C-TiSMoS Dataset and reevaluation of China's trade in services

(China's Trade in Services by Mode of Supply)

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1 Why to build C-TiSMoS Dataset?

2 How to build C-TiSMoS dataset?

3 Re-evaluation of China's trade in services

4 Conclusion and discussion

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Why to build C-TiSMoS dataset?

- **Trade in services is underestimated**
  - Advancements in digital technology and trade liberalization have enhanced the tradability of services.
  - Official datas show small relative magnitude of trade in services

	$\dfrac{\textit{Total Trade in Services}}{\textit{GDP}}$	$\dfrac{\textit{Total Trade in Services}}{\textit{Total Trade in Goods and Services}}$	$\dfrac{\textit{Value added of Services}}{\textit{GDP}}$
World	7.1%	23.0%	67.1%
China	5.0%	12.5%	52.8%

Data source: *Handbook of Statistics 2023, Report on China's Development of Trade in Services 2023*

Why to build C-TiSMoS dataset?

- *General Agreement on Trade in Services*: 4 modes of supply: cross-border Supply (M1), consumption Aboard (M2), commercial presence (M3) and movement of natural persons (M4).
- Statistics of trade in services primarily reply on the cross-border trade data (BOP).
- Cross-border trade cannot distinguish 4 modes of supply, unable to capture **mode 3** (Magdelaine and Maurer, 2008; Rueda-Cantuche et al., 2016).

Why to build C-TiSMoS dataset?

- **WTO**-**TiSMoS** covering 201 economies in 2019
- WTO-TiSMoS dataset fills in about 60 percent of the missing data in BOP and FATS by estimation (Wettstein et al., 2019). FATS is used to supplement commercial presence
- For China (individual country)
  - most FATS data are estimated
  - Sum of BOP and FATS, overlapping problem!

Why to build C-TiSMoS dataset?

- Based on China's BOP and FATS data, construct C-TiSMoS dataset, covering 2015-2020, 4 modes of supply, 15 major service industries
- Improve the construction methodology of WTO-TiSMoS .

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How to build C-TiSMoS dataset?

- Steps
- 1.Integrate and import raw data
- 2.Set classification standards and industry match
  ——solving the industry mismatch issue in raw data
- 3.Supplement missing data in original data
  ——solving the missing data issue in China's FATS statistics
- 4.Eliminate double counting between BOP and FATS
  ——solving the double counting issue present in raw data
- 5.Adjust some sector data
  ——solving the gaps in the methodology used in BOP statistics
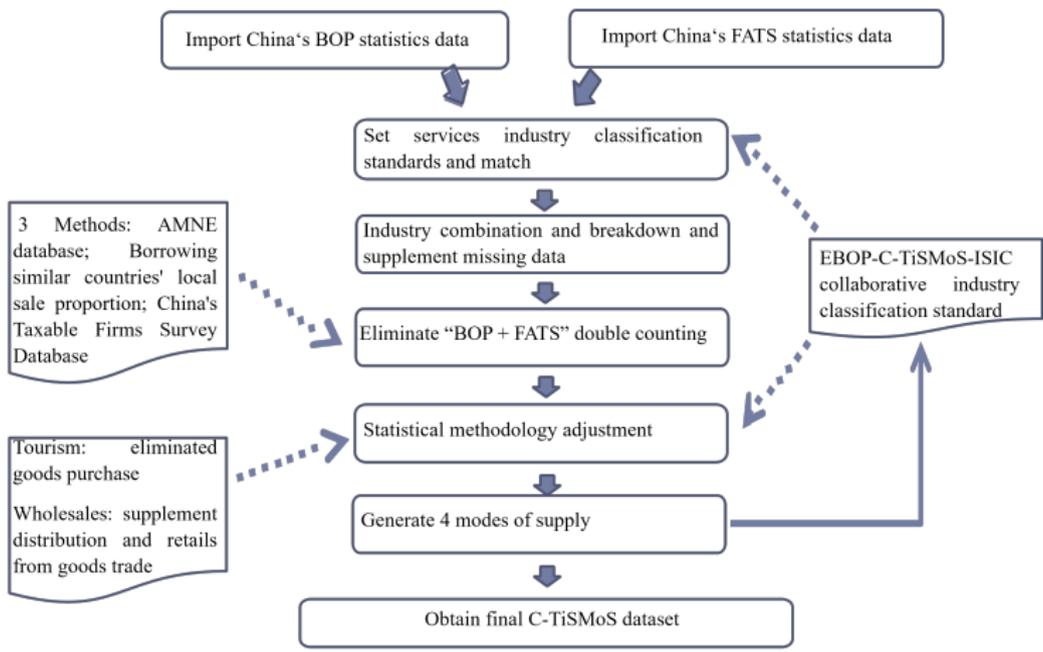- 6.Generate 4 modes of supply

How to build C-TiSMoS dataset?

