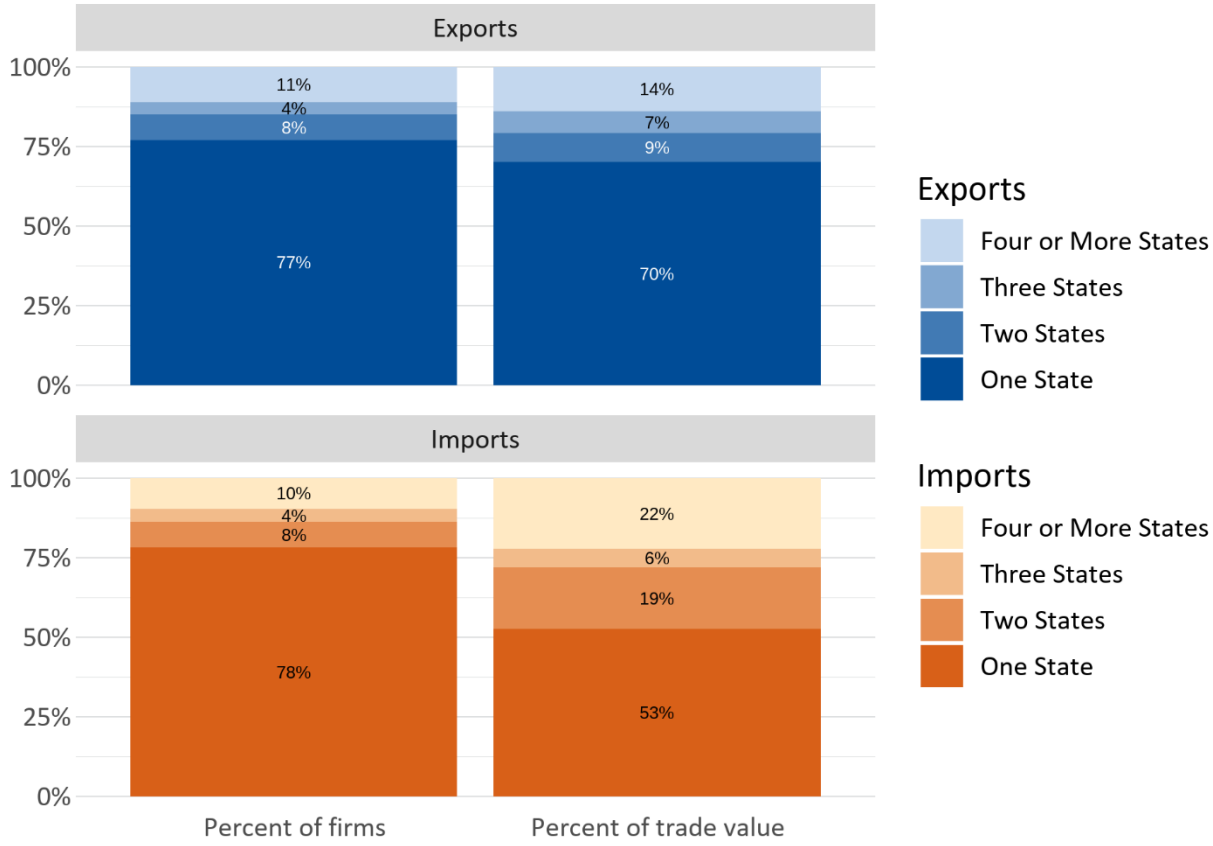
A. Exploratory Results

According to these results, most firms export and import from one state, although these single-state traders represented smaller shares of trade value than of the number of firms. Chart 6 illustrates the shares of respondents to the state question that report all trade from one, two, three, or four or more states.[36] Chart 6 depicts percentages by number of firms (left) and trade value (right).

[35] See discussion of these select non-respondents in Subsection 2B.

[36] The "four or more states" category represents firms whose reported percentages of trade summed to less than 100 percent, implying at least one more relevant state.

