

# TiSMoS – a new global trade in services data set

“What the modes of supply can tell us “

Simply Services

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# Overview

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1. What is TISMOS?

- Approach
- Purpose

2. BOP and FATS datasets

3. The “enhanced simplified approach”

4. Build a complete FATS dataset

5. Bridge table and results

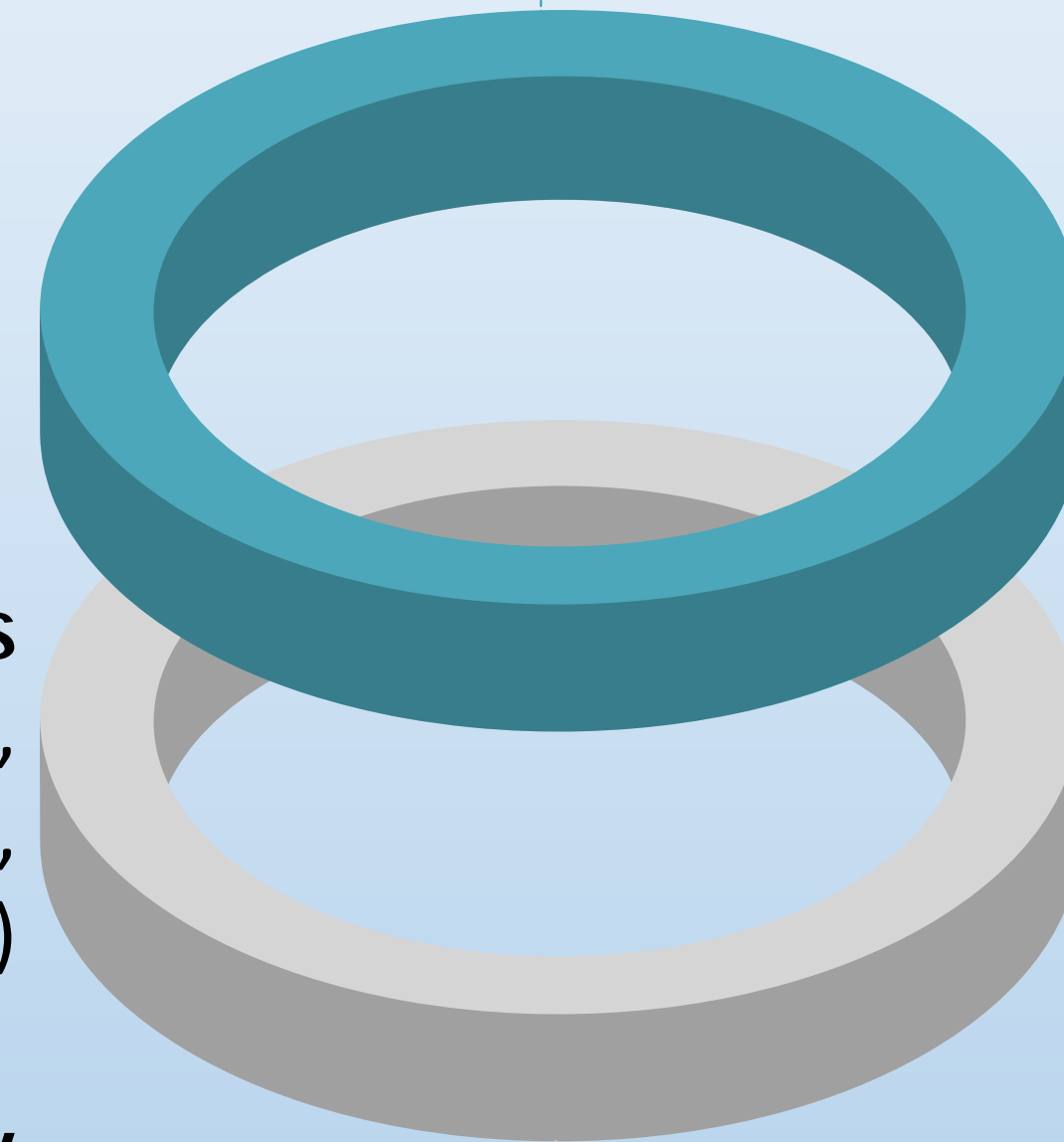
# WTO Trade in Services Data Hub

## Datasets

**Total trade in services  
(UNCTAD, ITC and WTO)**  
All countries, 2005-18, 12 categories

**Balanced bilateral trade in services**  
Experimental dataset, 191 x 191 economies,  
in BPM6 from 2005-2017 (released in 2020),  
in BPM5 from 1995-2012 (released in Dec. 2017)

**Trade in Services by mode of supply**  
Experimental dataset, 2005-17  
66 EBOPS2010 items



## Datasets

I-TIP

STRIs

Next?

