Export Similarity, Comparative Advantage, and World Market Position of Potentially Digitally Deliverable Services in China and the US

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Abstract. This study examines the export similarity, comparative advantage and world market position of potentially digitally deliverable services (PDDS) in China and the US from 2015 to 2024. Using data from the WTO–OECD Balanced Trade in Services database, the Export Similarity Index (ESI) and Revealed Comparative Advantage (RCA) index are calculated for six PDDS sectors. The results show that PDDS exports increased substantially in both countries. China and the US also have relatively similar export structures and structural overlap. The overlap was concentrated in other business services and remained limited in most other sectors. From the RCA index, the aggregate RCA of China's PDDS is not strong and weaker than the US but at the sector level, China's RCA in PDDS exports of other business services is strong. the US has advantages in most sectors.

Keywords: potentially digitally deliverable services; China; United States; export similarity index; revealed comparative advantage; world market share

1 Introduction

The development of AI and digital networks has increased the importance of services that can be supplied without physical proximity. Following the Handbook on Measuring Digital Trade, this study examines potentially digitally deliverable services (PDDS), defined as services that can potentially be delivered remotely through computer networks [1]. Because BaTiS identifies service categories rather than the actual mode of delivery, the data do not confirm that every recorded transaction was digitally delivered. Their expansion depends on both technology and policy. Digital technology promotes digital service trade, but policy restrictions constrain exports [2]. The US emphasizes freer data movement, but China gives greater weight to data security and personal-information protection [3]. These differences may shape sectoral export patterns and specialization.

The export value alone does not capture PDDS competitiveness. RCA and related indicators reveal different dimensions [4], and digital development affects sectors

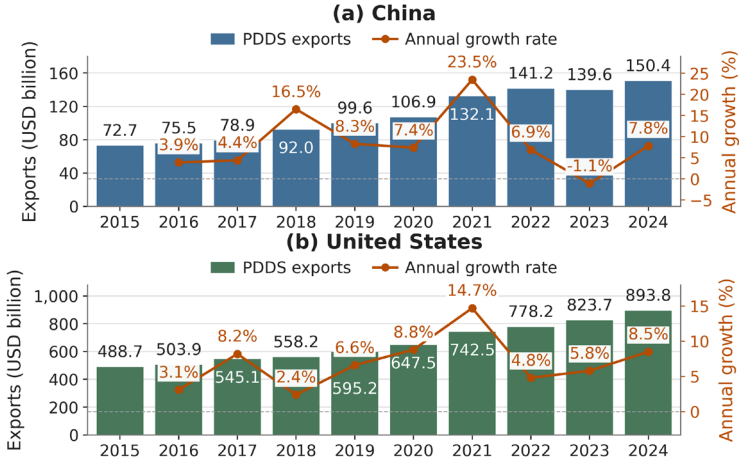
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unevenly, especially intellectual-property and cultural services [5]. China–Japan evidence also tells that weak overall competition can coexist with sector-specific advantages and complementarity [6]. But these studies do not jointly examine China–US export similarity and specialization.

Using 2015–2024 BaTiS data, this study applies ESI to measure overlap in China–US export structures and RCA to identify relative specialization across six EBOPS PDDS categories [1]. This distinguishes compositional similarity from sectoral advantage.

2 Overview of PDDS Exports in China and the US

Data are drawn from the December 2025 WTO–OECD BaTiS edition under BPM6 and EBOPS 2010. The sample comprises annual balanced exports in current US$ millions for China, the US, and the world, with the world as the partner economy, during 2015–2024. It covers six PDDS sectors (SF–SK), commercial services (SOX), and SJ1–SJ3 for the sensitivity test. No values are missing, imputed, or replaced with zero, and growth is calculated from the previous year. Because BaTiS reconciles reported data through estimation and adjustment, the 2024 observations are treated as balanced estimates.



Source: Authors' calculations based on the WTO–OECD BaTiS database.

Fig. 1. Export Value and Annual Growth Rate of PDDS in China and the US, 2015–2024.

As shown in Figure 1, China's PDDS exports more than doubled. The proportional export growth was faster than the US and the growth was particularly strong in 2018 and 2021. The strong growth in 2018 was very possibly related to the implementation of China's large-scale IPv6 deployment plan. From the data, we could observe a clear trend that with the rise of China, its participation in the international PDDS market also keeps increasing.

US PDDS exports increased from US$488.7 billion in 2015 to US$893.8 billion in 2024. The high value and growth rate are based on its strong digital economy. The exceptional growth in both countries in 2021 may be closely related to the Covid-19 pandemic,as it generated strong demand for remotely deliverable services.

3 Export Similarity and Comparative Advantage of PDDS in China and the US

3.1 Export Similarity of PDDS in China and the US

The ESI index measures the similarity between the export structures of two economies in a common market. Following the application of this index to PDDS , the China–US ESI is calculated as:

$$ESI_t = 100 \sum_{s=1}^{6} \min(Share_{Cst}, Share_{Ust})$$

$$Share_{Cst} = \frac{X_{Cst}}{X_{Ct}}, \qquad Share_{Ust} = \frac{X_{Ust}}{X_{Ut}}$$

Table 1. Definitions of Symbols Used in the ESI Formula

Symbol	Definition
ESI_t	Export similarity between China and the US in year (t)
s	One of the six PDDS sectors
$Share_{Cst}$	Share of sector (s) in China's PDDS exports
$Share_{Ust}$	Share of sector (s) in US PDDS exports

Table 2. China–US Export Similarity Index of PDDS, 2015–2024.