Figure 1: Flowchart of building C-TiSMoS

How to build C-TiSMoS dataset?

- (1) **Integrate and import raw data**
- BOP data: the State Administration of Foreign Exchange，using the service output and service input of residents and non-residents under the current account.
- FATS statistics: National Bureau of Statistics on the sale activities of foreign affiliates.

How to build C-TiSMoS dataset?

- **(2) Set classification standards and industry concordance**
- China's BOP statistics are based on the Extended Balance of Payments Services Classification (EBOPS 2010): 12 major items of services.
- FATS statistics are based the Industry Classification for International Surveys (ISIC): 13 major categories of service industries.
  - In WTO-TiSMoS, 56 items of EBOPS are selected and used to match ISIC classification. Though not all economies report the same level of detail, extra estimation is required for industrial breakdown.
- We designed the EBOP–C-TiSMoS–ISIC concordance table.

How to build C-TiSMoS dataset?

EBOP classification	C-TiSMoS classification	ISIC industry categories
SA - Manufacturing services on physical inputs owned by others	Manufacturing related services	
SB - Maintenance and repair services not included elsewhere		
SC - Transport	Transportation	ISIC-H Transportation and storage
SC1 - Sea transport		
SC11 - Passenger (Sea)		
SC12 - Freight (Sea)		
SC13 - Other (Sea)		
SC2 - Air transport		
SC11 - Passenger (Air)		
SC12 - Freight (Air)		
SC13 - Other (Air)		
SC3 -Other transport		
SC11 - Passenger (Other)		
SC12 - Freight (Other)		
SC13 - Other (Other)		
SC4 -Postal and courier services		
SD - Travel		
SDA - Business travel	Accomodation and catering services	ISIC-I Accommodation and food service activities
SDB3 - Other personal travel (exdued travel realated goods)		
SE - Construction	Construction	ISIC-F Construction
SF - Insurance and pension services	Finance	ISIC-K Finance
SG - Financial services		
SH - Charges for the use of intellectual property	Intellectual Property Services	
SJ - Other business services		
SJ1 - Research and development services		
SJ2 - Professional and management consulting services	Professional and technical services	ISIC-M Professional, scientific and technical activities
SJ21 - Legal, accounting		
SJ22 - Advertising, market research, public opinion polling		
SJ31 - Architectural, engineering, scientific and other		

How to build C-TiSMoS dataset?

- aggregate some sectors .
  - "Insurance and pension services" and "financial services" in BOP statistics are merged into "financial industry", and BOP's "processing services" and "repair and maintenance services" are merged into "manufacturing services"
- breakdown of some sectors.
  - "travel" in BOP is broken down into "accommodation and catering", "health care" and "education", "Other business services" is broken down into "professional and technical services", "business and auxiliary services", and "real estates"
  - The decomposition weight is drawn from WTO-TiSMoS.
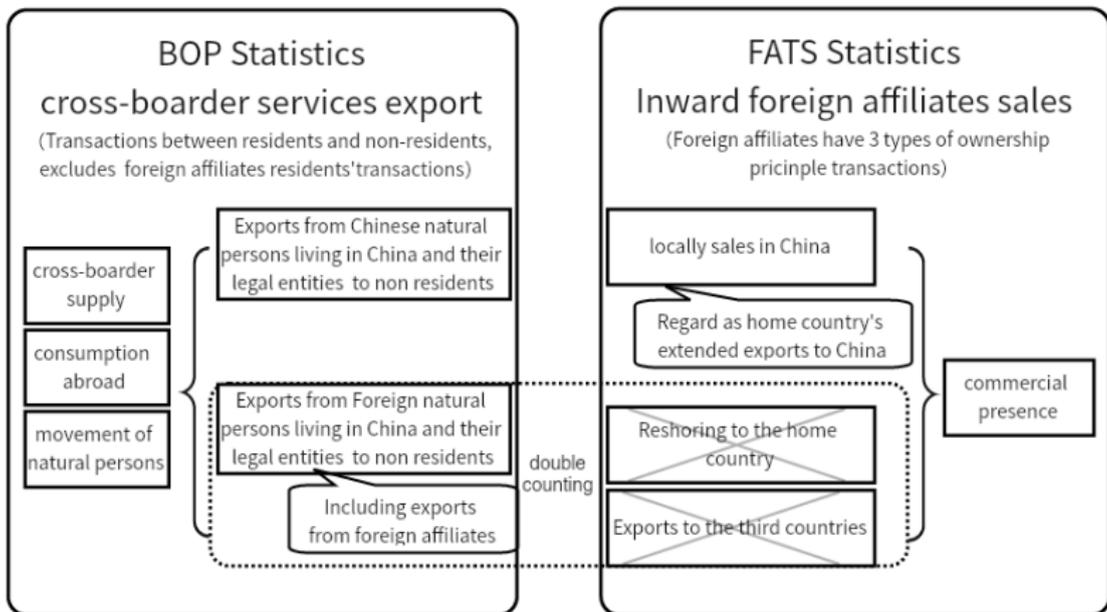
How to build C-TiSMoS dataset?

