

BEA's Initiative to Expand and Reconcile Trade in Services Statistics: New Detail for Improved Analysis

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The industrial composition of output in the United States and other advanced economies has been evolving rapidly away from goods toward services. Jensen (2011, p. 14) estimates that, for the United States, “whereas in 1960 the business service sector employed only half as many workers as the manufacturing sector, by 2007 business services employed just over twice as many.” For U.S. international transactions, growth in services exports is increasingly important to the U.S. economy and the trade balance. Exports of services represented 34 percent of total U.S. exports and led to a \$249 billion surplus in services trade in 2016. These patterns in the composition of U.S. output and international trade partly reflect the increased geographic fragmentation of production evidenced by global value chains (GVCs), in which U.S. firms seek to capture a higher share of value in production by specializing in high-value activities, such as research and development (R&D) and engineering. Therefore, this evolution of the U.S. economy toward services, particularly business services, can contribute to higher wages, higher output, and improved standards of living in the United States.

In recognition of these changes, the U.S. Bureau of Economic Analysis (BEA) has greatly expanded its statistics on international trade in services over the last four decades (Ascher and Whichard (1991) and Borga (2009)). These improvements include the introduction of new surveys, the expansion of existing surveys, and the estimation of difficult-to-measure services using indirect methods. Beginning in 2016, BEA received additional funding from Congress to further improve its trade in services statistics.

BEA currently compiles quarterly and annual statistics on trade in services by country or region of destination and by type of service for the U.S. international transactions accounts (ITAs).¹ Quarterly estimates separately identify 31 categories of private services. Additional annual detail, in which 47 types of services are identified, is provided with a view to serving needs beyond those traditionally associated with the ITAs, such as to support trade negotiations, trade promotion efforts, market analysis and strategic planning by businesses, and research by academics.

This paper summarizes BEA's efforts to date under the data improvement initiative, related BEA efforts to improve its trade in services statistics, and research that can be supported by these statistics.

I. General considerations

¹ BEA also compiles monthly trade in services estimates for nine service types, though without country detail.

When developing a program of statistics on trade in services, there are a number of general considerations that affect the types of data that are collected and the methods that are used to collect them. Some of these considerations are not important, or are not nearly as important, when developing a program to collect data on trade in goods.

I. A. Invisibility

One challenge for statistical organizations is identifying when international trade in services occurs. Feketekuty (1998, p. 30) notes that “an observer who is at the right spot at the right time might see the goods, money, people, or an information medium crossing the border, but such an observer would find it extremely difficult to see the services that are being exported or imported.” The inability to directly observe international trade in services requires statistical organizations to measure trade in services via different methods than those used for trade in goods, often with business surveys.

I. B. Limited categorization

Statistics on trade in goods for many countries are available in minute detail, covering tens of thousands of individual commodities. In contrast, statistics on trade in services are often limited to several dozen categories. The limits to categorization partly reflect the difficulty of precisely defining individual service activities. They also reflect limitations in the accounting records of survey respondents. Feketekuty (1988, p. 31) notes that, after overcoming the challenges of identifying the businesses that engage in international trade in services, “the government then has to persuade all firms and individuals that buy services from foreigners or sell services to foreigners to maintain detailed records of the transactions.”

I. C. Importance of international guidelines

National statistical organizations compiling economic accounts attempt to adhere closely to guidelines developed by the international statistical community to improve the accounts, promote consistency, and facilitate international comparability. This international comparability is particularly important for statistics underlying global computable general equilibrium models, such as Global Trade Analysis Project (GTAP), because of the balancing requirements. BEA follows international guidelines promulgated by the International Monetary Fund’s *Balance of Payments and International Investment Position Manual*, 6th edition (BPM6) and the United Nation’s *Manual on Statistics of International Trade in Services 2010* (MSITS 2010).

I. D. Residence concept

BEA statistics on trade in services cover transactions between U.S. residents and foreign residents, including trade between affiliated parties. For example, the export of headquarters services (e.g., industrial design services) from the parent company of a U.S. multinational enterprise (MNE) to its foreign affiliate is counted in U.S. exports of services.

I. E . Diverse customer needs

There are a wide variety of users for BEA statistics on U.S. international trade in services in other government agencies, private industry, nonprofits, and academia. The interests of these users do not always align, and BEA must therefore try to pursue a variety of initiatives that meet at least some of the needs of each group. For example, U.S. trade negotiators are most interested in statistics on trade by type of service using categories that follow international statistical guidelines because these statistics are the focus of trade negotiations. Other BEA customers, such as academics, are also interested in statistics by industry because those statistics allow them to study trade in services in the broader context of overall economic activity at the firm or industry level.

II. Services Data Initiative

In recognition of the evolution of the industrial composition of the U.S. economy away from goods toward services, BEA began receiving funding from Congress in 2016 to improve its statistics on trade in services. Under this initiative, BEA has expanded, and will continue to expand, detail by geography, by type of service, and possibly by other dimensions that are of interest to its user community. This section describes progress that BEA has already made, and remaining work to be done, under this budget initiative. The section concludes with a summary of BEA outreach to the user community to help set priorities.

II. A. Expanded Country Detail – Achievements to Date

In October 2016, BEA expanded the geographic detail it presents in its annual trade in services statistics by increasing the number of countries from 33 to 72, beginning with statistics for 2013. These statistics now separately present all countries with which the United States has a free trade agreement in force or under negotiation and other trading partners with significant transactions. Previously, these countries and areas were included in broader “other” regions, such as Other Europe, Other South and Central America, and Other Asia and Pacific. As a result of this expansion, the share of total exports and imports accounted for by separately published countries increased from 80 percent to more than 90 percent.

