

BEA Initiatives to Improve and Interpret its Statistics on Trade in Services and Global Production

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This paper describes recent advances in research by the U.S. Bureau of Economic Analysis (BEA) to better measure and analyze trade in services and global production. To provide new information on how services are supplied, BEA has prepared exploratory estimates of U.S. international services categorized by mode of supply and has begun to collect information on modes of supply from BEA survey respondents. BEA has also conducted research on the strategic movement of intellectual property assets by multinational enterprises (MNEs) and how it affects national and international economic accounts. One part of this research explores how large an impact this activity might have on measures such as U.S. domestic production, trade in services, and direct investment income. Another part of this research explores how U.S. MNEs use transfer pricing under cost sharing agreements to shift profits abroad. To better measure the globalization of production by domestic firms, BEA has also explored several approaches to creating supply-use tables extended by firm type that better illustrate heterogeneity in production by different types of firms in the same industry.

1. Introduction

The growing importance of the service sector in global production has been widely noted (e.g. Jensen 2011). Services account for nearly 80 percent of U.S. private GDP and for more than 70 percent of GDP in the European Union, as well as for a substantial share of GDP in emerging economies.² International trade in services is also important, representing about one-third of total U.S. exports and almost one-fifth of imports in 2017.³ The importance of services in trade is larger when services embedded in goods trade are accounted for. On a trade in value added basis, the OECD has estimated that services represent more than one-half of total

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² [http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_IDA\(2015\)549000](http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_IDA(2015)549000)

³ Author's calculations using BEA, U.S. International Transactions, Table 1.1, downloaded March 21, 2018.

exports from the United States, United Kingdom, France, Germany, and Italy and nearly one-third of total exports from China.⁴

Given the importance of the services sector, BEA continues its effort to enhance its statistics on trade in services and global production. Fetzer, Mataloni, and Thompson (2017) summarize BEA's efforts to enhance its trade in services statistics with broader coverage by country and by type of service, reconcile U.S. trade in services statistics with those of partner countries, and broaden access to its microdata to support research.

This paper describes efforts by BEA in the past year to enhance and interpret its statistics on trade in services. The paper focuses on research on estimating the modes of supply used to deliver services exports and imports and on the impact of the strategic movement of intellectual property (IP) on the national and international economic accounts, describes how U.S. trade in services statistics are used in BEA's research on measuring global production through extended supply-use tables, and describes recent efforts to reconcile asymmetries in bilateral trade statistics with partner countries, including the United Kingdom.

2. Allocating trade in services by mode of supply

Mann (2017) presents exploratory estimates of U.S. international trade in services by mode of supply using existing data sources. Trade by mode of supply is particularly of interest to trade negotiators since they often structure market access trade agreements for trade in services by how the services are delivered. The four modes of supply are cross-border supply (mode 1), consumption abroad (mode 2), commercial presence (mode 3), and presence of

⁴ <http://www.oecd.org/newsroom/new-analysis-highlights-importance-of-services-to-global-trade.htm>

natural persons (mode 4). See figure 1 for an illustration of the differences among the four modes of supply.

Mann (2017) notes that while trade in services by commercial presence (mode 3) can be derived from Foreign Affiliate Trade Statistics (FATS) covering services supplied by affiliates of multinational enterprises (MNEs), estimating traditional trade in services by mode of supply faces certain challenges.⁵ When trade in services is estimated using business surveys, it is often difficult for survey respondents to identify the mode of supply because companies typically do not track transactions by mode in their accounting systems and because, in some cases, a single transaction can involve multiple modes of supply.

The exploratory estimates in Mann (2017) are based on BEA's most detailed annual trade in services statistics, an estimation of distribution services, and BEA's FATS on services supplied by affiliates of MNEs. The allocation of services by mode of supply is based on the approach outlined in Chapter V of UN (2010) and section C of chapter 14 of the associated compilers guide (UN (2016)). This approach attributes service categories to either one dominant mode or to several modes based on assumptions on how specific service items are most likely supplied.