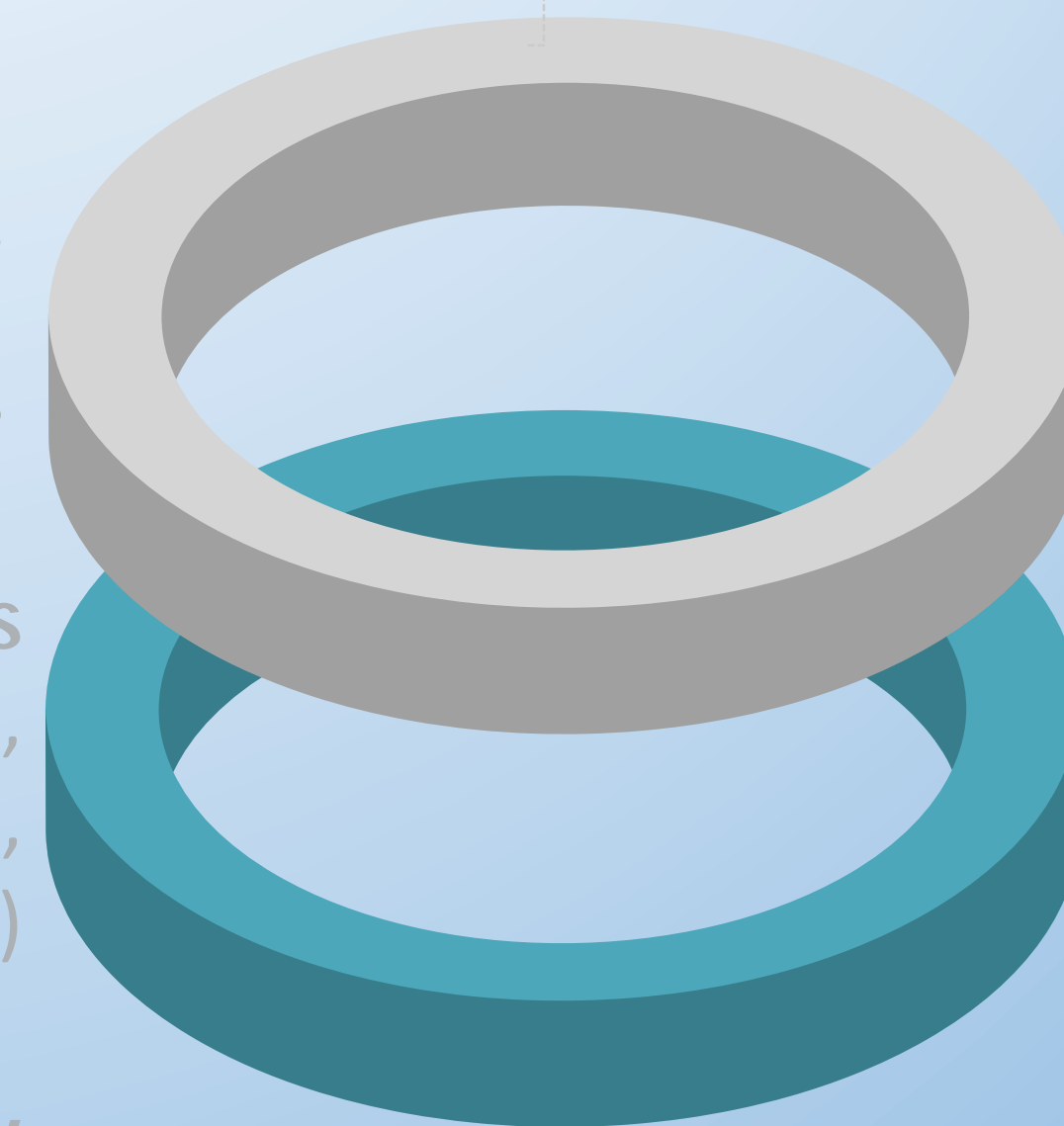
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## Datasets

**I-TIP**

**STRIs**

**Next?**

# GATS Modes of Supply and Statistical Domains

The simplified approach

Mode 1  
Mode 2  
Mode 4

M1,2,4

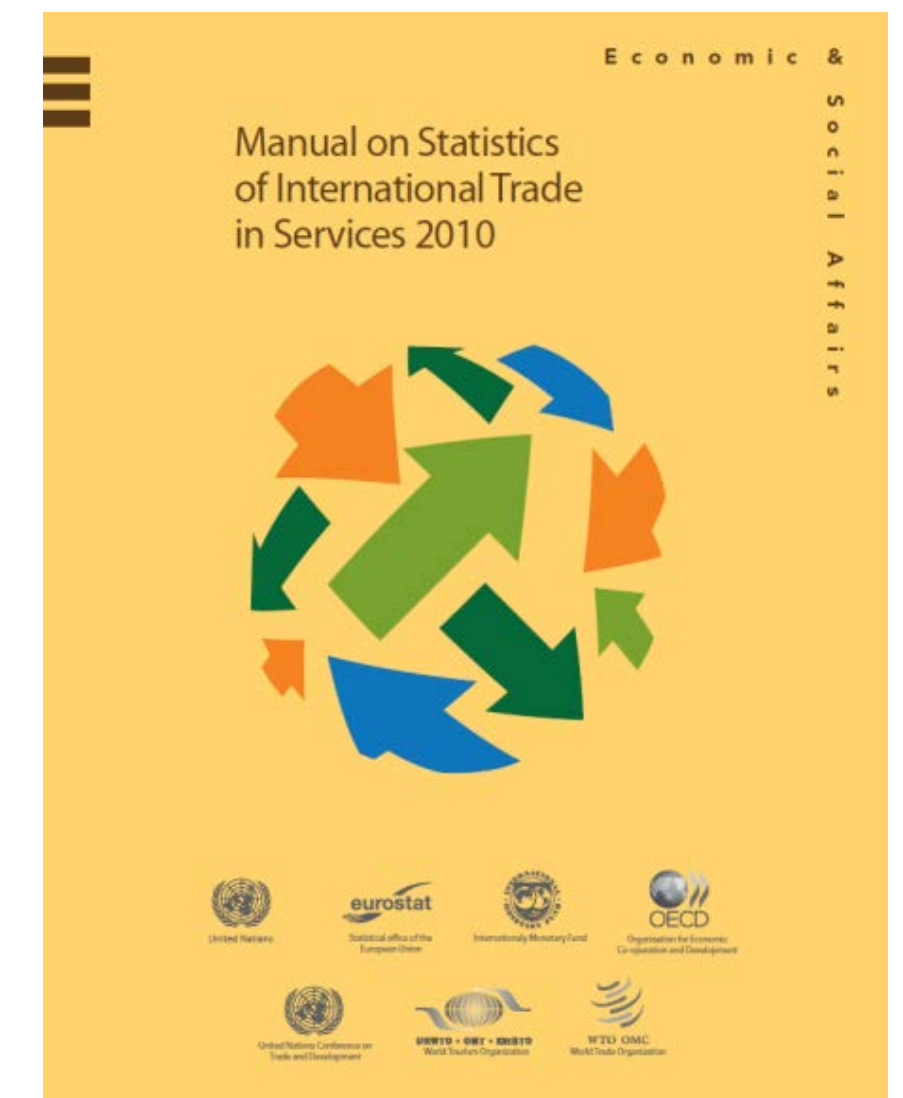
Balance of Payments  
Services Statistics