II. B. Expanded Country Detail – Looking Ahead

BEA plans to extend the annual time series for the expanded geographic detail introduced in 2016 to years before 2013. BEA customers have expressed interest in a longer time series to enhance policy analysis and allow for more rigorous econometric work. BEA also plans to accelerate the release of geographic detail by publishing bilateral statistics for more countries in the quarterly ITAs.

II. C. Expanded Detail by Type of Service

BEA undertook several steps to identify new service types to measure and refine the coverage of its existing service types. These steps included analyzing service industry data collected by the U.S. Census Bureau to identify industries and/or service types that present opportunities for expanding BEA's services statistics, carefully reviewing international guidelines and classification systems, surveying other countries' publications to see what detail they publish for services, and reaching out to BEA's key stakeholders to solicit their priority needs. In some cases BEA will need to expand the data collection on its surveys to measure new service types, while in other cases expanding services detail may require BEA to develop estimation methods and access source data beyond those available on BEA's surveys.

II. C.1. Expanded Detail by Type of Service – Achievements to Date

II. C.1.a. More detail on rights conveyed for intellectual property

As part of BEA's ongoing efforts to bring the international economic accounts into closer alignment with guidelines in BPM6, BEA has begun the process of identifying the rights to use intellectual property, the rights to reproduce or distribute intellectual property, and the outright sales and purchases of intellectual property by collecting this information on its Survey of Transactions in Selected Services and Intellectual Property with Foreign Persons (BE-120/125) beginning in the third quarter of 2016. The primary goal of the BPM6 guidelines is to use this added detail to classify intellectual property transactions as either: (a) a transfer of a productive asset (i.e., a capital flow), (b) a charge for the use of intellectual property, or (c) a charge for a specific type of service that led to the creation of that intellectual property (e.g., computer services or R&D services). The additional detail will assist BEA in implementing the guidelines of the System of National Accounts with regard to intellectual property. For example, outright sales of the outcomes of R&D, such as the outright sale of a patent or a copyright, should be recorded in R&D services, and transactions in the rights to use the outcomes of R&D should be recorded as charges for the use of intellectual property. Treating outright sales and purchases of the outcomes of R&D as trade in R&D services enables the recommended measurement of domestic R&D investment in the national income and product accounts, which is defined as domestic R&D output plus imports of R&D services less exports of R&D services. Currently, transactions in the rights to use or distribute intellectual property and transactions in the sale of intellectual property are commingled in BEA's source data and are recorded indistinguishably under charges for the use of intellectual property.

II. C.1.b. Statistics on information and communications technology (ICT) and potentially ICT-enabled services

To promote a better understanding of how U.S. companies engaged in services trade are reaching global markets, BEA began publishing statistics on ICT and potentially ICT-enabled services in 2016 (Grimm (2016)). ICT services are those services that are used to facilitate information processing and communication, and potentially ICT-enabled services are those services that can predominantly be delivered remotely over ICT networks. These statistics complement BEA's standard presentation of international trade in services statistics by

providing insight into the extent that ICT may be used to facilitate trade in services. They also shed light on whether and how companies have reconfigured their GVCs over time in response to improvements in ICT.

II. C.2. Expanded Detail by Type of Service – Looking Ahead

II. C.2.a. New Services Detail from International Guidelines

II. C.2.a.1. Manufacturing services on physical inputs owned by others

BEA does not currently measure manufacturing services on physical inputs owned by others (goods for processing), which is a standard component on the balance of payments accounts as recommended in international guidelines, because of a lack of source data.² One of the most ambitious recommendations of BPM6 was to more consistently apply the change in ownership principle to the treatment of goods sent abroad for processing. According to this recommendation, goods sent abroad for processing without a change in ownership should be excluded from goods trade; the processing fee charged by the manufacturing service provider should be recorded as services trade.

The change can enhance the accounts in several ways. First, by eliminating the flow of goods for which there was no cross-border sale, and therefore no cross-border payment, it brings the flows on the current account into better alignment with flows on the financial account. Second, it better reflects the nature of the export from the country processing the goods, by classifying the activity as an export of services rather than as an export of goods. Third, it records the gross cross-border flows in a way that better reflects the impact of those flows on the participating countries.

For most countries that have already implemented the new treatment, implementation was straightforward because merchandise exports and imports are identified as goods for processing in customs documents, usually because of special tax or import duty treatment related to such processing activity. Partly because U.S. customs documents do not collect this information, BEA has yet to adopt the BPM6 treatment of goods for processing and manufacturing services (Borga and Howell (2014)).

BEA continues to investigate several options for implementing the new treatment of goods for processing recommended in BPM6. Survey methods have been explored by both BEA and the Census Bureau, but this approach has so far had limited success because of the nature of business record-keeping practices. Because of these data constraints, BEA is developing a model-based approach to measure goods for processing and manufacturing services.

² Despite this source data limitation, services associated with contract manufacturing are partly included in the U.S. international economic accounts because a portion of these services is included in the value of goods exports and imports; however, the services portion cannot be separately identified.

While U.S. source data that would allow direct estimation of goods sent abroad for processing and manufacturing services are not currently available, some official U.S. government data sources and related special survey results have been used to develop illustrative measures. The Census Bureau's 2007 Census of Manufactures and Census of Wholesale Trade collected information on whether those business establishments purchased contract manufacturing services from abroad. At BEA's request, the Census Bureau matched those reports to U.S. customs data on exports and imports of goods by those firms. Moreover, it identified firms that both exported to, and imported from, the same country in an attempt to identify roundtrip shipments of goods for processing. Although the customs data do not separately identify shipments related to processing trade, it appeared that rough estimates of manufacturing services and goods for processing could be developed by profiling the characteristics of the shippers and their matched foreign trade transactions.