- (3) **Supplementing the missing data**
- China's orignal FATS data only encompass the top 10 industry data, data of education and healthcare is missing.
- Follow the following steps for estimates:
    - 1.2015-2017 Missing data: drawn from WTO-TiSMoS data
    - 2.2018-2020 Missing data: estimated. based on time series estimation equation
    - 3.Estimate FATS (inward/outward): based on FDI gravity model .

$$ln(FATS_{ikt}) = \alpha_0 + \beta_1 ln(GDP_{it}) + \beta_2 ln(BOP_{ikt}) + \varepsilon_{ikt}$$

How to build C-TiSMoS dataset?

- (4) **Eliminate double counting of BOP and FATS**
- BOP statistics and FATS statistics encounter issues of double counting due to distinct statistical principles and metrics.
- BOP statistics adhere to the "principle of territory," reporting the exports to non-residents by natural and legal persons within the reporting country, while FATS statistics adhere to the "principle of ownership", reporting transactions by foreign "ownership" firms within the reporting country (inward FATS) and by home "ownership" firms within the destination country (outward FATS)
- The reshoring of foreign affiliates to the home country and exports to third countries are both recognized as residents and non-resident transactions and foreign affiliates transactions are included in FATS statistics and need to be excluded.

How to build C-TiSMoS dataset?

How to build C-TiSMoS dataset?

- **estimate the proportion of local sales in the host country**
- 1.Estimation based on AMNE database
  ——Use the Analytical Multinational Enterprises (AMNE) database from OECD to calculate the proportion of the local sales in the host country.
- 2. borrow from similar countries' local sale proportion
  ——WTO-TiSMoS uses this method to estimate proportion of local sales and use local sales proportion pubilished by other economics, which are close to China's development status.
- 3.Estimation based on China's Survey Database
  ——Use foreign-invested firms data in China's Taxable Firms Survey Database to calculate the local sales proportion in China. (Inward FATS)

How to build C-TiSMoS dataset?

Table	Locally sales proportion of China's inward FATS		(%)
Industry	AMNE database estimation	Borrowing from similar countries	China's Taxable Firms Survey Database estimation
Construction	100.0	99	99.5
Wholesales and retails	84.4	89	94.2
Transportations	55.1	87	88.0
Accommodation and food services	99.4	98	99.9
Information and communication services	94.6	92	95.0
Finance	94.9	98	100.0
Real estate	98.7	84	100.0
Professional and technical services	97.8	91	55.2
Business and auxiliary services	97.8	97	97.0
Education	99.5	98	100.0
Health care	99.9	100	100.0
Arts and entertainment services	89.7	98	99.8
Living and other services	100.0	95	96.9

How to build C-TiSMoS dataset?

- （5）**adjustment of tourism and wholesales**
- Tourism
  ——BOP's "travel" include the total amount of goods and services obtained by non-residents. But goods purchase should be eliminated.
  ——Refer to WTO-TiSMoS, use IMF's Coordinated Direct Investment Survey (CDIS) data and Eurostat bilateral trade data, calculate the proportion of imports and exports of non-resident goods expenditures in total expenditures

- Wholesales
  ——In BOP statistics, wholesale and retail services are included in goods exports (CIF/FOB), not listed as a statistical service industry, which should be supplemented.
  ——Refer to WTO-TiSMoS, use 3.66 percent of China's goods trade to represent China's wholesale and retail trade volume

How to build C-TiSMoS dataset?

- （6）**Generate 4 modes of supply**
- Refer to WTO-TiSMoS, decompose industry-level data and generate data of 4 modes of supply
- ——Financial services trade is provided through cross-border supply to non-residents, and can be regarded as 100 ％ Cross-border Supply mode. Tourism is regarded as 100 ％ Consumption Abroad.
- ——Some industries need to make ex-ante judgments on the probability of occurrence of various supply modes. professional and technical services account for 75 ％ of cross-border supply, and 25 ％ of the movement of natural persons.
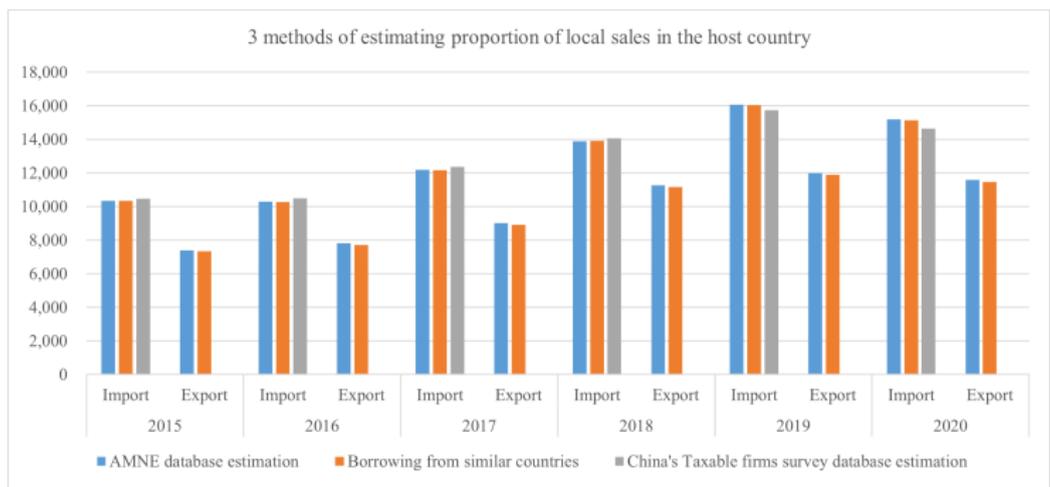
How to build C-TiSMoS dataset?