Mode 4  
Remittances and compensation of employees  
are not measures of mode 4 trade

Mode 3

M3

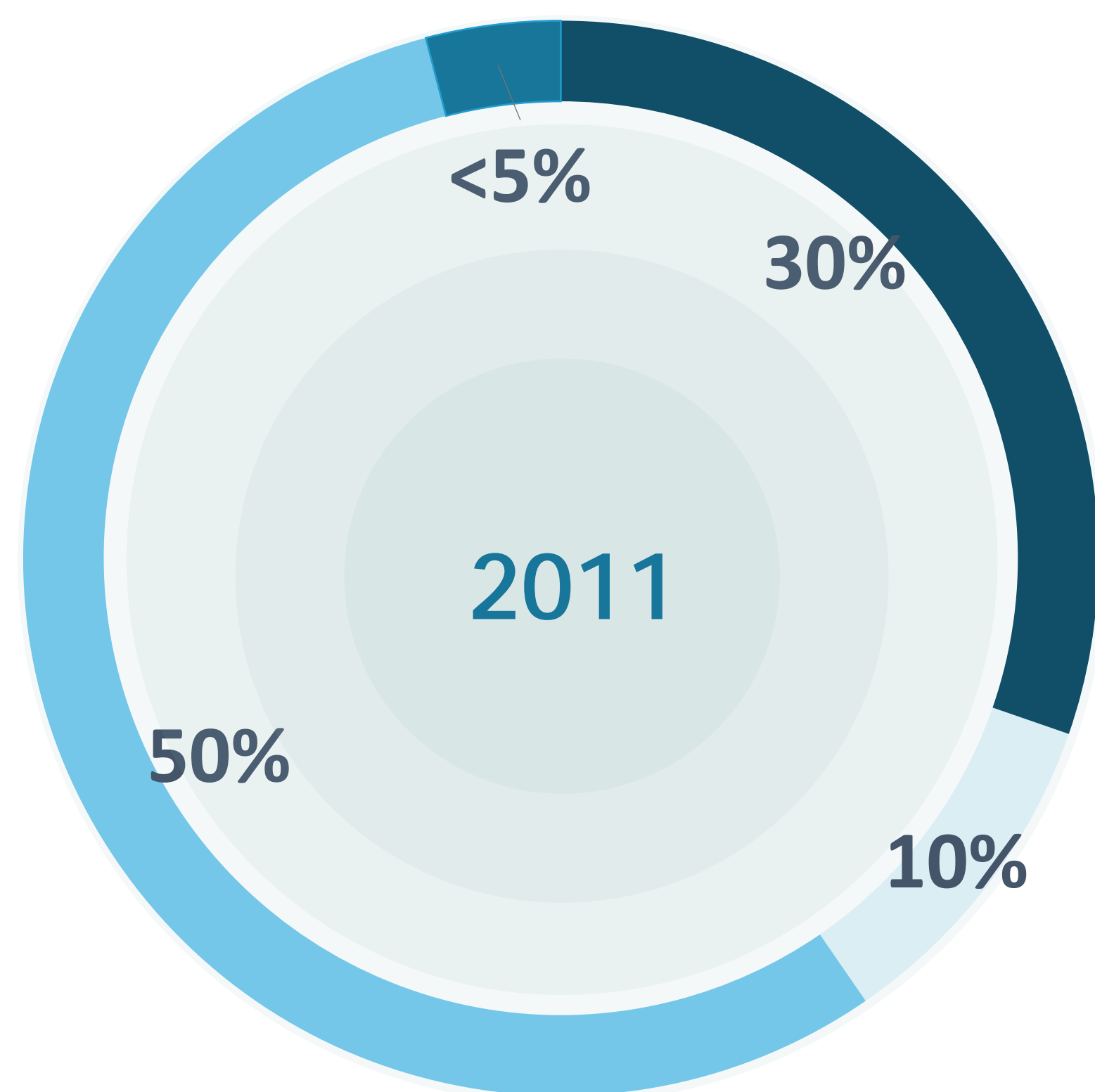
Foreign Affiliate Statistics  
FATS





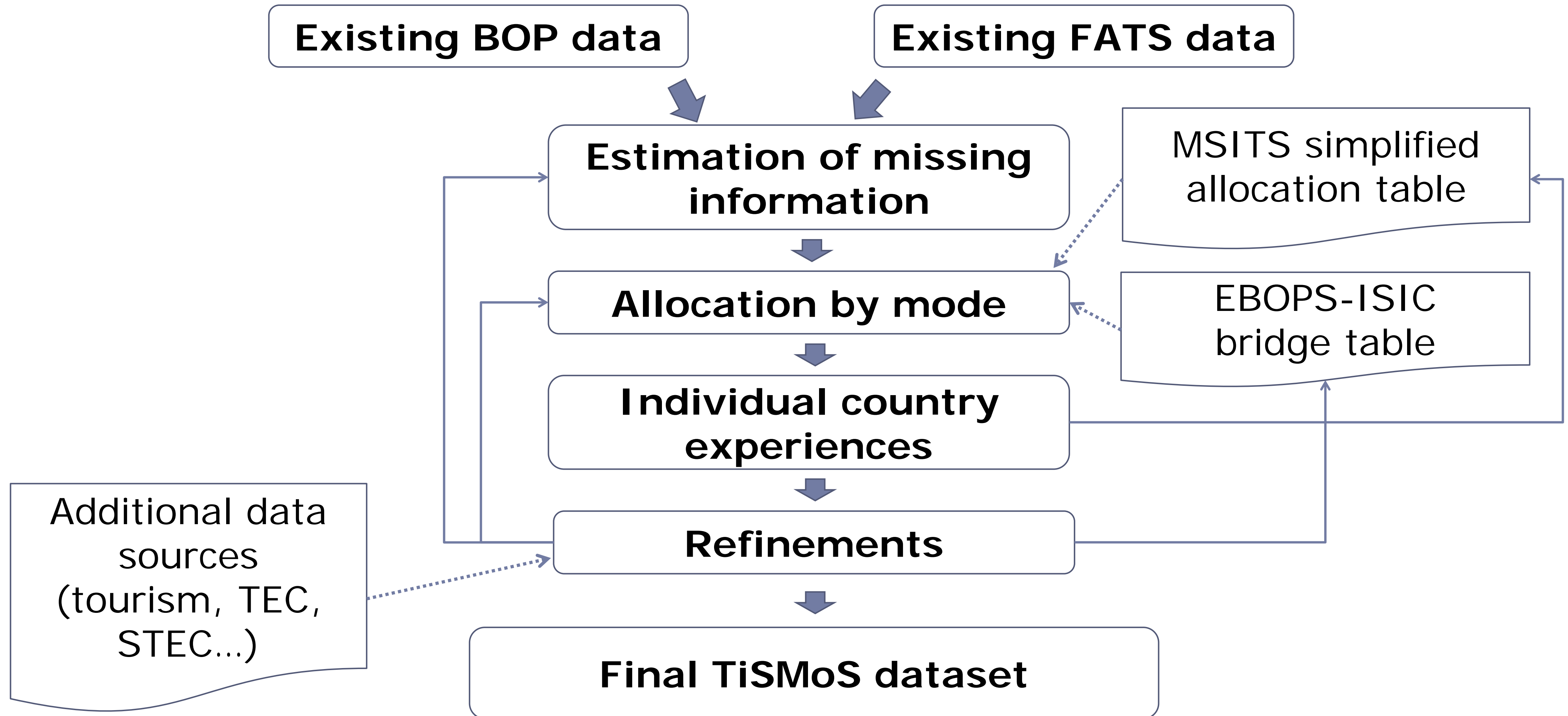
# Supply of Services by Modes

2011 Statistical Approximation



Modes of supply	Estimated share
<div></div> Cross-border transactions (mode 1)	30%
<div></div> Consumption abroad (mode 2)	10%
<div></div> Commercial presence in another country (mode 3)	55%
<div></div> Presence of individuals in another country (mode 4)	Less than 5% (approx. 220 billion USD)

# Bulding TiSMoS: the approach



# For what purpose?

- ▶ To create and maintain an experimental dataset on international trade in services by mode of supply:
  - ▶ Based on reported data by national authorities to the extent possible
  - ▶ Complemented with estimations, as close as possible to MSITS2010 recommendations
- ▶ Possible applications:
  - ▶ Orient trade negotiating strategies => commitments under most trade agreements specified according to the four modes of supply
  - ▶ Monitoring: Better understand world trade developments
  - ▶ Respond to analytical questions => looking for economic mechanisms, estimating impacts (e.g. effects of RTAs, regulatory heterogeneity, etc.)



## Aims

Include “all services”  
as covered by GATS

### #1 Starting point:

WTO/UNCTAD/ITC dataset

- Imports and exports for 200+
- Reporter countries
- With partner world
- From 2005 to 2017
- 66 services items

### Top-down approach

- Total commercial services
    - goods-related services
    - Travel
    - Transport
    - other commercial services
- already complete in base data

### #2 Complete dataset by imputing missing data

- **Simple derivations** (using item-subitem relationship), interpolations for missing information within time series
- Average share is used to **estimate completely missing breakdowns**
  - Mirror statistics
  - Clusters of similar countries

**20%** of the data values  
are estimated

**44%** of the data cells  
are estimated

Adjustments needed  
to meet the scope of  
supply services as  
defined by the GATS

### #3 Disentangling the goods from travel

Goods component estimated using

- Alternative breakdown (SD1)  
For 15 economies
- internal tourism consumption data (OECD)

Goods component removed from  
items in the presentation of travel

**-6.5%** Total commercial services  
is reduced by around 6.5%

### #4 Construction

10

Construction item is adjusted

- Total construction (SE) recalculated
- Identification of goods not possible
- Only cross-border transactions kept  
 $\widehat{SE}$  exports = construction abroad (SE1) exports  
 $\widehat{SE}$  imports = construction in rep. economy (SE2) imports
- Both allocated to modes 3 & 4 (50%)