BEA will update and extend this type of profiling analysis using linked microdata on production and trade at the Census Bureau's Center for Economic Studies. Unlike the exploratory Census Bureau study described above, BEA will make use of input-output relationships to more precisely connect roundtrip trade related to contract manufacturing. BEA will also have more detailed information about products and countries for both outward and inward processing. In addition, BEA has access to firm-level Chinese trade in goods data that identify processing trade. Although these data cover only one partner country, the country is an important partner country for contract manufacturing, and insights from the Chinese customs data can help BEA develop its profile of U.S. importers of manufacturing services.

To complement the model-based approach, BEA plans to survey companies to obtain relevant information. BEA is considering asking survey questions about the value of materials received and the value of the product returned to the country or shipped to a third country.

II. C.2.a.2. Merchanting

The concept of merchanting is related to the process of performing services as part of a GVC. It occurs when a trader in one country purchases goods from a foreign supplier and then sells the goods to a customer in a different foreign country, without the goods ever entering the trader's home country. Although the nature of this activity might best be described as a distribution service (wholesale or retail trade), it is recorded in the ITAs as a net export of goods.

BEA collects information on merchanting on its BE-120/125 surveys. Net exports of goods under merchanting were reclassified in the ITAs from services to goods in June 2014 to more closely align BEA's accounts with international guidelines. The guidelines prescribe this treatment so that margins on exports that do not originate from the trader's home country are given parallel treatment to those that do. Net exports of goods under merchanting are currently shown in the U.S. ITAs as a single line item for transactions with all foreign countries because there is not yet an international consensus on how to record the bilateral transactions involved. Further analysis and discussion will be required before international guidelines are issued.

II. C.2.a.3. Implicitly priced financial services

International guidelines recommend including the values of two implicitly priced services in the measure of financial services: (1) financial intermediation services indirectly measured (FISIM) and (2) dealers' and market-makers' margins on financial instruments. Financial intermediaries implicitly charge for services by paying a lower interest rate on deposits than they charge on loans. The resulting net receipts are used to defray expenses and provide profits. It is important to capture FISIM in the estimates of trade in financial services because the amounts are large and because the split between explicit and implicit charges for financial services may change over time. For example, if some financial institutions begin to charge implicitly for services for which they previously had charged explicitly, financial services excluding FISIM would show slower growth than if there had been no change in practices. In addition, including FISIM promotes international comparability as financial institutions in some countries may charge explicitly for services that are charged implicitly in other countries.

Dealers and market-makers in financial instruments may be reimbursed in full or in part for their market-making services by the margin between buying and selling prices. The existence of the buy/sell or bid/ask spread is an indication that these dealers are providing market-making services, similar to wholesalers, by providing liquidity and holding inventory. It is important to include these implicitly priced services in the measure of financial services to provide a complete picture of the services being traded. BEA includes margins on bond trading in brokerage services and has begun to explore possible data sources and methodologies for estimating these implicitly priced services for other financial instruments.

II. C.2.a.4. Personal, cultural, and recreational services

"Personal, cultural, and recreational services" cover a variety of services, including fees related to the production of motion pictures, radio and television programs, and musical recordings; receipts or payments for renting audiovisual and related products, downloaded recordings, and manuscripts; telemedicine; online education; and receipts or payments for cultural, sporting, and performing arts activities. BEA has good coverage of "personal, cultural, and recreational services," which are currently included but are not separately identifiable in the services categories "other business services" and "charges for the use of intellectual property." BEA is working to improve coverage of these services and plans to show them separately in the future.

II. C.2.b. Other Possibilities for New Services Detail

II. C.2.b.1. Services detail by product code

Although BEA currently provides significantly more detail on trade in services by type than do most other countries, the detail for trade in services remains much less than that for trade in goods. As part of BEA's comprehensive restructuring of the international accounts in 2014, BEA expanded the number of individual service types for which estimates are published annually

from 30 to 47. Despite this progress, the product detail for U.S. trade in services falls far short of the detail for U.S. trade in goods, for which there is detail for tens of thousands of individual commodities classified by the Harmonized Commodity Description and Coding System.

One reason for the shortfall on services detail is a conceptual problem in defining individual service types. The fullest detail of service types defined by the statistical systems of the world is a class of nomenclature known as product codes. For example, the United States, Canada, and Mexico have created the North American Product Classification System (NAPCS), which lists well over 400 individual service types. The Statistical Division of the United Nations maintains a similar nomenclature known as the Central Product Classification system. Another reason for the shortfall on services detail is limitations on the ability of businesses to provide the necessary information on statistical surveys.