Table: Decomposition proportion of 4 supply modes in industries under China's BOP statistics

Services item code (EBOPS)	Secondary item code （EBOPS）	Name	Decomposition Porportion （%）			
			Cross-border supply	Consumption abroad	Commercial presence	Movement of natural persons
SA		Manufacturing services		100		
SB		Maintenance, repair		90		10
SC		Transportation	90	10		
SD		Travel				
	SDA	Business travel		100		
	SDB1	Health-related travel		100		
	SDB2	Education-related travel		100		
	SDB3	Other personal travel		100		
SE		Construction			50	50
SF		Insurance, pension	100			
SG		Finance	100			
SH		Intellectual property services	100			
SI		Information, communication	79	1		20
SJ		Other business services				
	SJ1SJ2SJ31	Professional, technical services	75			25
	SJ32SJ33	Business, auxiliary services		50		50
	SJ35	Real estate	75			25
	SJ34	Trade-related services	100			
SK		Personal, arts and recreation				
	SK1	Audio-visual related services	79	1		20
	SK21	Health care	75			25
	SK22	Education	75			25
	SK23	Arts and entertainments	75			25
	SK24	Other living services	75			25

How to build C-TiSMoS dataset?

- （**7**）**Validation**
- 3 final datasets of 3 methods of eliminating double counting

3 methods of estimating proportion of local sales in the host country

- **Import and export volumes are close in 3 datasets.**
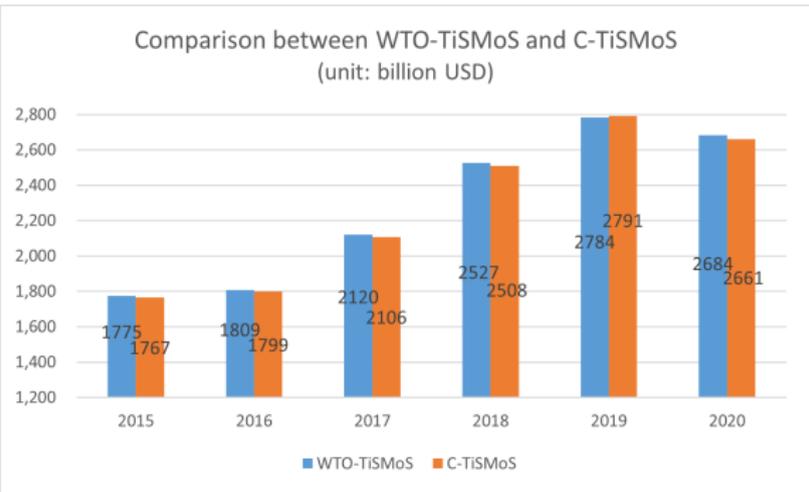
How to build C-TiSMoS dataset?