Affiliates of MNEs deliver a wide variety of services through commercial presence in the host country. These services, which are reported in BEA's FATS based on the industry of the MNE, are allocated to mode 3. Services delivered through trade are reported in BEA's trade-in-services statistics. Among those services, telecommunications, insurance, financial services,

⁵ Traditional trade in services covers services between residents and non-residents. These transactions are recorded as U.S. exports and imports in the U.S. balance of payments accounts.

passenger and freight transport services, and charges for the use of intellectual property are assumed to be mainly delivered through cross-border supply (mode 1) and make up the bulk of services delivered by this mode. Travel (including business and personal travel including travel for health and education purposes), port services (including cargo handling, storage and warehousing), and maintenance and repair services are assumed to be mainly delivered by consumption abroad (mode 2). For other types of services, there is not a single and clearly dominant mode of supply. The service types assumed to be delivered through the presence of natural persons (mode 4) are computer services, professional and management consulting services, and “other business services.” However, these services are assumed to be delivered primarily through cross-border supply (mode 1) and commercial presence (mode 3).

Distribution services, which are generally reflected in the value of traded goods in trade statistics, can be separately estimated and allocated to mode 1 to provide a more complete picture of the international supply of services. Distributive services associated with services supplied through commercial presence of affiliates of MNEs can be estimated and included in the FATS allocated to mode 3 (Borga (2009)).

According to Mann’s estimates, nearly 60 percent of total services supplied and received from 2012 to 2014 was delivered through commercial presence (mode 3) (see figure 2). Cross-border trade (mode 1) made up slightly more than 25 percent of both services supplied and received, while consumption abroad (mode 2) made up about 10 percent of both services supplied and received. The exploratory estimates show that presence of natural persons (mode 4) was the least significant mode of supply at only about 3 percent of both services supplied and received. These shares are similar to recent global estimates produced by the World Trade

Organization (WTO (2015)) and recent estimates produced by the European Commission (Eurostat (2016) and Cernat (2017)).

While Mann (2017) provides exploratory estimates based on existing data, BEA is also undertaking efforts to collect information on services by mode of supply directly from companies. BEA has included new questions on its 2017 Benchmark Survey of Transactions in Selected Services and Intellectual Property with Foreign Persons (BE-120) to help further refine these estimates of the modes of supply. The new questions ask respondents who provide services to foreign customers to select from a predetermined set of ranges (less than 25%, 25-49%, 50-74%, 75-89%, 90-99%, and 100%) of the share of each service that is performed remotely for a customer located abroad. Likewise, respondents who purchase services from foreign service providers are asked to select the share of each service that is performed remotely. This information will be helpful in estimating trade in services that are supplied through cross-border trade (mode 1). It will also be helpful in estimating trade supplied through the presence of natural persons (mode 4) since the services covered by the new survey questions are generally thought to be supplied through either mode 1 or mode 4. BEA plans to continue this exploratory work by comparing its estimates with those of other countries, utilizing the additional information on cross-border trade that is being collected on the BE-120 benchmark survey, and considering other changes to its survey and estimation methods.

3. Strategic movement of intellectual property

The ability of MNEs to shift IP assets between countries can make it difficult to measure economic activity by geography in a meaningful way. The intangible nature of IP assets, the difficulty of assigning a dollar value to them, and the large differences in tax rates around the

world incentivize MNEs to report assets and their associated income in the tax jurisdiction with the lowest tax rate. Therefore, the measured contribution of IP assets in a country may not reflect the actual economic contribution of IP assets in that country. This means that trade in services statistics related to IP assets may be attributed to a location different from the actual location of the economic activity associated with these services.

BEA has conducted research that looks broadly at different forms of strategic movement of IP for profit shifting purposes and research that focuses on estimating the impact of specific profit shifting methods. In research that broadly examines profit shifting associated with strategic movement of IP, Bruner, Rassier, and Ruhl (2018) use formulary apportionment to estimate the degree to which this profit shifting has affected the U.S. national and international economic accounts. Formulary apportionment aims to capture the actual location of economic activity by reallocating the global income of MNEs across countries based on factors that correlate with production by those enterprises, such as compensation and sales.