Chart 6: Number of States From Which Companies Trade in Selected Services (Excluding Financial and Insurance Services) per Direct Collection on the 2022 BE-120



Among respondent firms, approximately 77 percent of exporting firms and 78 percent of importing firms reported all exports (imports) from one state. However, these firms were on average smaller traders; they accounted for only 70 percent of export value and 53 percent of import value.[37] Import value was generally more broadly distributed than export value: firms reporting imports from four or more states accounted for 22 percent of import value, as compared to 14 percent for exports.

Charts 7A and 7B illustrate the distribution of services exports and imports, respectively, across the states and territories. State-level shares may shift over time with additional responses and imputations for missing values.

[37] These single-state reporters contributed substantially to the high proportion of trade attributable to the top state in the overall reporting—86 percent of export value and 77 percent of import value, exclusive of the major non-reporting services traders included in Chart 6.

Chart 7A: Percent of Exploratory U.S. Exports by State in Selected Services (Excluding Financial and Insurance Services) per Direct Collection on the 2022 BE-120

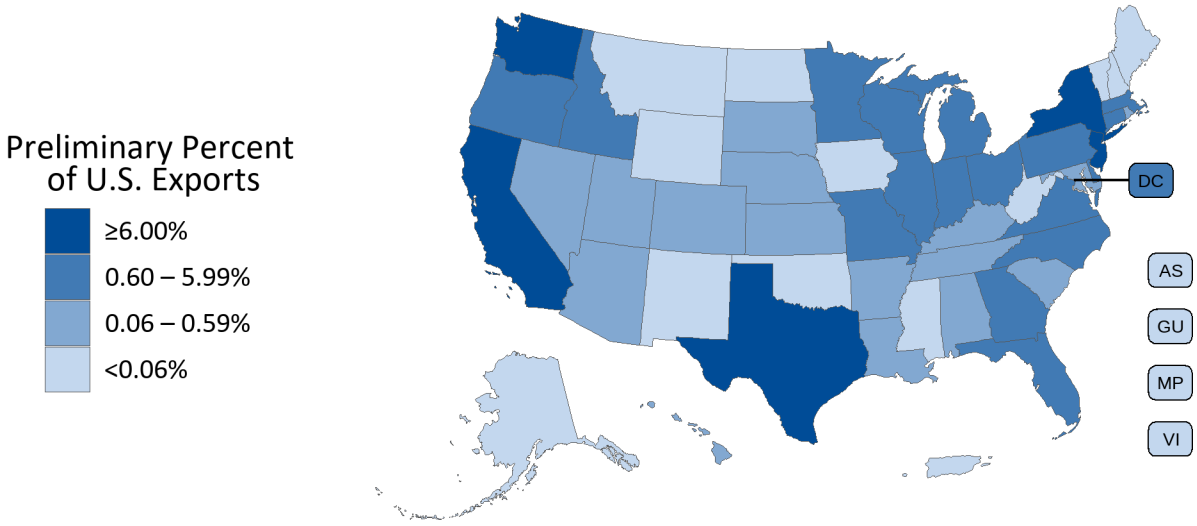
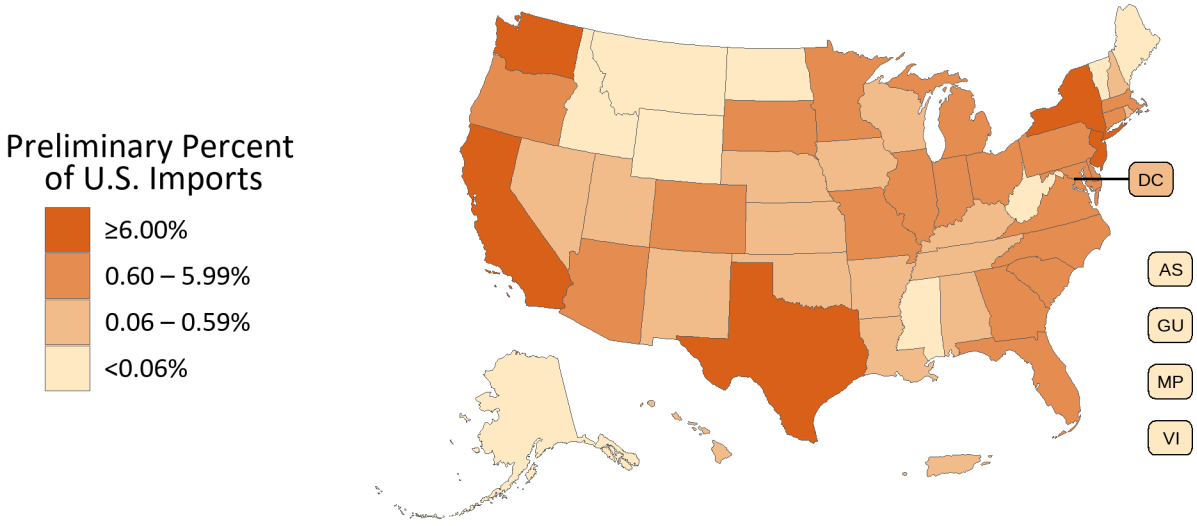