**-25%** This correction reduces total  
construction by around 25 %

### #5 Distribution services

- Trade-related services (SJ34)

Separately estimated and added in

- Trade margins included in goods' value
- Figures sourced from OECD TEC
- Figures sourced from Eurostat Structural Business Statistics
- $\widehat{DS}$  allocated Mode 1
- Added to total commercial services

**+25%** This correction increases  
M1 by 25 % in value terms

# BOP and simplified allocation (extract)

Indicator code	Item EBOPS	DEFAULT ALLOCATION		
		M1	M2	M4
SJ	Other business services			
SJ1	Research and development services	75		25
SJ2	Professional and management consulting services	75		25
SJ21	Legal, accounting, management, consulting and public relations	75		25
SJ22	Advertising, market research, public opinion polling	75		25
SJ3	Technical, trade-related, and other business services			
SJ31	Architectural, engineering, scientific and other technical services	75		25
SJ311	Architectural services	75		25
SJ312	Engineering services	75		25
SJ313	Scientific and other technical services	75		25
SJ32	Waste treatment and de-pollution, agricultural and mining services		50	50
SJ33	Operating leasing services	100		
SJ34	Trade-related services	100		
SJ35	Other business services n.i.e.	75		25

- **For the majority of reporters**  
BOP trade values are distributed among modes following the Simplified Allocation

## The Simplified Allocation

- Each (detailed) service item is allocated to one dominant mode, or, where there are no dominant mode, to the most significant modes of supply
- e.g. computer services  
M1: 75%, M4: 25%



# BOP and simplified allocation - "enhanced"

Indicator code	Item EBOPS	DEFAULT ALLOCATION			United States			...		
		M1	M2	M4	M1	M2	M4	M1	M2	M4
SJ1	Research and development services	75		25	59		41	...	...	...
SJ2	Professional and management consulting services	75		25	77		23			
SJ21	Legal, accounting, management, consulting and public relations	75		25				...	...	...
SJ22	Advertising, market research, public opinion polling	75		25	78		22	...	...	...
SJ3	Technical, trade-related, and other business services									
SJ31	Architectural, engineering, scientific and other technical services	75		25				...	...	...
SJ31 1	Architectural services	75		25	80		20	...	...	...
SJ31 2	Engineering services	75		25	59		41	...	...	...
SJ31 3	Scientific and other technical services	75		25				...	...	...
SJ32	Waste treatment and de-pollution, agricultural and mining services		50	50				...	...	...
SJ33	Operating leasing services	100						...	...	...
SJ34	Trade-related services	100						...	...	...
SJ35	Other business services n.i.e.	75		25				...	...	...

- Results of individual case studies incorporated:
  - United States
  - France
  - Finland
  - Spain
  - Colombia
  - India

**International supply  
of services through Mode 3  
approximated  
by FATS output (or sales)**

**#1 GATS refers to all foreign-  
controlled enterprises**

FATS does not include minority-  
owned affiliates  
(level of ownership between  
10 and 50%)

**#2 Product vs activities**

13

FATS classifies companies by  
primary activity  
and not by product

**Solution: National data compilation**

**#3 Goods Vs. Services**

The output, which contain only  
the trade margin realized on  
goods purchased for resale, is  
used for two services activities

**Solution: output variable**

**#4 Double-counting  
of trade flows**

There exists the possibility of  
double counting because  
some affiliates' exports may  
be captures by international  
trade in BOP

**Solution: Exclude exports from  
total output/sales**



## Step 1. Assess initial data availability & derive all possible values from the dataset

1

Merge existing FATS data:  
Eurostat, OECD, national sources  
13 service sectors ISIC Rev. 4 Sections F to S, excluding O

2

Break in series (NACE Rev. 1 and NACE Rev. 2) +  
other methodological changes

3

Output is a superior measure of the service supply  
(MSITS 2010, § 5.65)

*Wholesale and retail trade; repair of motor vehicles and motorcycles*  
*Financial and insurance activities sales in inward*

Step 1.

## Step 2. Dataset preparation, imputation and estimations



### Step 2.

1

Exploit mirror data

2

Impute zeros when FDI stocks are zeroes  
(Eurostat/IMF CDIS/OECD)

3

Develop a complete FATS dataset for countries that  
report some FATS (partner world)

4

Data gaps in the reported time series are  
extrapolated (back/forecasting and interpolation)  
using the growth rate obtained by the model  
predictions.

$$\ln(FATS_{rit}) = \alpha_0 + \beta_0 poly_t + \beta_1 \ln(gdps_{rit}) + \beta_2 \ln(BoP_{rit}) + \gamma_i \ln(gdps_{rit}) + \gamma_i \ln(BoP_{rit}) + \delta_f \ln(gdps_{rit}) + \delta_f \ln(BoP_{rit}) + \gamma_i + \delta_f + \varepsilon_{rit}$$