- Comparison of C-TiSMoS and WTO-TiSMoS
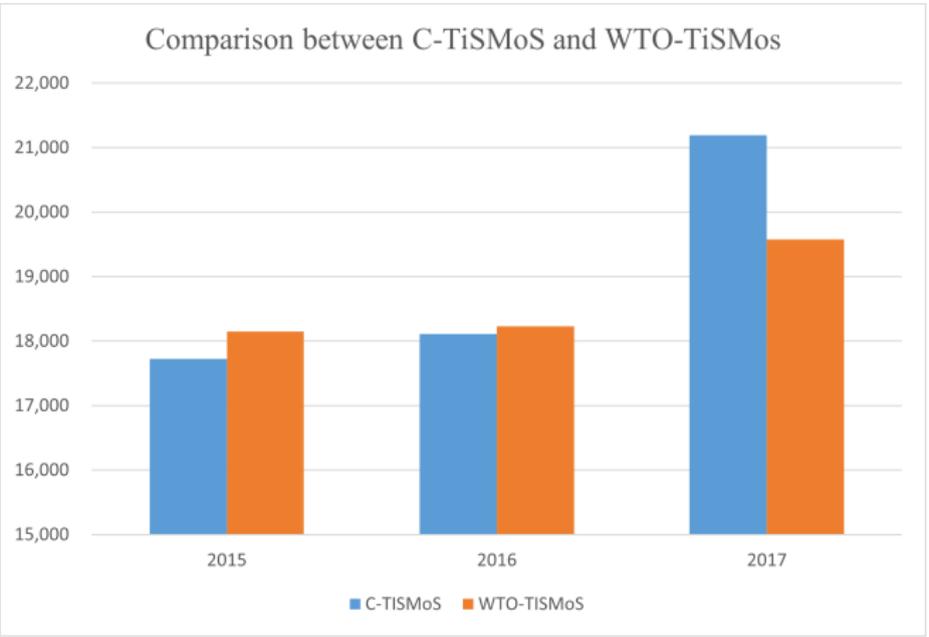
- **C-TiSMoS shows more rapidly growing**

How to build C-TiSMoS dataset?

- Comparison of C-TiSMoS and WTO-TiSMoS

Comparison between WTO-TiSMoS and C-TiSMoS
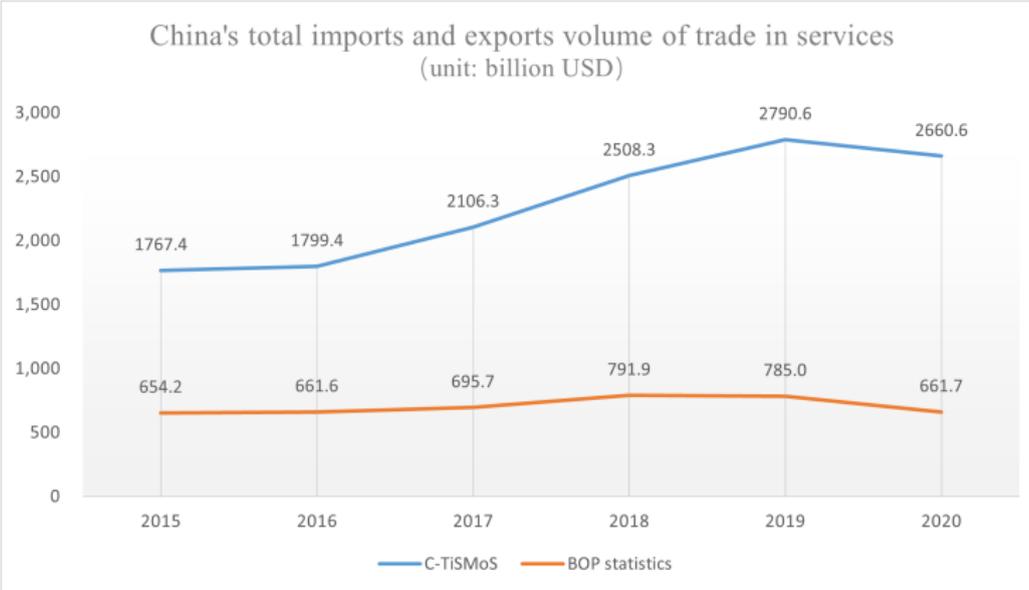(unit: billion USD)

- **Similarity shows the methodology of C-TiSMoS is reliable**

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Re-evaluation of China's trade in services

- (1) **Trade Value**

China's total imports and exports volume of trade in services
(unit: billion USD)

Re-evaluation of China ' s trade in services

- The total import and export volume of service trade in 2019 reached USD 2,805.1 billion, 3.57 times that under BOP statistics。
- From 2015 to 2019, China's trade in services grew faster under C-TiSMoS than BOP statistics. The average annual growth rate was 4.7％under BOP, 20％under C-TiSMoS.
- In 2020, service trade has declined due to Covid-19. China's trade in services has decreased by 15.7％under BOP, and service trade under C-TiSMoS has decreased by 4.％

Re-evaluation of China's trade in services

- （2）**Trade Balance**

China's total imports of trade in services
(unit: billion USD)