Chart 7B: Percent of Exploratory U.S. Imports by State in Selected Services (Excluding Financial and Insurance Services) per Direct Collection on the 2022 BE-120



As would be expected, states with larger GDPs figured significantly among the major traders. California, New Jersey, New York, Texas, and Washington were in the largest category (≥6.00 percent of U.S. trade) for both exports and imports. Table 3.1 includes the share of U.S. exports and imports accounted for by the top twenty states in each direction of trade.

Table 3.1: Shares of Exploratory U.S. Exports and Imports in Selected Services (Excluding Financial and Insurance Services) Accounted for by the Top 20 States per Direct Collection on the 2022 BE-120

	Exports		*Imports*	
Rank	*State*	*Percent*	*State*	*Percent*
1	California	23.6	California	24.4
2	Washington	16.5	New York	8.9
3	New York	9.8	New Jersey	8.7
4	New Jersey	9.0	Washington	7.7
5	Texas	6.3	Texas	7.6
6	Pennsylvania	4.2	Pennsylvania	4.6
7	Ohio	3.4	Ohio	4.2
8	Illinois	2.9	Illinois	3.3
9	Florida	2.6	Florida	2.9
10	Oregon	(D)	Delaware, Massachusetts, Minnesota, North Carolina, Oregon	(D)
11	North Carolina	1.9		
12	Minnesota	1.9		
13	Massachusetts	1.8		
14	Indiana	(D)		
15	Georgia	1.5	Virginia	1.9
16	Virginia	1.2	South Carolina	1.5
17	Michigan	1.0	Michigan	1.4
18	Delaware	1.0	Georgia	1.3
19	Connecticut	0.8	Colorado	1.0
20	District of Columbia	0.7	Connecticut	0.9

(D) Suppressed to avoid the disclosure of data of individual companies. In some cases, suppressing a single state's value is not sufficient to avoid disclosing information about an individual firm and it is also necessary to suppress the value of one or more states adjacent in rank order. In these cases, states are presented on the same line in alphabetical order. For values that are suppressed, a range of feasible shares that applies to each of the states listed can be identified from the shares attributed to the states adjacent in the rank order.

Services trade was highly concentrated in certain states. The top five exporting states accounted for 65 percent of exports; the top five importing states accounted for 57 percent of imports.

Tables 3.2A and 3.2B add further detail by indicating the top service types for each of the largest twenty states for exports and imports, respectively. State percentages were not reported by service type. So, to identify the top service types, the reported percentage composition of trade by state was applied equally to each reported service type that the firm exported (imported).

Table 3.2A: Top Service Categories of Exploratory U.S. Exports by State in Selected Services (Excluding Financial and Insurance Services) Based on Simple Allocation of Service Types Using Data From the 2022 BE-120