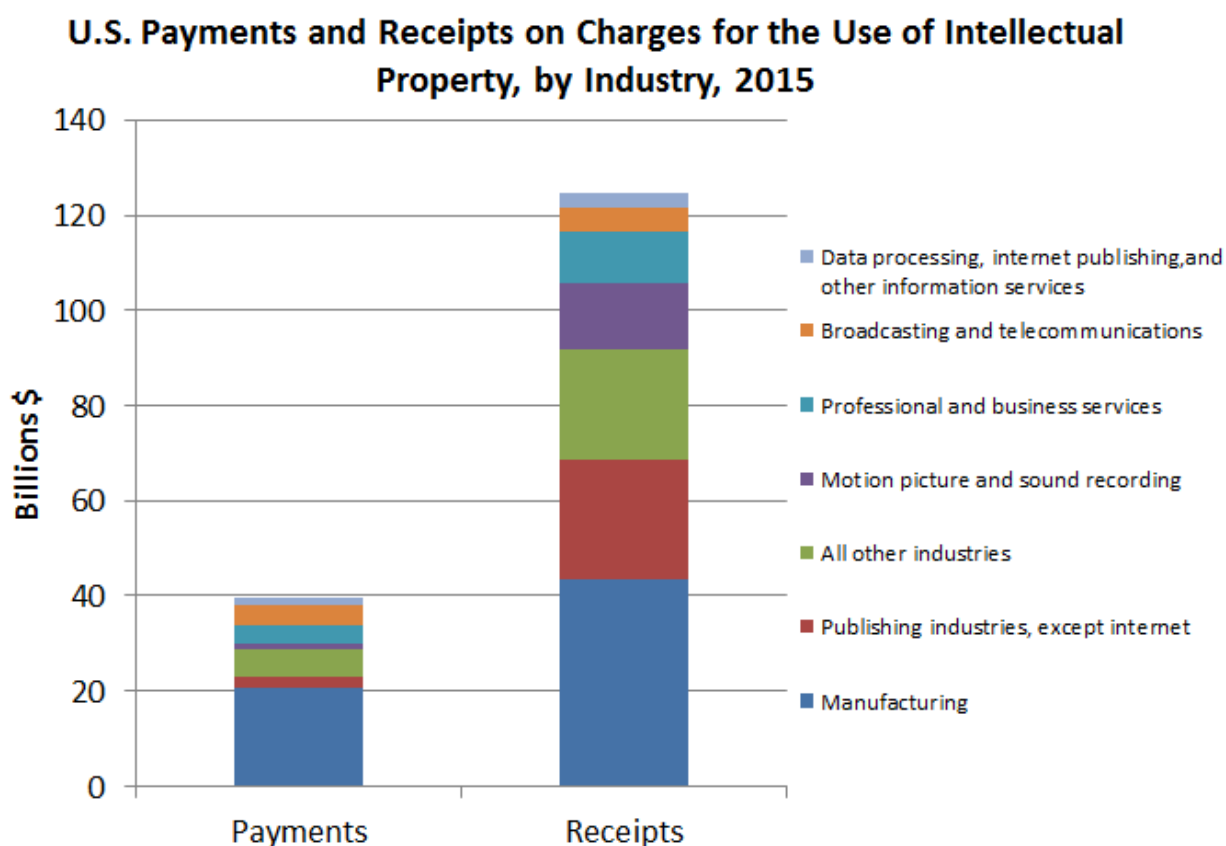
A possible solution to the dilemma of the desire to meet the demand for greater product detail and the desire to minimize survey respondent burden is to use information from more detailed domestic business surveys to add granularity to survey data collected on international services transactions. For example, BEA surveys of international services collect data for all advertising services combined, whereas the NAPCS provides detail for at least seven individual service types within that category:

- Advertising creative services, including advertising graphic design services (NAPCS 77101020104)
- Concept development services for direct mail advertising campaigns (NAPCS 77101020301)
- Coordination of production and delivery of premiums (advertising specialties) (NAPCS 77101020402)
- Direct mail advertising, full-service (NAPCS 77101020103)
- Internet advertising (NAPCS 77101010104)
- Leased display advertising media space (NAPCS 77101010105)
- Multiple advertising services (NAPCS 77101020101)

It may be possible to take the information reported on BEA surveys on total trade in advertising services and mechanically allocate it to the seven individual advertising service types from the NAPCS. A first approximation could be to allocate the total across the seven categories by matching Census Bureau data on domestic sales to BEA data on trade in advertising at the firm level and allocating total trade across the seven categories based on the proportion of each firm's domestic sales in each category, as derived from data collected in the U.S. economic censuses. These rough estimates might be further refined by determining the tradability of the seven individual service types. This work could be conducted with the linked BEA and Census Bureau microdata supporting the development of estimates of manufacturing services on physical inputs owned by others.

II. C.2.b.2. Services detail by industry

There is strong interest in statistics by industry among customers who wish to put services trade in the broader context of overall economic activity at the firm or industry level. This group of users includes academics who wish to study the causes and effects of trade in services at the micro level, in addition to academics who wish to study industry-level input-output relationships at the macro level. In fact, these users would most like to have statistics *cross-classified* by industry and by type of service. BEA collects information on the primary industry of firms that engage in trade in services, but so far, the statistics have been tabulated that way only for special projects (e.g., Barefoot and Koncz-Bruner (2012)). For illustration, the chart below shows U.S. receipts and payments on charges for the use of intellectual property, by industry, in 2015:



Source: U.S. Bureau of Economic Analysis (unpublished detail)

One limitation of these statistics is that they are classified by the primary industry of the U.S. exporter or importer. Trade in services is dominated by large MNEs, most of which operate in more than one industry. Classifying the statistics by the primary industry of the service trader creates a risk of attributing the trade to an industry that differs from the business unit that undertook the transaction. For example, the finance arm of an automobile manufacturer may export financing services to a foreign customer of a U.S. automobile manufacturer. When that transaction is tabulated by primary industry, it will most likely appear under automobile manufacturing rather than under finance. A possible solution to this lack of industry granularity

is to link the business enterprises that complete the BEA surveys to individual business establishments from economic surveys conducted by the Census Bureau. In particular, the Census of Service Industries collects information on exports of services by individual business establishments. As with trade in services statistics by product code, this exercise would have to reconcile differences in classification between the two surveys: the BEA statistics are classified by service type whereas the Census Bureau statistics are classified by industry.