1033.9   1026.9   1215.7   1391.9   1602.5   1514.2

435.6   452.1   467.6   525.0   501.4   381.1

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |

—— C-TiSMoS   —— BOP statistics
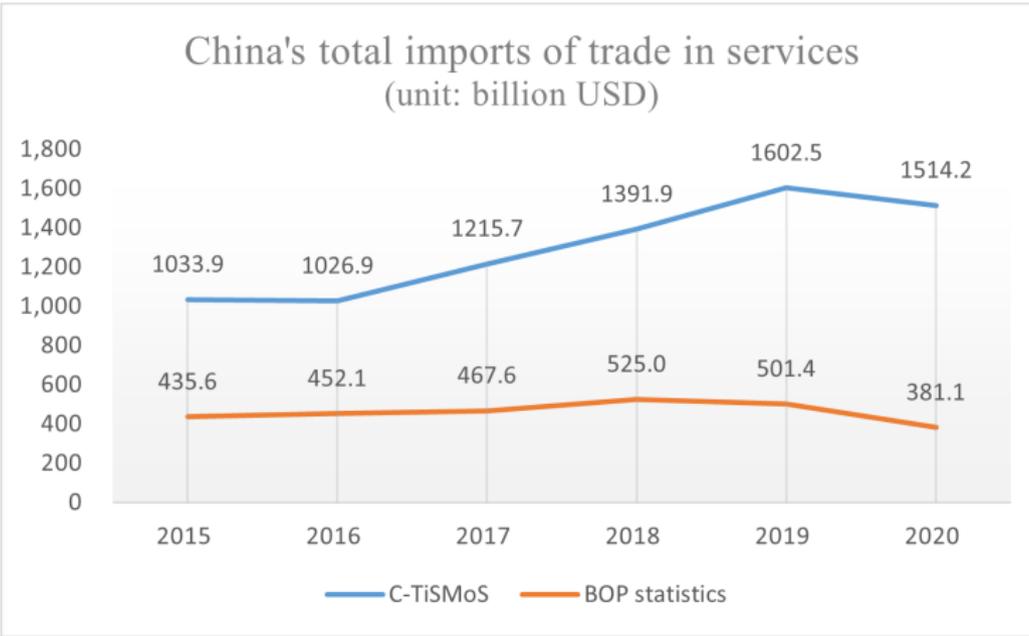
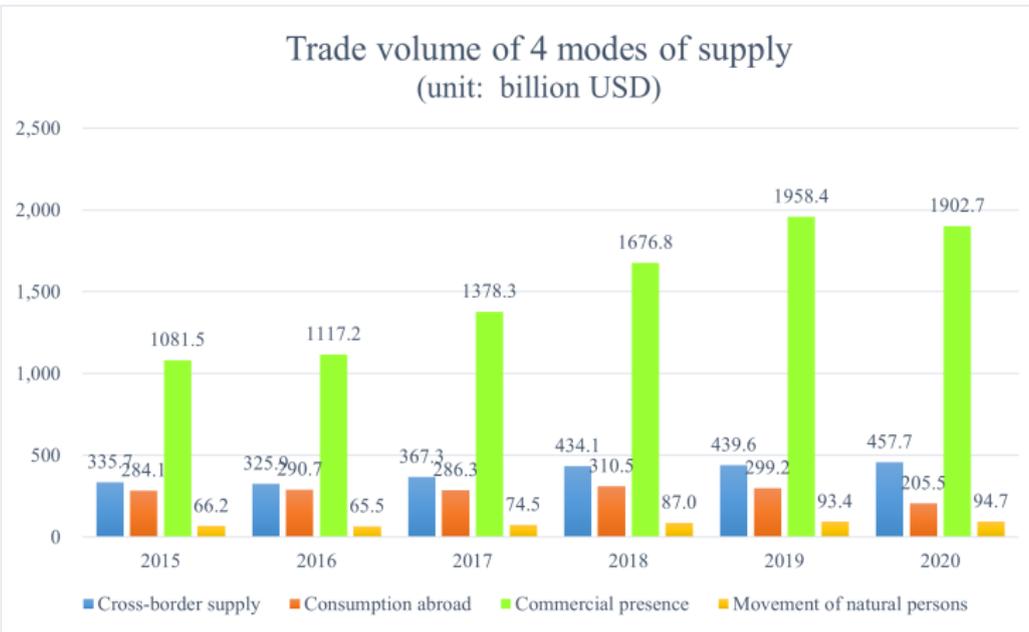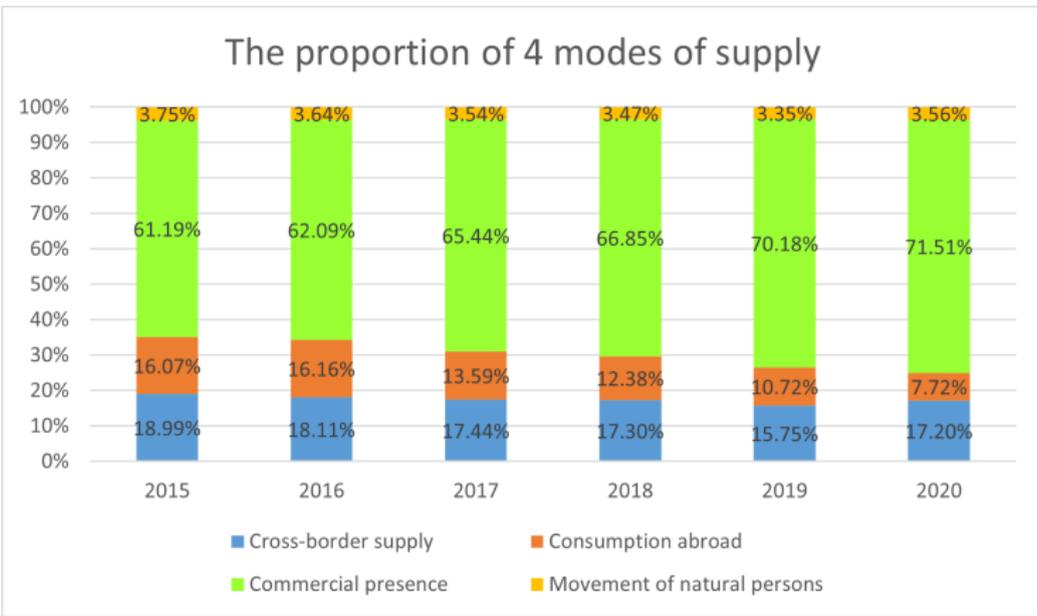## Re-evaluation of China's trade in services