Rank	*State*	*Top service category*
1	California	Professional and management consulting services
2	Washington	Charges for the use of intellectual property n.i.e.
3	New York	Professional and management consulting services
4	New Jersey	Charges for the use of intellectual property n.i.e.
5	Texas	Technical, trade-related, and other business services
6	Pennsylvania	Charges for the use of intellectual property n.i.e.
7	Ohio	Professional and management consulting services
8	Illinois	Professional and management consulting services
9	Florida	Audiovisual services
10	Oregon	Technical, trade-related, and other business services
11	North Carolina	Research and development services
12	Minnesota	Professional and management consulting services
13	Massachusetts	Professional and management consulting services
14	Indiana	Charges for the use of intellectual property n.i.e.
15	Georgia	Charges for the use of intellectual property n.i.e.
16	Virginia	Professional and management consulting services
17	Michigan	Charges for the use of intellectual property n.i.e.
18	Delaware	Charges for the use of intellectual property n.i.e.
19	Connecticut	Charges for the use of intellectual property n.i.e.
20	District of Columbia	Professional and management consulting services

Table 3.2B: Top Service Categories of Exploratory U.S. Imports by State in Selected Services (Excluding Financial and Insurance Services) Based on Simple Allocation of Service Types Using Data From the 2022 BE-120

Rank	*State*	*Top service category*
1	California	Professional and management consulting services
2	New York	Professional and management consulting services
3	New Jersey	Charges for the use of intellectual property n.i.e.
4	Washington	Computer services and information services
5	Texas	Professional and management consulting services
6	Pennsylvania	Charges for the use of intellectual property n.i.e.
7	Ohio	Professional and management consulting services
8	Illinois	Professional and management consulting services
9	Florida	Professional and management consulting services
10	Delaware	Computer services and information services
	Massachusetts	Professional and management consulting services
	Minnesota	Computer services and information services
	North Carolina	Computer services and information services
	Oregon	Research and development services
15	Virginia	Charges for the use of intellectual property n.i.e.
16	South Carolina	Computer services and information services
17	Michigan	Research and development services
18	Georgia	Professional and management consulting services
19	Colorado	Technical, trade-related, and other business services
20	Connecticut	Computer services and information services

States listed at the same rank reflect suppressions to avoid the disclosure of data of individual companies. In some cases, suppressing a single state's value is not sufficient to avoid disclosing information about an individual firm and it is also necessary to suppress the value of one or more states adjacent in rank order. In these cases, states are presented on the same line in alphabetical order. For values that are suppressed, a range of feasible shares that applies to each of the states listed can be identified from the shares attributed to the states adjacent in the rank order.

The top service types at the state level often tracked national trends. Among respondents to the state questions, professional and management consulting services accounted for 28 percent of exports and 28 percent of imports; it was also the top service type for eight of the largest exporting states and eight of the largest importing states. Charges for the use of intellectual property n.i.e. accounted for a larger share of trade among exporters—33 percent of export value and the top service type in eight of the top twenty exporting states—than for importers—21 percent of import value and the top service type in only three of the largest importing states. "Computer services and information services" accounted for

only 13 percent of exports and was not the top service type in any of the largest 20 exporting states, but it accounted for 18 percent of imports and ranked number one in 6 of the largest 20 importing states.

Cross-state patterns, in particular the concentration of trade in certain states, bear comparison to underlying economic patterns that would presumably be correlated with services trade. The next subsection compares these results to data on state GDP, headquarters location of BE-120 survey respondents, and state employment by foreign-owned services traders.

B. Insights From Other BEA Data

This subsection establishes patterns in the BE-120 responses by comparing the results to three variables that would expectedly be positively correlated with trade in services. These patterns can help assess the accuracy of BEA survey responses and could be useful in future efforts to estimate services trade by state for firms with missing data.

First, this subsection aggregates estimates of trade in services to the state level and compares the results to state GDP. Second, it assesses the location of services traders' headquarters as a predictor of state trade in services. Third, it compares trade in services to data from BEA's surveys on the activities of multinational enterprises (AMNE), with a particular focus on reported employment by state from BEA's Benchmark and Annual Surveys of Foreign Direct Investment in the United States (BE-12 and BE-15). Data on the activities of multinational enterprises (MNEs) collected by BEA have been linked to trade in services survey data, allowing for direct comparison of the two data sources.[38]

These comparisons present a trade-off between the amount of detail available and the applicability of the findings, both of which impact their utility as bases to assess data quality or estimate the composition of trade by state for non-respondents. Data on state GDP is universally available but applies only at the state level without capturing any firm-specific nuance. Information on services trader headquarters is widely available at the firm level but only identifies one state per firm. Data from the AMNE surveys contain the most detail: notably, U.S. affiliate employment data include information on many states per firm. However, these data are only available for MNEs, and in some instances are limited to foreign-owned MNEs. These MNEs are often larger than many other services traders and may not be a representative sample.