5

Gravity models to estimate missing sectors

# PORTUGAL, INWARD FATS SALES (MIO USD)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Construction</b>	1,820	1,735	2,085	4,606	4,685	4,767	4,318	2,821	2,594	2,420	1,871	1,447	1,595
<b>Wholesale and retail trade; repair...</b>	8,482	8,481	10,342	13,181	12,012	11,264	10,992	9,429	9,569	10,336	9,026	9,453	10,488
<b>Transport and storage</b>	1,697	1,988	2,473	2,782	2,331	2,586	2,659	2,256	2,705	3,189	2,704	2,870	3,336
<b>Accommodation and food services</b>	519	659	780	908	870	804	840	714	715	816	749	848	972
<b>Information and communication</b>	2,409	2,873	3,453	4,014	3,715	3,422	3,412	2,908	2,812	3,099	4,822	4,913	5,114
<b>Financial intermediation</b>	831	990	4,087	13,819	13,083	12,717	10,547	7,725	7,775	11,645	9,957	11,040	11,506
<b>Real estate activities</b>	192	874	1,037	995	1,152	955	848	717	779	833	819	860	929
<b>Professional, scientific &amp; technical activities</b>	1,036	1,189	1,508	1,910	1,714	1,643	1,533	1,373	1,605	1,725	1,485	1,539	1,789
<b>Administrative and support activities</b>	1,908	2,214	2,755	3,344	3,302	3,054	3,201	2,863	2,801	3,067	2,588	2,904	3,341
<b>Education</b>	14	16	15	15	17	19	24	27	31	52	34	45	52
<b>Health and social work</b>	2	2	5	6	5	8	15	10	7	15	15	16	24
<b>Arts, entertainment and recreation</b>	6	8	16	27	27	24	35	31	27	30	21	37	63
<b>Other service activities</b>	6	5	8	11	10	10	8	9	6	37	20	43	29
<b>Total services</b>	18,923	21,033	28,563	45,619	42,924	41,272	38,433	30,883	31,426	37,265	34,111	36,015	39,237
			REPORTED		MODEL		BACK/FORE CASTING						

## Step 3. Develop a complete FATS dataset for countries with no available data

- 1 Gravity models fit to predict bilateral sales for inward and outward and for each sector
- 2 For a total of 26 regressions using Poisson Pseudo Maximum Likelihood (PPML)

$$FATS_{rst} = \alpha_0 + \beta_1 year_t + \beta_2 \ln(BoP_{rt}) + \beta_3 \ln(gdps_{rt}) + \beta_4 \ln(gdps_{st}) + \beta_5 \ln(GDPpc_{rt}) + \beta_6 \ln(GDPpc_{st}) + \beta_7 \ln(dist_{rs}) + \beta_8 colony_{rs} + \beta_9 contig_{rs} + \beta_{10} comlang_{rs} + \varepsilon_{rst}$$

where  $FAS_{rst}$ : foreign affiliates sales, host country  $r$ , in country  $s$  in year  $t$ , and  $\varepsilon_{rst}$ : the error term.

- 3 Derive partner world by summing up values for all partners

Description	% data points		% value	
	IWA	OWA	IWA	OWA
Total reported	8.7	6.9	50.2	36.9
Total estimated	91.3	93.1	49.8	63.1

Step 3.

# Construction of the complete dataset

## Step 4. Estimate local sales – inward

Estimate of exports by foreign-owned firms

Countries averages: clustered for IWA and OWA

Step 4.

**Table 11: Available information on output sold locally**

### Inward

<b>FATS - national source</b>	Canada, Estonia, Austria, Denmark, United States, Zambia
<b>FATS - OECD</b>	Germany, Israel, Italy, Japan, Sweden, Spain
<b>STEC</b>	Austria, Belgium, Czech Republic, Estonia, Finland, Luxembourg, Netherlands

**Available information on output sold locally**

### Outward

<b>FATS - national source</b>	Estonia, United States
<b>FATS - OECD</b>	Czech Republic, Italy, Slovenia, Japan
<b>STEC</b>	Not applicable



## Step 5. Balancing of inward and outward flows

1 Two distinct FATS datasets are built for inward and outward

2 Large asymmetries arise between the two flows when the data are aggregated for all reporters (i.e. when the total "world" figures are built)

Level of total services the inward figures are about 25 to 30% higher than the outward ones  
Heterogeneity across sectors

3 These asymmetries are balanced in TiSMoS (and in the accompanying FATS dataset) by benchmarking the final values to the outward "world" totals for

education;  
health and social work;  
arts, entertainment and recreation and other service activities

And to the inward "world" totals for all the remaining sectors

4 Only estimated values are rescaled (no reported figure has been changed)



Step 5.

# Bridge table – transformed EBOPS

EBOPS-like code	Description	ISIC CODE	ISIC description
SA	Manufacturing services on physical inputs owned by others		
SB	Maintenance and repair services not included elsewhere		
SC	Transport	H	Transport and Storage
SDB1SK21	Health services	Q	Human health and social work activities
SDB2SK22	Education services	P	Education
SDASDB3	Tourism and business travel	I	Accommodation and food service activities
SE	Construction	F	Construction
SFSG	Insurance and financial services	K	Financial and insurance activities
SH	Charges for the use of intellectual property n.i.e.		
SISK1	Telecommunications, computer, information and audiovisual services	J	Information and Communication
SJXSJ34	Other business services (excluding trade-related)	L+M+N	Real estate, Professional, scientific and technical activities, Administrative and support service activities.
SK23	Heritage and recreational services	R	Arts, entertainment and recreation
SK24	Other personal services	S	Other service activities
SWSJ34	Trade-related services (Distribution)	G	Wholesale and retail trade; repair of motor vehicl. and motorcycl.