Year	**2015**	**2016**	**2017**	**2018**	**2019**
ESI	61.231	64.081	68.144	67.362	68.207
Year	**2020**	**2021**	**2022**	**2023**	**2024**
ESI	68.599	67.283	**68.996**	68.264	66.789

Source: Authors' calculations based on the WTO–OECD BaTiS database.

Table 1 defines the symbols used in the ESI formula. Following Finger and Kreinin [7], the ESI measures the similarity between the sectoral export structures of two economies in a common reference market. The index ranges from 0 to 100, where 100 indicates identical export shares across sectors and 0 indicates no overlap.

As shown in Table 2, the China–US ESI increased during the period, but it is also comparatively stable. Greater export similarity may imply greater potential for competitive overlap when two exporters serve the same market. Because the BaTiS data aggregate all destinations into the world market, the ESI provides only indirect evi-

dence of potential competition and does not establish direct competition in specific destination markets. If we look at the sectoral contribution to the China-US ESI, it would be different from the overall ESI.

Table 3. Sectoral Contributions to the China–US ESI, 2015–2024.

Year	SF	SG	SH	SI	SJ	SK	Total ESI
2015	3.702	4.477	2.126	9.340	40.316	1.270	61.231
2016	3.741	5.178	2.320	9.500	41.764	1.578	64.081
2017	3.825	5.690	4.483	9.892	42.336	1.918	68.144
2018	3.737	5.305	3.748	10.318	42.425	1.828	67.362
2019	3.410	5.240	4.251	11.340	42.043	1.924	68.207
2020	3.263	6.685	4.611	10.596	41.510	1.933	68.599
2021	3.459	6.792	5.428	10.399	39.164	2.040	67.283
2022	3.541	6.827	5.537	11.078	40.285	1.730	68.996
2023	3.725	5.967	4.028	11.965	40.626	1.954	68.264
2024	3.670	6.008	4.323	12.130	38.762	1.895	66.789
Mean	**3.607**	**5.817**	**4.085**	**10.656**	**40.923**	**1.807**	**66.896**

Note: SF = insurance and pension services. SG = financial services. SH = charges for the use of intellectual property n.i.e. SI = telecommunications, computer and information services. SJ = other business services (R&D, consulting, legal, accounting, advertising, and technical services). SK = personal, cultural and recreational services. Source: Authors' calculations based on the WTO–OECD BaTiS database.

As shown in table 3, at the sectoral level, SJ made the largest contribution to the China–US ESI. SJ is a broad and heterogeneous category and alone accounts for approximately 61.2% of the overall ESI. To examine whether the broad SJ category mechanically increases the ESI, sensitivity checks were conducted.

Table 4. Sensitivity of the ESI to the Treatment of SJ.

Measure	Treatment of SJ	Result
Original ESI	SJ retained as one aggregate category	66.90
ESI excluding SJ	SJ removed from both countries' export baskets	55.88
Disaggregated ESI	SJ replaced by SJ1, SJ2, and SJ3	66.74
Within-SJ ESI	Similarity calculated across SJ1–SJ3 only	88.34
Mean aggregation effect	Original ESI minus disaggregated ESI	0.15
Maximum annual aggregation effect	Largest annual difference between the two measures	0.98

Note: ESI values are averages for 2015–2024. The aggregation effect is calculated using the unrounded annual ESI values. SJ1:research and development services, SJ2:professional and management consulting services, and SJ3:technical, trade-related, and other business services.

Table 4 shows that excluding SJ lowers the ESI hugely,but disaggregating it into SJ1–SJ3 has little effect despite high within-SJ similarity. SJ drives much of the structural overlap,its aggregation has little influence on the overall ESI. The two nations have compositional similarity rather than direct destination-market competition. Table 5 complements this analysis with sectoral world market shares, calculated as each country's sectoral exports divided by corresponding world exports.

Table 5. World Export Market Shares of China and the US by PDDS Sector (%)

Sector	China (2015/2024)	US (2015/2024)	Sector	China (2015/2024)	US (2015/2024)
SF	2.46/1.87	11.56/11.69	SI	3.35/3.82	11.22/11.86
SG	0.91/1.46	24.29/24.33	SJ	4.43/4.45	17.61/16.84
SH	0.41/1.07	31.77/37.97	SK	1.25/2.06	29.14/16.78

Note: The 2024 observations are balanced analytical estimates from the December 2025 BaTiS edition. Source: Authors' calculations based on the WTO–OECD BaTiS database.

As shown in table 5, between 2015 and 2024, China's share of world PDDS exports increased,and the US share edged down. The US maintained a larger market position, but China's modest increase, together with the persistent structural overlap, suggests growing potential for competitive overlap at the aggregate level. But these contrasting changes do not demonstrate that China's gains occurred at the expense of the US, destination-level data would be required to establish direct competition.