- China's service trade deficit under C-TiSMoS is larger than that under BOP statistics.
- In 2019, trade deficit reached USD 408.37 billion (TISMoS), higher than USD 217.8 billion(BOP）
- Effects of covid-19. In 2020, China's import and export of trade in services have declined, and imports have declined more than exports.

Re-evaluation of China's trade in services

- （3）**Mode of Supply**

Trade volume of 4 modes of supply
(unit: billion USD)

Cross-border supply, Consumption abroad, Commercial presence, Movement of natural persons data by year:

2015: 335.7, 284.1, 1081.5, 66.2
2016: 325.8, 290.7, 1117.2, 65.5
2017: 367.3, 286.3, 1378.3, 74.5
2018: 434.1, 310.5, 1676.8, 87.0
2019: 439.6, 299.2, 1958.4, 93.4
2020: 457.7, 205.5, 1902.7, 94.7

Legend: ■ Cross-border supply   ■ Consumption abroad   ■ Commercial presence   ■ Movement of natural persons

Re-evaluation of China's trade in services

The proportion of 4 modes of supply

Year	Cross-border supply	Consumption abroad	Commercial presence	Movement of natural persons
2015	18.99%	16.07%	61.19%	3.75%
2016	18.11%	16.16%	62.09%	3.64%
2017	17.44%	13.59%	65.44%	3.54%
2018	17.30%	12.38%	66.85%	3.47%
2019	15.75%	10.72%	70.18%	3.35%
2020	17.20%	7.72%	71.51%	3.56%

■ Cross-border supply   ■ Consumption abroad
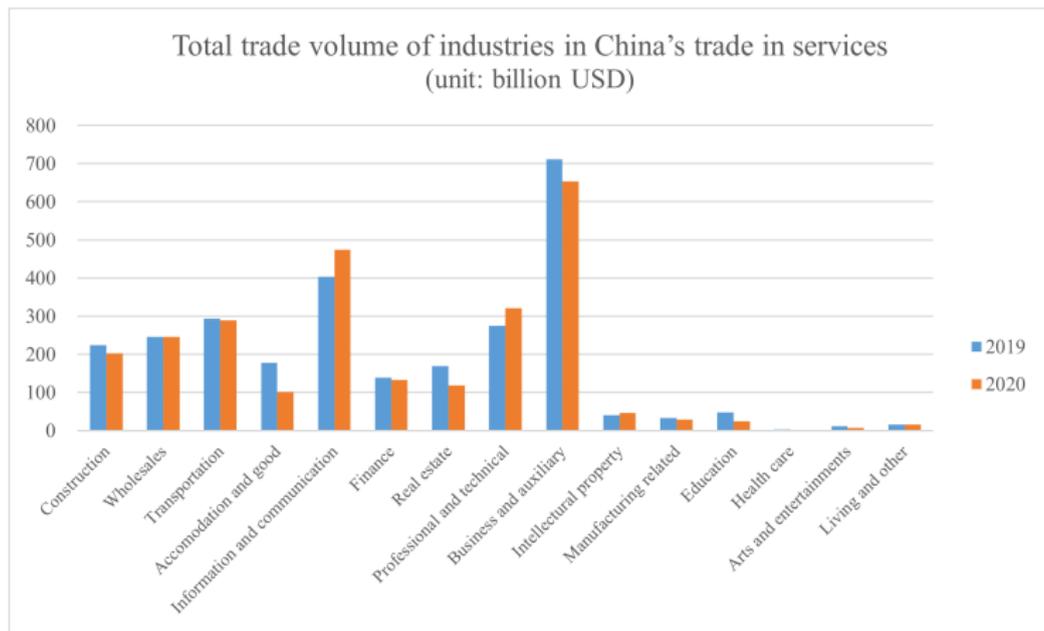■ Commercial presence   ■ Movement of natural persons