## Reminder

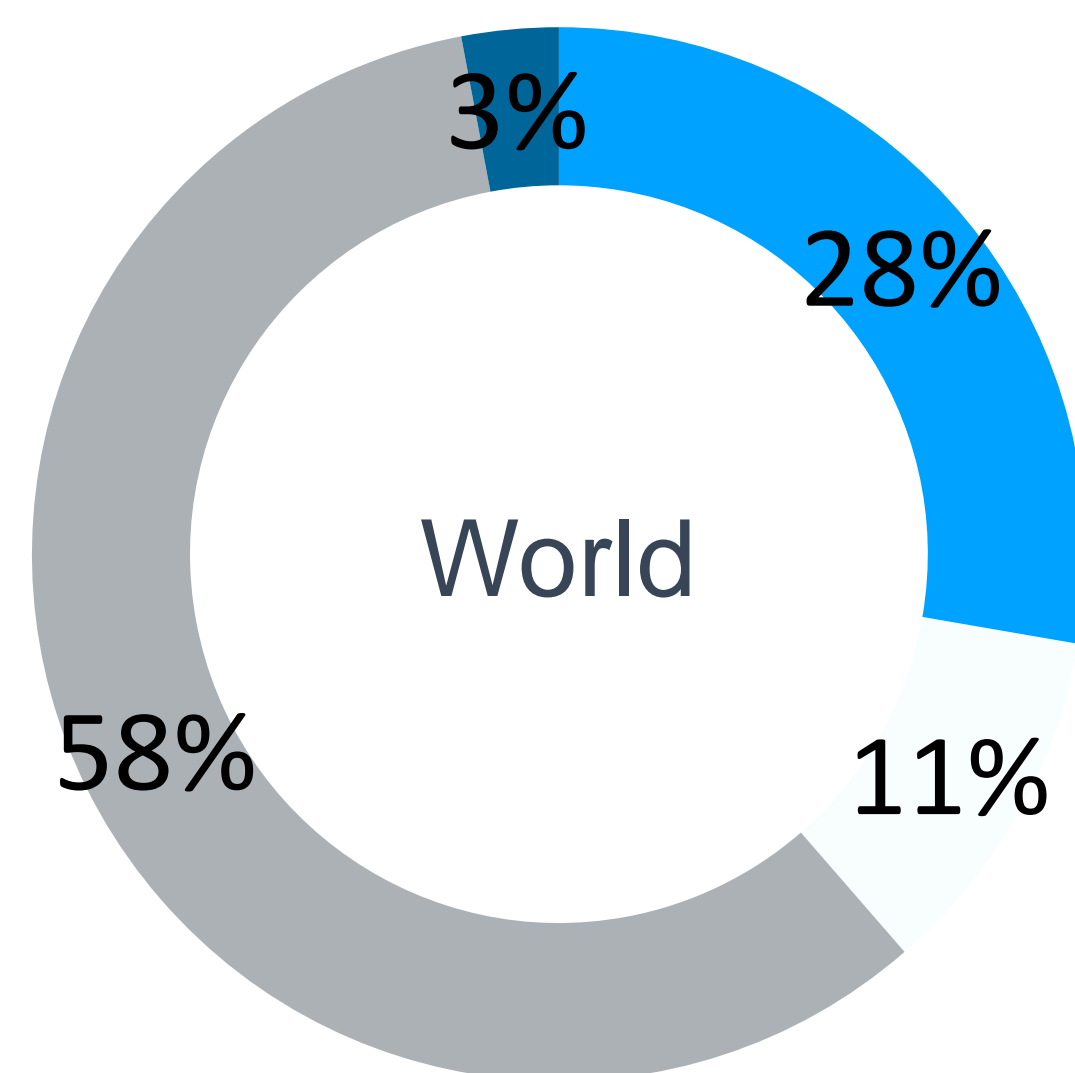
- EBOPS – product based classification and FATS follow a breakdown by activity
- No clear-cut exists
- GATS refers to services as product

## Key points

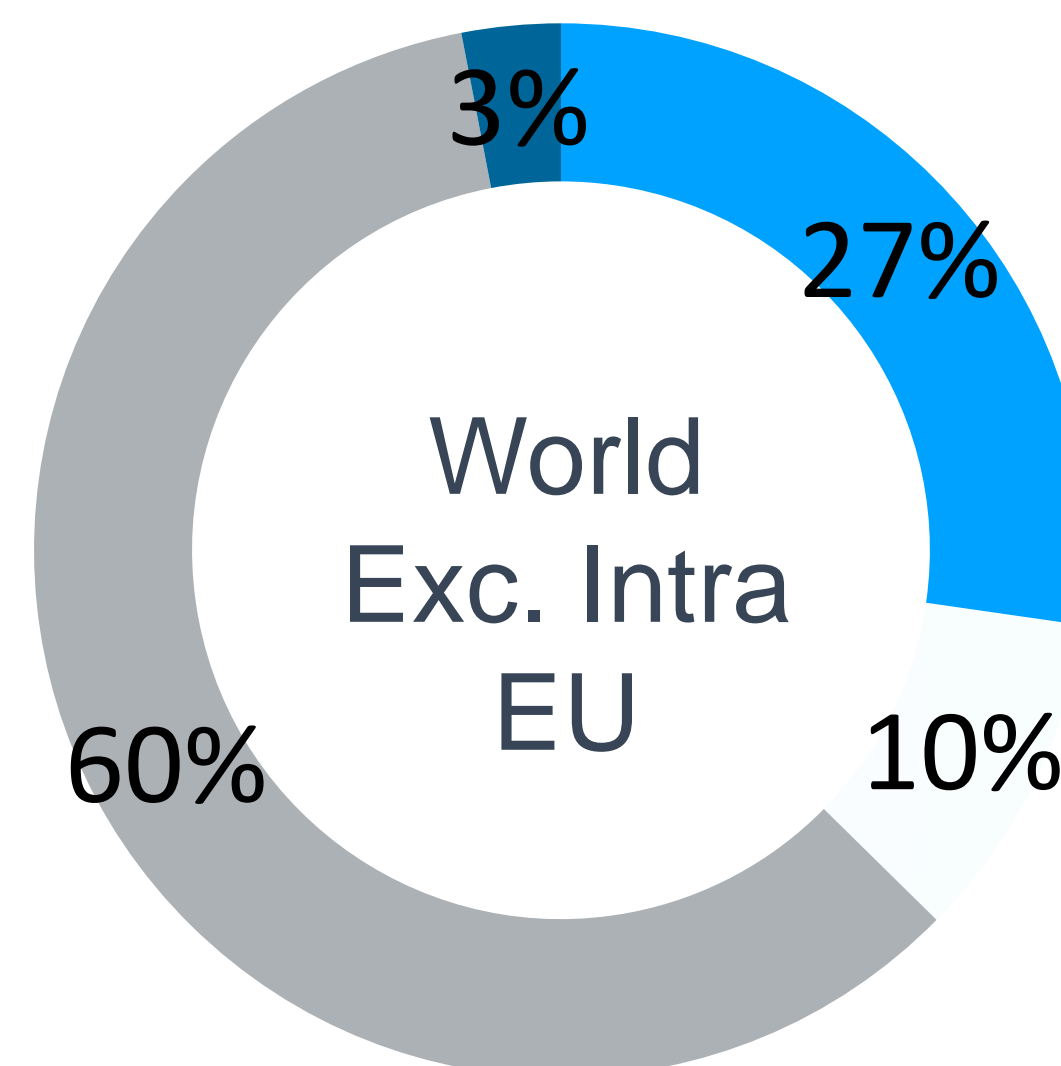
- New EBOPS-like classification
- Health-related services as a new item
- Education-related services as a new item