[38] For more information on the linking process, see BEA, "What information does the Bureau of Economic Analysis publish on services trade by enterprise characteristics (STEC)?" July 3, 2025.

i. State GDP

We would expect trade in services to correlate positively with state GDP.[39] The data confirm this expectation, but with the caveat that trade is disproportionately concentrated in larger states.

For example, while the previous subsection found that the top five exporting states accounted for 65 percent of exports, these states accounted for only 37 percent of U.S. GDP. A similar pattern held for imports: the top five importing states accounted for 57 percent of imports but only 37 percent of U.S. GDP. More broadly speaking, across the full sample, a 1 percent increase in state GDP was associated with a 2.05 percent increase in exports and a 1.99 percent increase in imports.[40]

ii. Headquarters

The data confirm the intuitive expectation that the location of a firm's headquarters is a predictor of the location of services trade.

BEA does not directly collect information on the location of firms' headquarters. As a first step in identifying headquarters locations, BEA started with the assumption that the firms' contact information for the BE-120 survey was the headquarters or an establishment in the same state as the headquarters. Some firms' addresses were found to belong to establishments in states other than the location of their headquarters; many of these were larger firms with operations in many states. BEA manually reviewed addresses on file for all firms that accounted for 0.1 percent or more of exports and/or imports and adjusted the state of headquarters if found to be different from the state of the contact address. Missing data were a limited issue, accounting for less than 1 percent of trade in either direction.[41]

The location of firms' headquarters was a significant predictor of services trade. This finding may reflect known or hypothesized dynamics across different types of firms. Among U.S.-owned MNEs, Ibarra-Caton and Mataloni (2018) found that greater multinational interdependence in production is correlated with services exports from the headquarters country to affiliates.[42] Assuming that these headquarters services are concentrated not just in the country of headquarters but also the state of headquarters, one would expect many firms to concentrate U.S. services trade in the state of headquarters. It may also

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[39] For more information on state GDP, see BEA, "GDP by State," updated January 23, 2026.
[40] Based on ordinary least squares (OLS) regressions for exports and imports using the formula $\ln(trade_s) = \alpha + \beta * ln\,(GDP_s) + \varepsilon_s$, where *s* indexes state.
[41] The missing data were accounted for by firms providing mailing addresses outside the United States.
[42] Marilyn Ibarra-Caton and Raymond J. Mataloni, Jr., "Headquarter Services in the Global Integration of Production," *Journal of International Management* 24, 2 (June 2018): 93-107.

be that foreign-owned firms engage in similar patterns of trade with their U.S. affiliates' headquarters. Many non-MNEs are smaller and more likely to trade from a more limited number of states.

For exporters with available data on both trade by state and location of headquarters, 78 percent of exports was from the state of headquarters. This figure was 64 percent for imports. The location of company headquarters could be used as a reasonable starting point in estimating the composition by state of services trade for non-reporting firms.