The apportionment factors used by Bruner et al. (2018), sourced from a related study by Guvenen, Mataloni, Rassier, and Ruhl (2017), geographically redistribute a portion of U.S. direct investment income receipts from foreign affiliates to their U.S. parent. The application of the formulary apportionment has a sizable impact on measures of economic activity in the United States in 2014, increasing gross operating surplus by 3.5 percent, GDP by 1.5 percent, and decreasing income from direct investment by 4.3 percent. The counterpart to the decrease in direct investment income receipts is an implied increase in U.S. exports associated with charges for the use of IP and, as a result of these adjustments, the U.S. trade in services surplus as a share of GDP increases by 1.4 percentage points. The research also shows that measures of

national income and returns to direct investment are affected by how firms geographically allocate their IP assets.

In research that focuses on the impact of a specific method of profit shifting, Jenniges, Mataloni, Stutzman, and Xin (2018) find evidence that cost sharing agreements between U.S. parents and their affiliates are associated with lower profitability for U.S. parents and higher profitability for foreign affiliates. U.S. parents and foreign affiliates involved in a cost sharing agreement contractually share the costs of developing one or more intangible assets. In return for sharing in the costs of the research and development (R&D), both the U.S. parent and the foreign affiliate are assigned a portion of the worldwide territory in which they can sell goods or services produced from the resulting IP assets. Through transfer pricing, these agreements allow some MNEs to recognize income from goods or services employing these IP assets at foreign affiliates in low-tax countries that would have otherwise been recognized by the U.S. parent if the rights to the IP had remained in the United States.

The authors document the difficulty of identifying firms that use intrafirm cost sharing agreements. After finding it difficult or impossible to identify firms with cost sharing agreements from U.S. Patent and Trademark Office firm-level patent data and BEA microdata on trade in R&D services, they identify firms with cost sharing agreements from a search of publicly available 10-K documents filed with the U.S. Securities and Exchange Commission.

The authors find evidence that engaging in cost sharing agreements lowers the profitability of U.S. parents. The evidence is mixed by industry, but is strongest for industries where cost sharing agreements are concentrated. The magnitude of the results reported by the authors are also economically significant. For U.S. parents in all industries combined the

average effect of a cost sharing agreement on their profitability is -\$57 million and for those parents in the three industry sectors in which use of cost sharing agreements is concentrated, the average effect is -\$103 million. The authors hope to refine these estimates in the future by obtaining a better measure of cost sharing agreements by using data from the U.S. Internal Revenue Service.

4. Firm heterogeneity in global production

The degree to which firms import or export goods or services varies by the type of firm. For example, Barefoot and Koncz-Bruner (2012) show that MNEs accounted for over 80 percent of U.S. trade in services in 2008. A related analysis of trade in services by enterprise characteristics for a group of European countries shows that smaller enterprises tended to dominate in trade in services in smaller countries, while larger enterprises tended to dominate in larger countries (Eurostat (2018)).

Supply-use tables provide an integrated presentation of the total domestic supply of goods and services from both domestic and foreign producers and the use of this supply across the U.S. economy. Extended supply-use tables apply the same principles to depict the supply and use patterns of different types of firms. Recent research by Fetzer, Highfill, et al. (2018) produces experimental extended supply-use tables for the United States that can be used to better understand the roles of different types of U.S. firms in global production. These tables contribute to international efforts to construct international input-output tables that can be used to calculate trade in value added statistics by firm type. Beyond calculating trade in value added statistics, the tables can help us understand more generally how production is organized

across different firm types and the role of both domestic services and trade in services for different types of firms.

Fetzer, Highfill, et al. (2018) use data on the activities of MNEs to allocate the components of production for the United States for 2005 and 2012 by type of ownership—U.S.-MNEs, foreign-owned MNEs, and non-MNEs. Since services are an important part of trade, part of their work allocates trade in services by firm type based on firm-level microdata or other information on ownership related to those services. They find that imported content as a share of gross output is larger for MNEs than for non-MNEs and varies by firm type across industries. Their measure of imported content includes both reported trade in services and services embedded in goods trade. They also find that half of the domestic value added content of exports by foreign-owned MNEs is in chemicals, motor vehicles, wholesale trade and machinery.