II. C.2.b.3. Services detail by modes of supply

There is interest in understanding the international supply of services by mode. Part of the interest comes from government trade negotiators who structure agreements around these modes. Other interested BEA customers include those who wish to explore alternative accounting structures for international transactions. These modes represent the paths businesses take to access foreign markets. As explained in the MSITS 2010, the modes of supply are defined based on the location of the supplier and the consumer, taking into account their respective residencies:

- Cross-border supply (Mode 1), where both the supplier and the consumer remain in their respective territories (which would correspond to the traditional notion of trade)
- Consumption abroad (Mode 2), where the consumer consumes the service outside his or her home territory (as is the case for tourists consuming travel services)
- Commercial presence (Mode 3), where service suppliers establish (or acquire) an affiliate, branch, or representative office in another territory through which the suppliers provide their services (as is the case, for example, when a foreign IT firm creates a subsidiary in the United States in order to supply IT services to the United States)
- Presence of natural persons (Mode 4), where an individual (either the service supplier himself or herself, if he or she is a self-employed person, or his or her employee) is present abroad in order to supply a service (as is the case, for example, when an independent software designer travels abroad to oversee a 6-month-long software development project)

The vast majority of mode 3 services transactions are separately collected by BEA on surveys of the activities of MNEs and presented in BEA's foreign affiliate statistics on services supplied through the channel of direct investment. BEA is exploring the possibility of amending its trade in services surveys to ask reporters to provide their services transactions by mode. In the interim, BEA is preparing exploratory estimates of U.S. international services categorized by mode of supply. The estimates are based on BEA's statistics on trade in services and an estimate of distribution services (not currently included in BEA's trade in services statistics), disaggregated by mode based on service type, and on statistics on services supplied through affiliates of MNEs. The results indicate that mode 3, commercial presence, is the predominant mode of supply for both services supplied by and services received by the United States. The value of mode 3 exceeds the value of the other three modes combined for both services provided and services received. Mode 1, cross-border supply, is the next largest for both

services provided and services received, followed by mode 2, consumption abroad. Mode 4, presence of natural persons, has the smallest value for both directions of supply.

II. C.2.b.4. Service detail by business function

Timothy Sturgeon, research economist at the Massachusetts Institute of Technology, has proposed the collection of trade in services by eight business functions: 1) the primary business function (typically associated with main product or service produced), 2) research and development (R&D), 3) sales and marketing, 4) transportation, logistics, and distribution, 5) customer and after-sales service, 6) management, administration, and back office functions, 7) informational technology (IT) systems, and 8) facilities maintenance. He and others maintain that statistics classified in this way “can provide researchers and policymakers with a better map of the value chain, reveal the roles that domestic establishments, firms, and industries play within GVCs, and offer a unique view of the competitive pressures facing domestic firms and industries” (Sturgeon and Gereffi (2009)). The feasibility of directly surveying businesses about their exports and imports by these categories is an open question, but it may be possible to derive these categories from statistics by detailed product code.

II. C.2.b.5. Services detail by state

Comparative advantage, the driver of international trade, operates at any level of aggregation, not just at the national level. Therefore, analysis of U.S. trade in services by state is just as meaningful as analysis at the national level and is of particular interest to those concerned with the effects of international trade at the state level, such as state governments. In 2008, BEA prepared a report for the U.S. International Trade Administration studying the feasibility of producing state-level estimates of U.S. exports of private services. BEA was asked to study which types of exported services are amenable to being estimated at the state level and which types present significant conceptual or technical obstacles. For those services amenable to state-level estimation, BEA was asked to provide methodologies for producing estimates by state, and to estimate the timeliness, the frequency, and the associated costs of these estimates. BEA concluded that it is feasible to produce order-of-magnitude estimates at the state level for almost all types of services. However, the information that is available to inform the estimates and the most appropriate basis for making the estimates varies from one service to another, and the quality of the estimates and the detail in which it may be reasonable to provide them are likely to be influenced by these differences. In addition, for some services, the suggested method of estimation would require matching reports on BEA’s trade-in-services surveys with reports by the respondent companies on Census Bureau surveys that can provide information on the location(s) of the operations of these companies in the United States. This work could be conducted with the linked BEA and Census Bureau microdata supporting the development of estimates of manufacturing services on physical inputs owned by others.

II. D. Outreach to stakeholders

As one of its first steps following Congressional approval of funds for the Services Data Initiative, BEA laid out a plan to solicit input from its customers to ensure that due weight would be given to their priorities and needs. BEA staff visited seven services-trade-focused government agencies. BEA staff also conducted a webinar with trade-focused analysts from academia and other parts of the private sector. A consistent theme across all groups was for BEA to move forward on three fronts: 1) continue to expand the amount of geographic detail, 2) publish statistics for more types of services, and 3) publish a breakout of services trade by industry. Currently, BEA classifies services by type only, in accordance with international guidelines.

Other requests were raised but less frequently. Among the most common of these requests from a few agencies was for BEA to publish services by mode of supply and by whether services were traded digitally. Others suggested that BEA publish complementary groupings of services, in particular environmental services and total health- and total education-related services. The academicians also highlighted their interest in obtaining access to BEA's firm-level microdata.³

II. E. Timeline

As mentioned above, work on the trade in services data improvement initiative has already begun. Later this year, BEA plans to publish exploratory estimates of trade in services by modes of supply. Starting in June of 2018, the expanded geographic detail is scheduled to become available on a quarterly basis. New services detail, including expanded detail by type of service, is scheduled to appear beginning in June of 2019.

II. F. Incorporating the expanded statistics into the GTAP model

The current version of the GTAP Computable General Equilibrium (CGE) model, GTAP Data Base 9, incorporates detail on international trade in services on 11 different service types based on

³ Recognizing that some research requires data at a more detailed level than those provided in its publicly disseminated tabulations, the International Economics Directorate of BEA maintains a program that permits outside researchers to work onsite as unpaid special sworn employees of BEA for the purpose of conducting analytical and statistical studies using the microdata on MNEs and international service transactions BEA collects under the International Investment and Trade in Services Survey Act.