iii. Data on the Activities of Multinational Enterprises

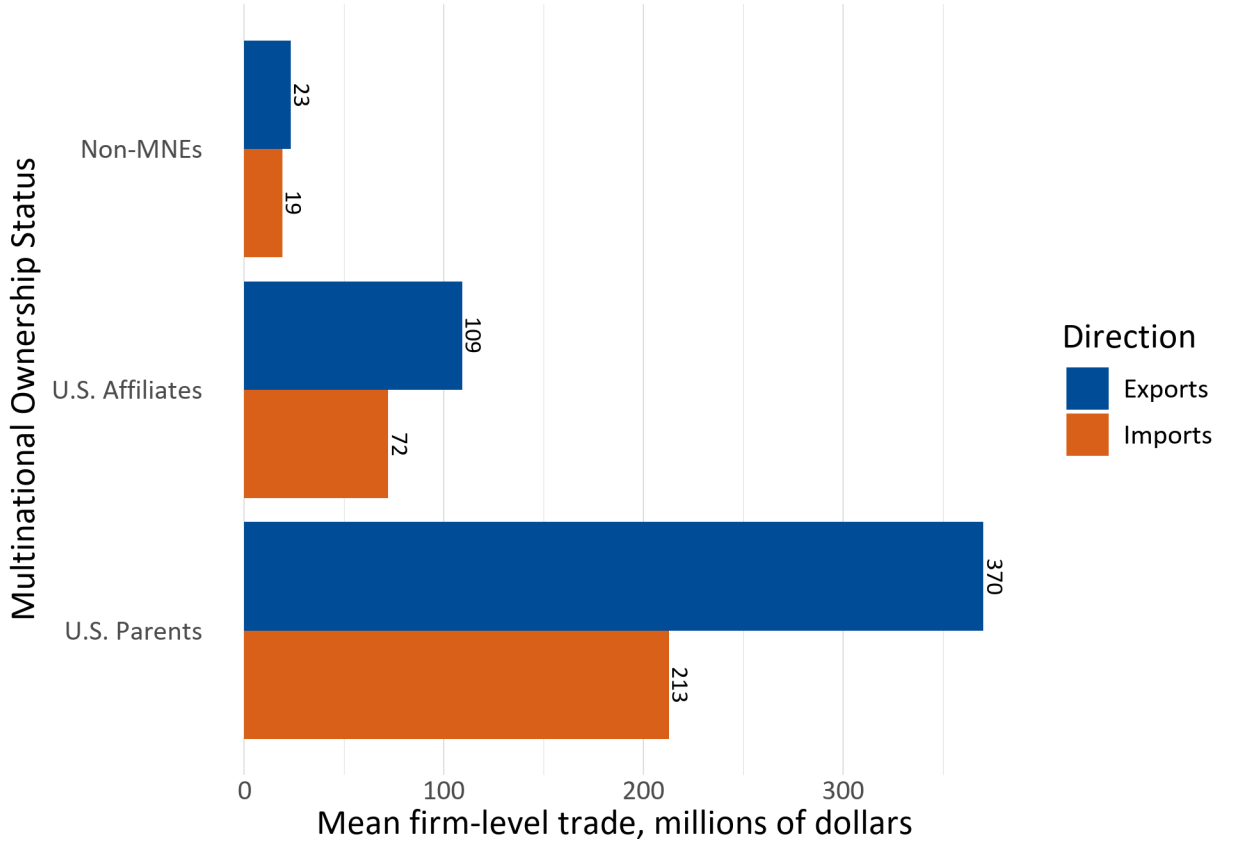
BEA has linked its trade in services data to its extensive data on multinational enterprises collected on its AMNE surveys, allowing for the integration of data on many aspects of companies' finances and operations. For example, the AMNE data contain information on company location, industry, and total sales of services. The AMNE data can provide considerable insight for services traders given that MNEs account for a large proportion of services trade—as of 2022, MNEs accounted for approximately 90 percent of U.S. selected services exports and 86 percent of U.S. selected services imports.[43]

However, it is worth noting that the AMNE data may not be indicative of all firms. Chart 8 shows that among traders in selected services (excluding financial and insurance services) that responded to questions on trade by state, U.S. affiliates on average traded more than non-MNEs but less than U.S. parents.[44] Non-MNEs are those business enterprises that are neither U.S. parents nor U.S. affiliates.

[43] These figures include financial and insurance services, which are out of scope for this working paper but will be covered in future papers.

[44] A U.S. affiliate is a U.S. business enterprise in which there is foreign direct investment—that is, at least 10 percent is owned by a foreign parent. A U.S. parent is a person (in the broad legal sense to include any individual, partnership, corporation, or other form of organization), resident in the United States, that owns 10 percent or more of a foreign business enterprise. It should be noted that some firms may appear in this analysis as both U.S. parents and U.S. affiliates if they have multi-tiered ownership structures: for example, a foreign parent owns a U.S. affiliate which in turn owns a foreign affiliate, or a U.S. parent owns a foreign affiliate which then owns a third company in the United States.