Fetzer, Highfill, et al. (2018) also report preliminary results for the semiconductor industry that are based on establishment-level rather than enterprise-level data. The underlying dataset is produced by linking enterprise-level BEA data on MNEs and trade in services with U.S. Census Bureau data on establishment-level production and enterprise-level trade in goods. The MNE data allow each establishment to be identified as owned by either a domestic MNE, a foreign MNE, or a non-MNE. In addition to the ownership criterion, this research will also consider other firm type criteria, such as firm size class, and firm export and import intensity. This work will also illustrate how trade in services varies by different firms.

5. Efforts to harmonize bilateral statistics

Howell, Obrzut, and Nowak (2017) note that differences, or asymmetries, in the bilateral trade statistics reported by two partner countries can obscure how trade in services data are interpreted. For example, they note that since 2012 the United States and European Union have each reported being net exporters in trade in services with each other. Also, the international input-output tables used for trade in value added statistics require balanced bilateral trade statistics for both goods and services.

Fetzer, Mataloni, and Thompson (2017) describe the efforts that BEA has been engaged in to reconcile bilateral asymmetries in trade in services with its major trading partners, Canada and the European Union. Garber, Peck, and Howell (2018) describe a recent statistical reconciliation effort between BEA and the U.K. Office for National Statistics (ONS).

Garber et al. (2018) note that the United Kingdom is the largest services trading partner for the United States and the country with which the United States has its largest asymmetries. The United States and United Kingdom also have consistently reported higher exports to each other than imports from each other. One reason for the discrepancies between the U.S. and U.K. statistics is that while both BEA and the ONS have been developing methodologies to implement the latest international standards for trade in services,⁶ ONS has been quicker to implement measures such as manufacturing services and financial intermediation services implicitly measured (FISIM).

The authors indicate that the initial analysis from the reconciliation points to several definitional differences that are contributing to the asymmetries between U.K. and U.S. trade in

⁶ *Balance of Payments and International Investment Position Manual, 6th edition*. Washington, DC: International Monetary Fund, 2009.

services. For example, BEA includes the British Crown Dependencies (the Isle of Man and the bailiwicks of Jersey and Guernsey) in its trade with the United Kingdom, while the ONS excludes these dependencies. Also, FISIM is included in trade in services by ONS, but is not captured in the BEA services trade data. The definitional differences that can be quantified make up about one-third of the asymmetry between U.S. imports and U.K. exports of trade in services in 2014 to 2016. Treating the quantifiable definitional differences consistently between BEA and ONS would decrease the asymmetry between U.S. imports and U.K. exports. For U.S. exports and U.K. imports, however, treating the quantifiable differences consistently would increase the asymmetry.

According to the authors, the relatively small share of the asymmetry being accounted for by definitional differences is consistent with BEA's experience with reconciling trade statistics with Statistics Canada. In that case, most of the bilateral asymmetries were due to differences in data sources, coverage, and estimation methods. BEA plans on comparing data sources and methods with ONS in the future, but these efforts may be hampered by challenges such as legal constraints on sharing confidential firm-level microdata.

The authors also indicate that the reconciliation effort with ONS has identified other differences between the U.S. and U.K. data, such as different treatment of personal, cultural, and recreational (PCR) services; construction services; and outright sales and purchases of patents. Because these services are classified in other services categories in the BEA statistics, these differences contribute to asymmetries between types of services, but not to the asymmetries in total services trade.