This work is conducted under strict guidelines and procedures that protect the confidentiality of company-specific data, as required by law. Because the program exists for the express purpose of advancing scientific knowledge and because of legal requirements that limit the use of the data for analytical and statistical purposes, appointment to special-sworn-employee status under this program is limited to researchers. Appointments are not extended to any persons affiliated with organizations that collect taxes, enforce regulations, or make policy. Questions about BEA's program for outside researchers can be addressed to William Zeile at william.zeile@bea.gov.

the International Monetary Fund Extended Balance of Payments Services (EBOPS 2002) classification system (appendix table A1). With one exception, BEA provides annual statistics on U.S. exports and imports of these service types for 72 individual countries. The one missing service type is “personal, cultural and recreational services,” which BEA plans to add to its services detail as part of the data improvement initiative.

In addition to directly contributing to GTAP by providing data inputs for U.S. trade in services, BEA indirectly contributes by providing rich detail on trade in services for partner countries. The next generation of GTAP plans to draw on a global matrix of trade in services statistics that is produced and maintained by the Organisation for Economic Co-operation and Development (OECD) and the World Trade Organization (Fortanier et al. (2016)). An advantage of this dataset is that it fills in missing values using a variety of methods. For countries that report global trade in services but with little or no detail on service type, their detail on services trade by type is completed using mirror data of 10 to 20 partner countries.

III. Reconciling asymmetries in the trade in services statistics

In addition to publishing trade in services in greater detail, BEA has tried to identify how the quality of the statistics can be improved. Ensuring the quality of most economic statistics is challenging, but it is particularly so for trade in services statistics, for the reasons already discussed. One indication of the measurement challenges for U.S. trade in services is differences between statistics published by BEA and those published by the statistical organizations of other countries or other statistical organizations in the U.S. government, such as the Census Bureau. Nevertheless, these asymmetries also provide an opportunity for BEA to improve the quality of its estimates. Once discrepancies have been identified, reconciliation of trade in services statistics, especially at the international level, can be challenging because of laws prohibiting the exchange of confidential firm-level data.

Reconciling bilateral differences is particularly important to support CGE models because of the balancing requirements. Bilateral trade in services statistics from different countries must exactly balance to create international input-output tables (IIOTs) from different countries’ supply-use tables (SUTs). These IIOTs are essential inputs for multi-country CGE models, such as GTAP and trade in value added (TiVA) statistics.

The asymmetries in trade in services statistics from different statistical agencies are not trivial. Markhonko (2014) notes that the United States and the European Union reported trade in services surpluses with each other almost every year between 2004 and 2012. This trend has continued in the most recent statistics, with the United States reporting a EUR 48.7 billion trade surplus with the European Union in 2015, while the European Union reported a EUR 13.8 billion trade surplus with the United States (Howell, Obrzut, and Nowalk (forthcoming)). The OECD found that in 2012 the largest asymmetries between reported bilateral U.S. service trade flows and flows reported by partner countries were for Canada, Germany, and the United Kingdom (OECD (2014)). The report also found that the five to ten largest country-service type combinations explained most of the total asymmetry in services trade with asymmetries

occurring most frequently in royalties and license fees (a.k.a. charges for the use of intellectual property), financial services, and transport services.

To help explain these differences, BEA has engaged in efforts to reconcile trade in services statistics with countries with which it has its largest trade asymmetries. Beginning in 1970, BEA has engaged with Statistics Canada to reconcile bilateral differences in the U.S. and Canadian trade statistics. The effort was part of a larger effort to reconcile current-account statistics reported by both countries. The reconciliation exercises were done annually between 1970 and 2008 and in 2010 and 2012 and involved exchanging both published and unpublished statistics as well as methodologies for producing the statistics. This information and the experience of periodic reconciliations have also helped identify areas for improvement and series for which BEA might consider using its partner's mirror statistics rather than producing its own estimates. However, the sharing of unpublished data is limited to data that are sufficiently aggregated so as to not reveal any firm-specific information (Berman, Dozier, and Caron (2013)).

In BEA's most recent reconciliation with Statistics Canada, the \$11.1 billion difference between the 2011 U.S. trade in services surplus of \$27.8 billion in the U.S. official statistics and the \$16.7 billion deficit for Canada in the Canadian official statistics was reconciled to a \$21.6 billion surplus for the United States.⁴ In 2011, most of the adjustments to both countries' "northbound" data (U.S. exports and Canadian imports) were classified as "statistical," or due to the use of different data sources. This was also true for the U.S.-reported "southbound" data (U.S. imports and Canadian exports), although most of the adjustments to the Canadian data were classified as "definitional," or due to data limitations and differences in country attribution. Some of the adjustments were classified as "methodological," and mainly reflected differences in classification. For example, U.S. official statistics for trade in education services needed to be reclassified from "other services" to "travel services" for the reconciliation. Despite the best efforts of BEA and Statistics Canada, differences in official statistics remain because of reasons such as methodological differences and the inability to exchange confidential source data (Berman, Dozier, and Caron (2013)).

BEA also engaged with its largest trade in services partner, the United Kingdom, in an effort to reconcile trade in services statistics in 2006. The reconciliation exercise occurred at the United Kingdom's Office of National Statistics (ONS). The similar methods used in the United States and in the United Kingdom to compile trade in services statistics—both generally use survey-based systems—should have been an advantage in a reconciliation exercise, but the inability to exchange confidential firm-level data from those surveys made reconciliation a challenge. Another challenge was that the U.S. data on trade in services by affiliated enterprises had very limited information on the type of service traded, while the data collected by the United Kingdom did not distinguish between affiliated and unaffiliated trade. Unfortunately, BEA and ONS were not able to reconcile the U.S. and U.K. trade in services statistics because of other priorities and resource constraints. The experience highlighted the fact that data reconciliation

⁴ The reconciliation was an internal exercise and did not directly result in revision to the U.S. official statistics on trade in services with Canada.

is a very resource-intensive exercise for statistical organizations whose top priorities are to revise and publish statistics and to update their methodologies to be consistent with international standards (Orford, Dozier, and Lowes (2007)).