Chart 8: Mean Exports and Imports of Selected Services (Excluding Financial and Insurance Services) by Multinational Ownership Status, 2022



Firm trade value varies with ownership type, and this paper has demonstrated an inverse relationship between firm trade value and the geographic concentration of trade in certain states. Therefore, extrapolation from U.S. affiliates' data to other parts of the sample set should be interpreted with care.

Information provided by foreign-owned MNEs on the number of employees by state is particularly relevant to estimating trade in services by state. However, two factors limit the insight that can be gained from these data. First, data on employment by state from the BE-12 and BE-15 are available only for U.S. affiliates with assets, sales, gross operating revenues, or net income above $40 million.[45] These larger U.S. affiliates systematically differ from other firms. Notably, they tend to trade less than U.S.

[45] The number of states covered varies based on the maximum of a given U.S. affiliate's assets, sales, gross operating revenues, and net income. If this figure is above $300 million, data are available for all states and territories for the affiliate. If the figure is above $120 million but does not exceed $300 million, then data are available for the top 15 states and territories for the affiliate. If the figure is above $40 million but does not exceed $120 million, then data are available for the top state or territory for the affiliate.

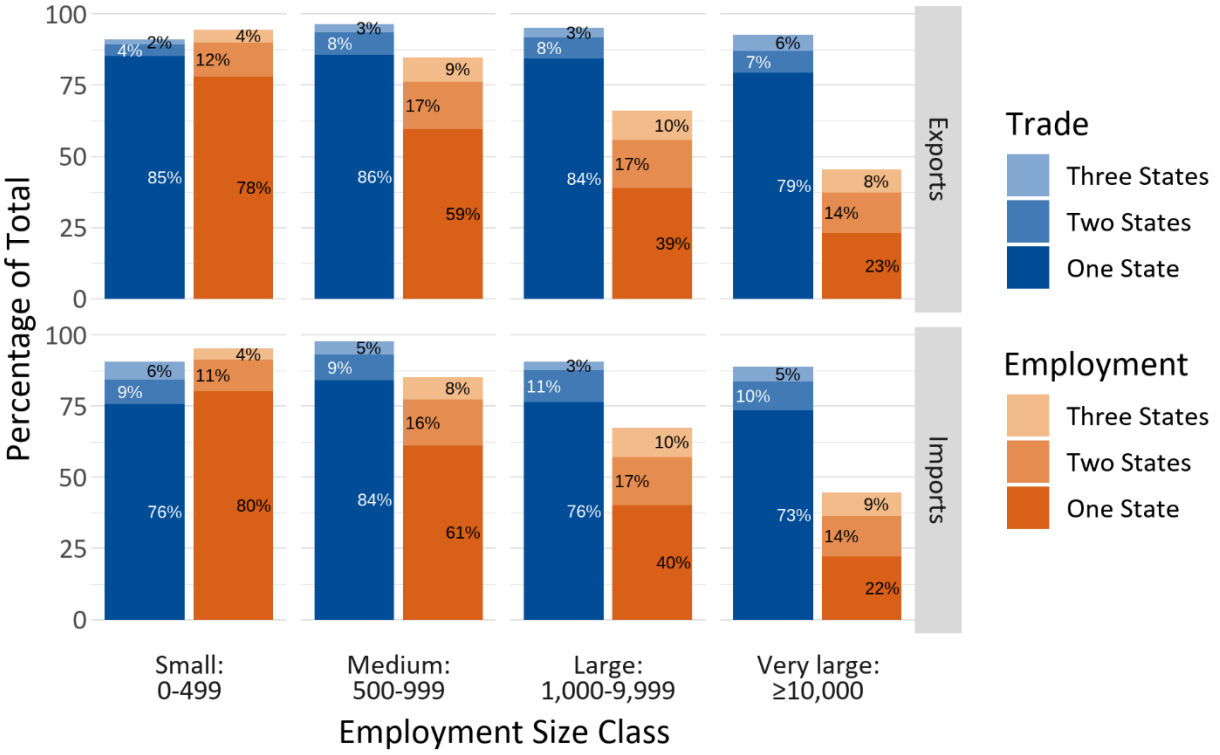
parents, for which BEA collects data on the BE-10 Benchmark Survey of U.S. Direct Investment Abroad and the BE-11 Annual Survey of U.S. Direct Investment Abroad.