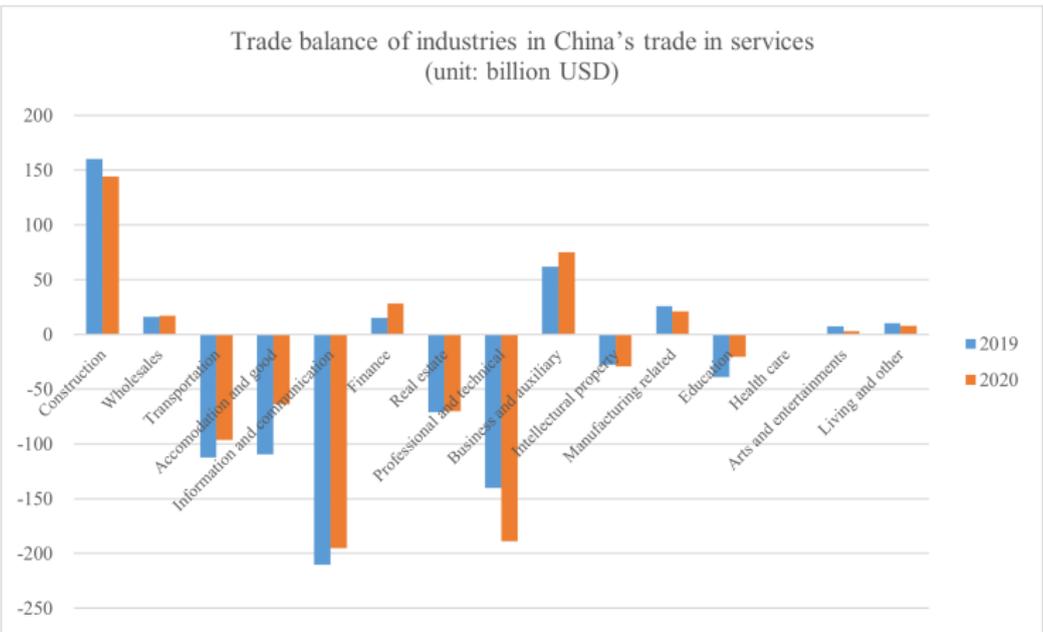## Re-evaluation of China ' s trade in services

- Commercial presence (M3) accounting for 71 % of total trade in
  2020. BOP statistics seriously underestimate the scale of China ' s
  trade in services。

- Between 2015-2019, China ' s commercial presence grew faster than
  other modes.

- In 2020, consumption abroad (M2) was greatly affected by
  pandemic. Commercial presence (M3) has also shrunk due to the
  pandemic. Cross-border delivery (M1) has maintained a growth
  trend. Movement of natural persons (M4) has increased slightly.

Re-evaluation of China's trade in services

- （4）**Service sectors**

Total trade volume of industries in China's trade in services
(unit: billion USD)

Re-evaluation of China's trade in services

Trade balance of industries in China's trade in services (unit: billion USD)

Re-evaluation of China ' s trade in services

- China's service industries show a trade surplus in construction ,
  business and auxiliary services, but a trade deficit in ICT services,
  professional and technical services.

- Affected by the pandemic, most service sectors has shrunk in 2020.
  Accommodation, catering services and real estate have been greatly
  affects. ICT services, professional and technical services, intellectual
  property services maintain growth.

Conclusion

- Improve the methodology to build C-TiSMoS for individual country)

- C-TiSMoS: China's service trade scale, trade balance, mode of supply, and industry development exhibit distinct characteristics compared to BOP statistics.

- C-TiSMoS: Provide a foundation for research and policy.

Discussions

- FATS statistics or estimation
- 44 economies report original FATS data (from Eurostat, OECD-FATS, National report).
- OECD AMNE data encompasses 34 industries and 59 countries, serving as a valuable data source to complement FATS database and calculate the local sale share.

FATS and AMNE

	FATS reported economics	**AMNE database reported economics**
Both	Austria, Belgium, Bulgaria, Canada, China, Costa Rica, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Greece, Hong Kong, Croatia, Hungary, Ireland, Israel, India, Italy, Japan, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, New Zealand, Poland, Portugal, Romania, Sweden, Slovenia, Slovak Republic, Thailand, United States, Viet Nam (40 economics)	
Only	Bosnia and Herzegovina, Serbia, Zambia, Zimbabwe (4 economics)	Australia, Chile, Iceland, South Korea, Mexico, Switzerland, Turkey, Argentina, Brazil, Colombia, Indonesia, Malaysia, Morocco, Philippines, Russian Federation, Saudi Arabia, Singapore, South Africa, Chinese Taipei (19 economics)

Discussions

- **Industry decomposition and concordance.**
  If there's insufficient data, efforts should be made to minimize industry decomposition.

- **Decomposition of the supply mode**
  International organizations should offer a uniform ratio for each sector.

Thanks!

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