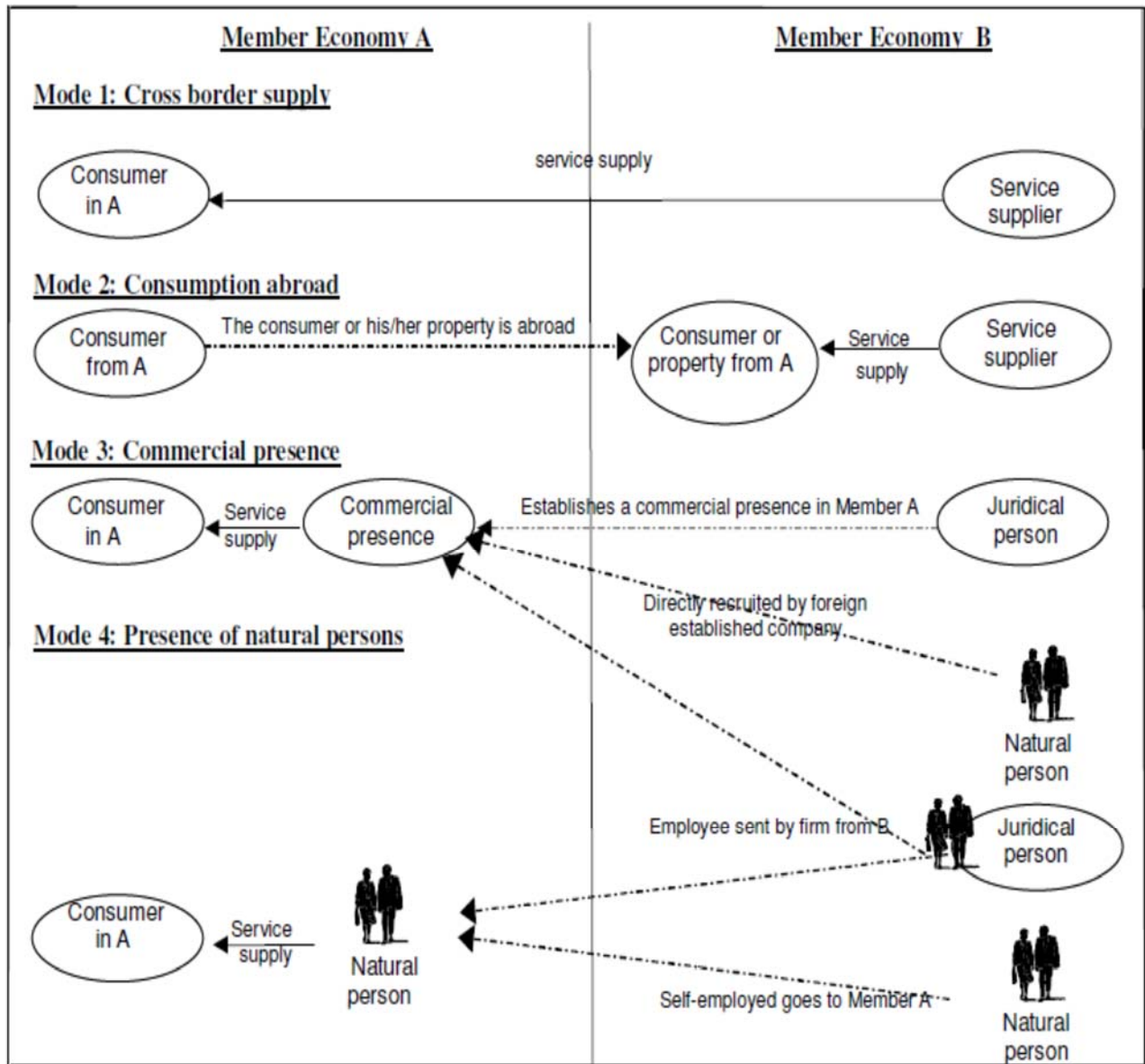
BEA modified its international services surveys in the third quarter of 2016 to enable it to collect data on PCR services and outright sales and purchases of intellectual property. BEA is evaluating the survey results with the goal of incorporating the survey data in the U.S. trade in services statistics in June 2019. These changes will align BEA's trade in services statistics more closely with international guidelines and improve comparability between U.S. statistics and those of its trading partners.