While the United States has not engaged with Germany in a formal statistical reconciliation exercise, the two countries have met informally on several occasions to discuss some of the larger asymmetries for specific services. These discussions have been useful in learning more about the differing methodologies and data sources used by the two countries, but they have not led to a reconciliation of the statistics because of the inability to share information on asymmetries in firm-level data reported to both governments.

The United States has not engaged in a bilateral reconciliation in trade in services with Mexico because the Mexican statistics are published at a much lower level of detail than those of the United States. However, the United States has used mirror trade in travel services statistics from both Mexico and Canada and mirror trade in air passenger transport services statistics from Canada for its official statistics since the late 1980s because the data sources BEA uses to estimate trade in travel and air passenger transport services with all other countries do not have adequate coverage of these transactions. The United States, Canada, and Mexico are currently engaged in a reconciliation of trade in services of the three countries to produce a regional extended SUT.⁵ Given the lack of detail in Mexico's statistics, it may be necessary to use mirror statistics from the United States, Canada, and global statistics on trade in services for many services categories to flesh out more detail in Mexican services trade.

There are also asymmetries between different U.S. sources of services trade statistics. For example, Ibarra-Caton (2010) found that exports of business, professional, and technical services measured by the Census Bureau's 2002 Economic Census of \$28.3 billion fell far short of the \$62.7 billion estimate of the same exports of services published by BEA that was estimated from data collected on the 2002 "BE-22 Annual Survey of Selected Services Transactions Between U.S. and Unaffiliated Foreign Persons." Ibarra-Caton attributed most of the differences to differences in classification and coverage. More firms report services on the Economic Census because the BEA survey had a reporting threshold of \$1.0 million of exports. Ibarra-Caton found that the asymmetries between the BEA and Census Bureau data varied by the type of service and that firms related to the industry of the service were more likely to report to both surveys. Another important difference was that, at that time, the linked BEA survey data only collected services provided to unaffiliated customers while the Census Bureau statistics covered services provided to related and non-related firms. Also, the BEA survey

⁵ These data reconciliation exercises are part of an initiative by the United States, Canada, and Mexico to jointly develop North American regional SUTs and TiVA statistics in 2018 and extended SUTs and TiVA measures by 2020 or 2021. This North American initiative is part of broader global initiatives, such as the OECD's initiative to develop a framework for extended SUTs and TiVA statistics for OECD member countries and the Asia-Pacific Economic Cooperation (APEC) countries' initiative to develop APEC region SUTs, input-output tables, and associated TiVA estimates. For a discussion, see Fetzer, Howells, Jones, Strassner, and Wang (2016).

statistics covered a large selection of types of services whereas the Economic Census collected services for only selected industries within some sectors.

IV. Research uses of the statistics

IV. A. A profile of U.S. exporters and importers of services

The traditional focus of BEA's trade in services statistics has been on the type of service provided, but as noted above, there are customers who would like to examine the statistics by characteristics of the firms engaged in this trade. This group of customers includes academics who wish to study the causes and effects of trade in services at the micro level, in addition to academics who wish to study industry-level input-output relationships at the macro level. In Barefoot and Koncz-Bruner (2012), BEA began to look at the data from this perspective by linking the microdata from its trade in services surveys to its activities of MNEs surveys. In 2008, U.S.-based MNEs and foreign MNEs operating in the United States accounted for over 80 percent of U.S. exports and imports of services. Other findings of the paper include:

- Transactions by non-MNEs are much smaller than those by MNEs for all but a few types of services, including financial services and various types of business, professional, and technical services, including legal and "computer and information" services.⁶
- Many small firms engage in services trade, but large firms dominate the value of services trade.
- Firms in industries that are typically associated with the production or sales of goods are significant services exporters and importers. Manufacturing was among the largest sectors that exported and imported services.
- The prevalence of MNEs' two-way transactions in "royalties and license fees" and "R&D and testing" services indicates that innovative activities are being carried out across locations and not just at the firm headquarters. Trade in "management and consulting" services was also common among both U.S. parents and U.S. affiliates for both exports and imports, reflecting the importance of costs or business functions that are centralized in one location but may benefit other parts of the firm.⁷

IV. B. Determinants of headquarters services

An aspect of the evolution of the industrial composition of the United States away from goods toward services is the creation of GVCs by U.S. businesses. GVCs are production structures in which the production process is geographically fragmented to take advantage of the comparative advantage of productive resources in different countries. For example, the U.S.

⁶ In accordance with BPM6, services types classified under business, professional, and technical services have since largely been reclassified under the categories "other business services" and "telecommunications services."

⁷ In accordance with BPM6, "royalties and license fees" have since been renamed "charges for the use of intellectual property;" "R&D and testing services" have since been renamed "research and development services;" and "management and consulting" services have since been renamed "business and management consulting and public relations services."

headquarters of a U.S. MNE might conduct product development in the United States to take advantage of the relative abundance of high-skill workers in the United States but then assemble that product in another country with a relative abundance of manual laborers. The exact configuration of individual GVCs varies, depending on a wide variety of factors, including the production technologies in the individual industries and the resource endowments of the individual countries involved. Nevertheless, a common thread for U.S. businesses is that the orchestrating firms will tend to engage in high-skill and high-wage activities that take advantage of the relatively high-skill U.S. workforce. This theoretical prediction, based on the law of comparative advantage, suggests that U.S. parent companies of MNEs using GVCs will tend to export high-skill headquarter services, such as product and process engineering services, to foreign affiliates that are linked with the parent in a GVC.