3.2 Comparative Advantage of PDDS in China and the US

RCA index measures an economy's relative export advantage in a particular sector. It compares the sector's share in the economy's total exports with the corresponding sector's share in total world exports. The formulation is following and the definitions of RCA index are in the table 6

$$RCA_{cst}=\frac{X_{cst}/X_{ct}}{X_{wst}/X_{wt}}$$

Table 6. Definitions of Symbols Used in the RCA Formula.

Symbol	Definition
RCA_{cst}	RCA of country (c) in sector (s) and year (t)
X_{cst}	Exports of sector (s) by country (c) in year (t)
X_{ct}	Total commercial services exports of country (c) in year (t)
X_{wst}	World exports of sector (s) in year (t)
X_{wt}	Total world commercial services exports in year (t)

Table 7. Aggregate RCA of PDDS in China and the US, 2015–2024.

Year	2015	2016	2017	2018	2019
China	0.733	0.757	0.738	0.759	0.771
The US	1.216	1.206	1.228	1.221	1.218

Year	2020	2021	2022	2023	2024
China	0.741	0.710	0.769	**0.815**	0.763
The US	1.227	1.280	**1.310**	1.278	1.272

Source: Authors' calculations based on the WTO–OECD BaTiS database.

Normally, an RCA value above 1 indicates a revealed comparative advantage, and below 1 indicates no revealed comparative advantage. As shown in Table 7, China's aggregate RCA remained below 1 throughout the period. Although China's PDDS exports increased rapidly, their share in the country's commercial services exports remained lower than the corresponding global share. This may partly reflect China's manufacturing-oriented development model and its greater concentration of economic resources in the real economy.

The US RCA remained above 1 in every year. The US maintained a persistent aggregate comparative advantage and stronger relative specialization in PDDS exports. Aggregate RCA alone may tell that the US is competitive across all sectors while China is weak across all sectors. Such an interpretation would overlook substantial sectoral differences. Therefore, the following analysis examines the RCA indices at the sectoral level.

Table 8. Sectoral RCA Indices of China and the US, 2015–2024.

Year(China/US)	**SF**	**SG**	**SH**	**SI**	**SJ**	**SK**
2015	0.618/0.717	0.228/1.505	0.104/1.969	0.840/0.695	1.112/1.091	0.314/1.806
2016	0.550/0.698	0.280/1.507	0.115/1.847	0.909/0.735	1.121/1.105	0.391/1.604
2017	0.560/0.767	0.301/1.585	0.215/1.741	0.765/0.765	1.083/1.143	0.444/1.586
2018	0.610/0.769	0.292/1.629	0.184/1.702	0.922/0.758	1.079/1.148	0.446/1.403
2019	0.538/0.750	0.306/1.660	0.218/1.771	0.944/0.820	1.068/1.106	0.489/1.339
2020	0.597/0.693	0.355/1.597	0.251/2.130	0.854/0.719	0.992/1.113	0.502/1.235
2021	0.596/0.764	0.336/1.655	0.277/2.333	0.779/0.704	0.975/1.144	0.454/1.209
2022	0.618/0.810	0.382/1.588	0.308/2.406	0.859/0.754	1.034/1.187	0.439/1.325
2023	0.634/0.781	0.359/1.541	0.254/2.389	0.936/0.780	1.108/1.162	0.505/1.310
2024	0.438/0.771	0.343/1.604	0.252/2.503	0.898/0.782	1.046/1.110	0.484/1.106
2015–2024 mean	0.576/0.752	0.318/1.587	0.218/2.079	0.871/0.751	1.062/1.131	0.447/1.392

Source: Authors' calculations based on the WTO–OECD BaTiS database.

As shown in Table 8, China's sectoral comparative advantage was highly concentrated in SJ and its SI comparative advantage could keep a relatively strong position. These may be associated with China's large manufacturing and foreign-trade base, which supports related service exports. The other less competitive ones share one common trait that their international expansion depends more on mature global service networks and cross-border market access, but receives less direct support from China's domestic manufacturing and merchandise-trade base.

For the US, due to long-established digital-economy advantages and the global operations of US multinational enterprises, the US maintained RCA values above 1 in SG, SH, SJ and SK.

The RCA index of SF and SI remained below 1. However, the RCA index measures relative export specialization rather than absolute capacity, so these results do not mean that the US insurance or digital technology industries are weak.

4 Conclusion

This study's results distinguish export-structure similarity from relative specialization and market position. Both countries' PDDS exports grew, but the ESI was driven mainly by SJ, with limited overlap elsewhere. The US retained a much larger world market share despite a slight decline,and China's share increased. The two nations have potential aggregate competitive overlap, not direct competition in specific markets or equal competitive strength. RCA advantages were broader in the US (SG, SH, SJ, and SK) and concentrated in SJ for China. These findings identify where structural overlap is strongest. Because BaTiS does not identify actual delivery modes or destinations, future research should use destination-level data to examine direct competition.

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