6. Conclusions and next steps

BEA is exploring ways to improve the quality and usefulness of its trade in services statistics. Some of the research described here explores issues broadly, while other research focuses on one aspect of a larger issue. For example, Mann (2018) examines all services types across industries, while Jenniges et al. (2018) focus on the impact of a very specific form of transfer pricing for strategically moving intellectual property. Some of BEA's efforts may lead to new or improved methodologies but, in some instances, they may simply highlight measurement challenges and help with the interpretation of the economic statistics BEA publishes.

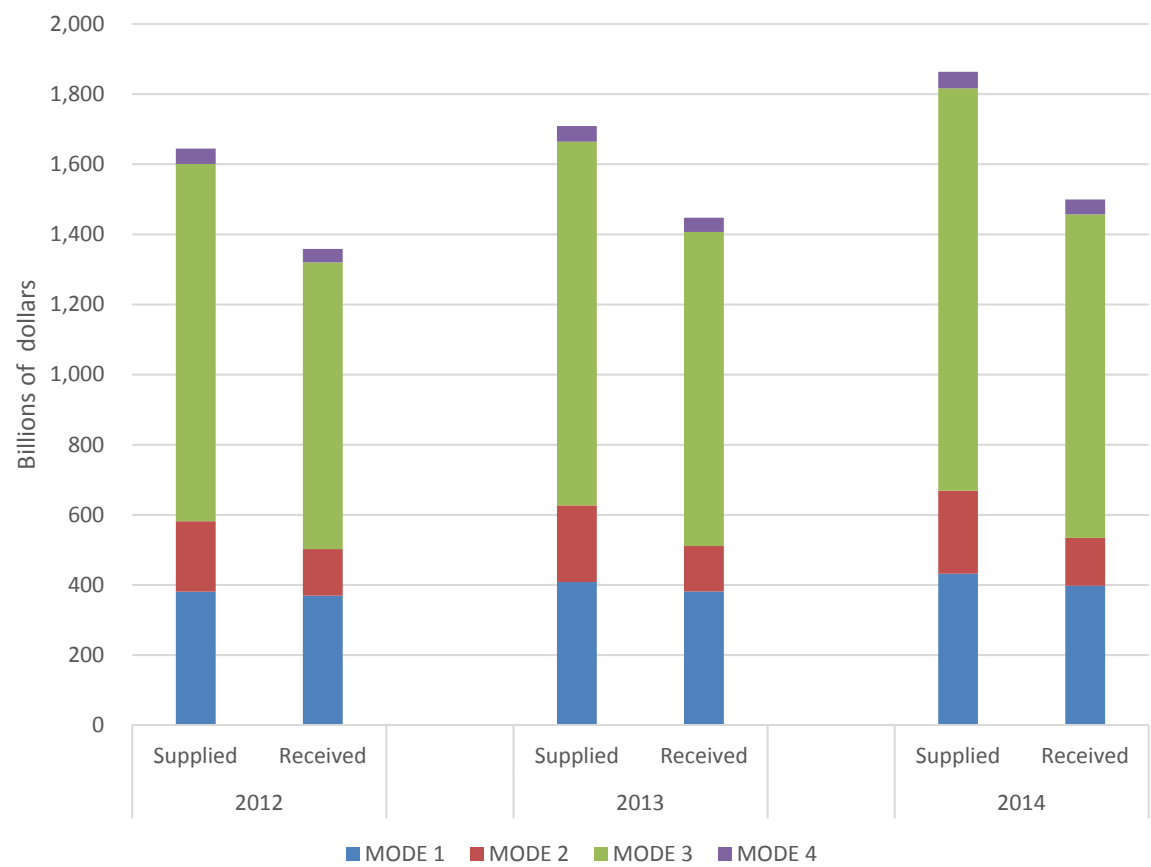
In addition to the efforts described here, BEA has started initiatives to investigate how to measure manufacturing services, informal (including illegal) international transactions, and digital trade. Some of this research will build on previous efforts in these areas and newly introduced questions on the 2017 benchmark survey.

Figure 1. Illustration of modes of supply



Source: Mann (2017)

Figure 2. Exploratory estimates of U.S. Trade in Services by Mode of Supply



Source: Based on Mann (2017)

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