In Ibarra-Caton and Mataloni (forthcoming), BEA uses linked data from its activities of MNEs surveys and its trade in services surveys to examine this question. The study finds that U.S. parents provide more assistance to their foreign subsidiaries that are linked in a GVC than to those that are not involved in production sharing. This study builds on the earlier studies of the relationship between intra-MNE product flows and knowledge flows in multiple ways. It separately examines the relationship for high-tech and low-tech manufacturing industries, and finds that knowledge services from the U.S. headquarters that could be combined with knowledge of the subsidiary, such as R&D services, are primarily associated with production sharing with subsidiaries in high-tech manufacturing industries, which are assumed to be more technologically capable. Likewise, the study finds that knowledge services from the U.S. headquarters that might be considered to be more passively received from the parent, such as industrial-type maintenance and design, are primarily associated with subsidiaries in low-tech manufacturing industries, which are assumed to be less technologically capable. The results suggest that a 1-percentage-point increase in production sharing between U.S. parents in manufacturing and their foreign affiliates is associated with a 0.17 percentage point increase in exports of headquarters services by parents to their affiliates, with the effect being much larger (0.33 percentage point) in high-tech manufacturing.

IV. C. Trade in services statistics for extended SUTs

The trade in services statistics are an important input for extended SUTs that will be used for CGE models, such as GTAP, and TiVA statistics. While additional detail in trade in services statistics will improve the industrial and geographic attribution of value added, additional assumptions will also be required in allocating the more detailed trade in services to the appropriate commodities and firm types.

Trade in services statistics are published by type of service while the input-output accounts are based on commodity products. BEA currently allocates both published and unpublished detail of its trade in services statistics to commodities in the input-output accounts. Some services are allocated directly to a particular commodity, such as legal services, which are assigned to a commodity of the same name, and air passenger transport services, which are assigned to air and water commodities. In other instances, trade in services are allocated to a broad range of

commodities and industries. BEA also uses a variety of data sources to distribute the services to the appropriate industries. Important sources include BEA surveys of direct investment, which report how services are distributed to and from affiliated firms, and BEA surveys of trade in services. For categories where BEA does not have up-to-date source data, distributions of services from previous benchmark input-output tables are used.

Trade in services statistics will also be allocated by firm characteristics for the extended SUTs that BEA plans to publish in the future. SUTs are essentially production functions for an economy that account for which commodities are supplied by specific industries and the commodities that are used as inputs by particular industries. For extended SUTs, the industries are further subdivided by enterprise characteristics, such as multinational status, size of the firm, or import/export intensity of the firm. These firm characteristics can be identified from BEA surveys of the activities of MNEs, Census Bureau surveys of firms, customs records for trade in goods, and BEA surveys of trade in services. One challenge in allocating trade in services by firm characteristics is that BEA does not have firm-level information on trade in some services, such as travel and certain transport services, making it difficult to disaggregate these data by firm characteristics. However, reasonable assumptions can be made about these characteristics in many instances. For example, exports of passenger fares are mostly provided by a few large airlines.

In order to create IIOTs for global CGE models and TiVA statistics, the actual and mirror bilateral trade in services data flows should be the same. Therefore, trade reconciliation is an essential part of building IIOTs so that the forcing of these flows to be the same is kept at a minimum. It is also important that trade in services flows are allocated to commodities and firm characteristics in a consistent fashion in order for the input to the IIOTs to be consistent.

IV. D. Future research

BEA hopes to support additional research that will improve understanding of the causes and effects of U.S. international trade in services. The expanded detail by type of service could allow researchers to examine whether U.S. firms have a comparative advantage in some of BEA's current service categories but not in others. For example, although the United States currently has a negative trade balance in the overall "computer services" category, it may be the case that U.S. firms have a positive trade balance in some computer services, such as computer systems design, and have a negative trade balance in other computer services, such as computer graphics. Other innovative research projects could come from linking BEA trade in services microdata to microdata from other statistical surveys. For example, by linking the BEA data to occupational data collected by the Bureau of Labor Statistics and production data collected by the Census Bureau, it may be possible to determine how offshoring of certain service activities by U.S. firms affects the occupational mix of the employees of those firms.

V. Conclusion

BEA has made great improvements in its statistics on international trade in services over the last four decades. Although international trade in services has occurred for millennia, until as recently as the mid-1980s, BEA published statistics on international trade in services for only six individual service types. Through new legislation, budget initiatives, and refocused BEA resources, BEA has since expanded its trade in services statistics to the point where detail is shown annually for 47 individual service types and for 72 individual countries. The current budget initiative will allow BEA to add additional detail to its statistics. Outreach to BEA customers indicates that the top priorities for improvements are additional geographic detail, additional detail by type of service, and a breakout of services trade by industry. By incorporating this feedback and developing further enhancements to the statistics, such as linking the statistics to other economic surveys, BEA hopes to support research that will improve understanding of the causes and effects of U.S. international trade in services.

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Appendix – GTAP Classification

Table A1. Concordance between EBOPS 2002 types of trade in services and GTAP Data Base 9 service sectors

EBOPS code	EBOPS description	GTAP 9 code	GTAP 9 description
s200	Total services		
s205	Transportation		
s206	Sea transport	wtp	Water transport
s210	Air transport	atp	Air transport
s214	Other transport	otp	Transport nec
s236	Travel	trd	Trade
s245	Communication services	cmn	Communication
s249	Construction services	cns	Construction
s253	Insurance services	isr	Insurance
s260	Financial services	ofi	Financial services nec
s262	Computer and information services	obs	Business services nec
s266	Royalties and license fees	obs	Business services nec
s268	Other business services	obs	Business services nec
s287	Personal, cultural and recreational services	ros	Recreational and other services
s291	Government services, n.i.e.	osg	Public administration, defense, education, health
s981	Other commercial services	obs	Business services nec

Source: van Leeuwen and McDougall (2016)