Second, only a subset of employees is likely engaged in international services transactions. Many employees may be engaged in goods-related activities or domestic-facing services roles. Within firms, international services trade may be more likely to happen at headquarters or at other major offices. For example, the headquarters establishment may be more likely to hold the rights to intellectual property. Especially for larger firms, research and development may not happen at the same location as manufacturing or corporate headquarters. So, employment may not always be a good predictor of services trade.

The relationship between state-level employment and services trade was varied. For U.S. affiliates that responded to the BE-120 state questions, the top state for trade and the top state for employment were the same for 65 percent of exporters and 65 percent of importers. These firms accounted for 46 percent of exports and 42 percent of imports.

The correlation between employment and trade varied substantially with number of employees. Chart 9 shows the percentages of trade and employment associated with the top three states for employment. It shows these percentages across four employment size classes.

Chart 9: Percentage of U.S. Affiliates' Exploratory U.S. Trade in Selected Services (Excluding Financial and Insurance Services) and Employment in the Top Three States for Employment, by Employment Size Class, 2022



Note: Employment data are derived from a link between BEA's trade in services data and its Activities of Multinational Enterprises (AMNE) data on foreign-owned firms. It is only available for U.S. affiliates with assets, sales, gross operating revenues, or net income above $40 million.

Among the smaller two employment size classes (firms with fewer than 1,000 employees), the three states in which firms reported the largest number of employees were also home to large shares of services trade.[46] However, this correlation was less consistent among firms with more employees. Many smaller firms may have limited geographic footprints and concentrate all activity in a small number of states. Larger firms, on the other hand, may be more likely to have multiple establishments with specialized roles, with trade in services more concentrated in fewer locations than overall employment.

[46] It should be noted that because survey questions only covered the top three states, shares of trade as reported here could be lower than the true values. For example, say a firm's top three states for employment are A, B, and C, and it reports that 80 percent of its trade comes from A, B, and D. It is possible that some of the remaining 20 percent came from state C, but this quantity remains unobserved. This would mean that given equal geographic concentration of trade and employment, we would expect employment shares in the top three states by employment to be higher than (reported) trade shares in the top three states by employment. However, due to a high degree of concentration of trade in services, this is not the case in larger employment size classes.

4. Conclusion and Planned Next Steps

This paper has presented the first steps in a longer-term effort to estimate total U.S. trade in services by state. The exploratory results presented here cover the largest of BEA's data sources on trade in services, and the response rates were generally high. That said, more work remains, and BEA plans a phased approach to estimating a complete set of statistics on trade in services by state. A series of publications will successively broaden BEA's coverage by developing methods to estimate missing survey data and by introducing techniques for state allocation of service types beyond the scope of this paper.

First, BEA is currently working toward methods to estimate missing values of selected services (excluding financial and insurance services) for both (1) firms that did not respond to the questions on trade by state; and (2) trade outside the top three states for responding firms. Evidence presented in this paper suggests that filling these gaps could be particularly important to developing accurate estimates for smaller firms and smaller states.

Second, the results of similar survey questions on the 2023 BE-140 covering trade in insurance and the 2024 BE-180 covering trade in financial services are forthcoming. Publications will present results for insurance and financial services, respectively, with analysis similar to that presented in this paper. Future publications will also address approaches to imputation for missing data in insurance and financial services, potentially using methods based on those developed for the selected services (excluding financial and insurance services) presented here.

Third, in parallel to the efforts described above, BEA is finalizing a project to estimate selected services (excluding financial and insurance services), financial services, and insurance services using the linked data allocation approach based on BEA data on total services trade and Economic Census data on establishments. While this method will not be the focus of future work, its results will provide another basis against which the direct collection method results may be evaluated.

Lastly, BEA is engaging in additional efforts to estimate the composition by state of service types such as travel and tourism, which are estimated using non-survey methods. The results of these efforts will also be described and analyzed in forthcoming publications as they are completed.

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