# Trade in commercial services

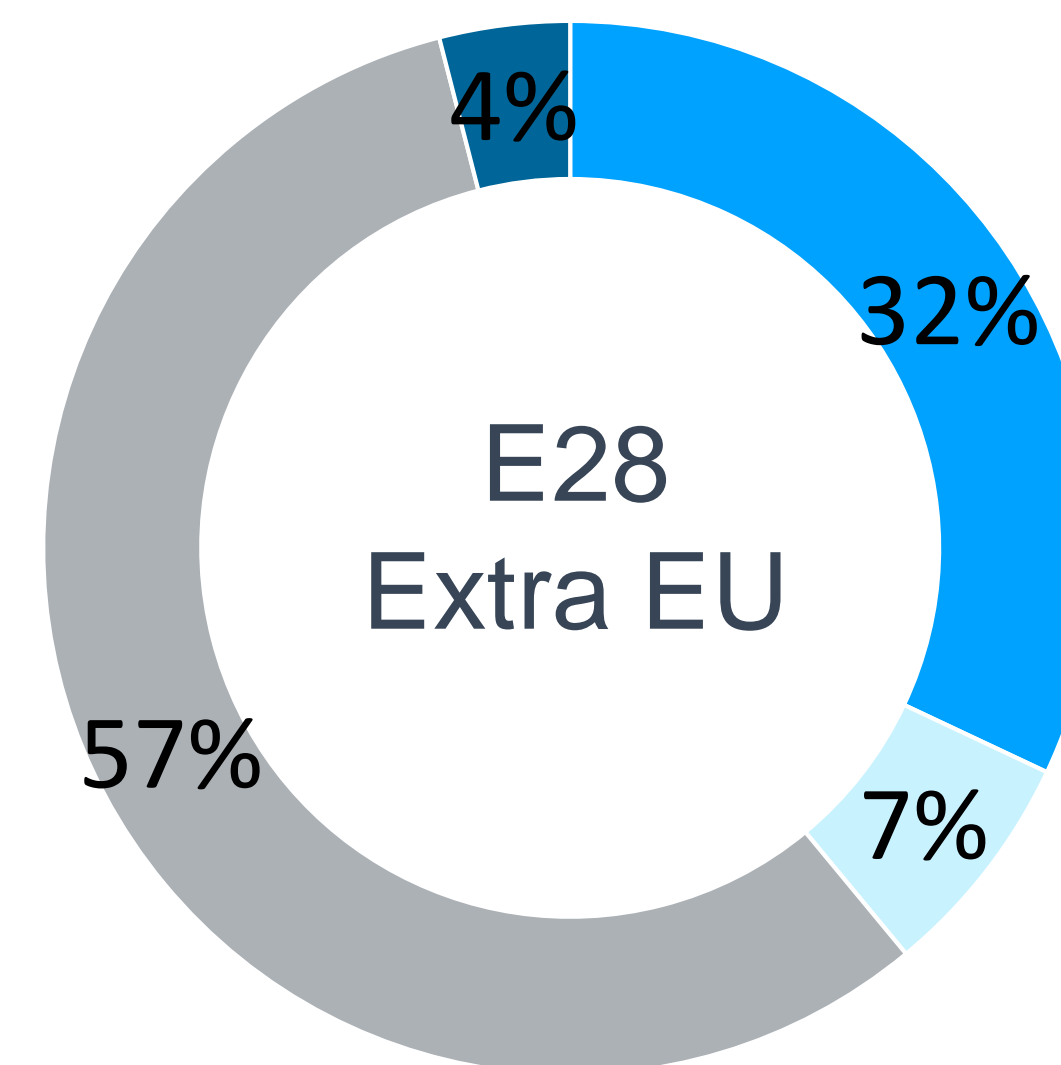
by modes of supply, 2016



Mode 3 accounts for 58%



Mode 3 accounts for 60%

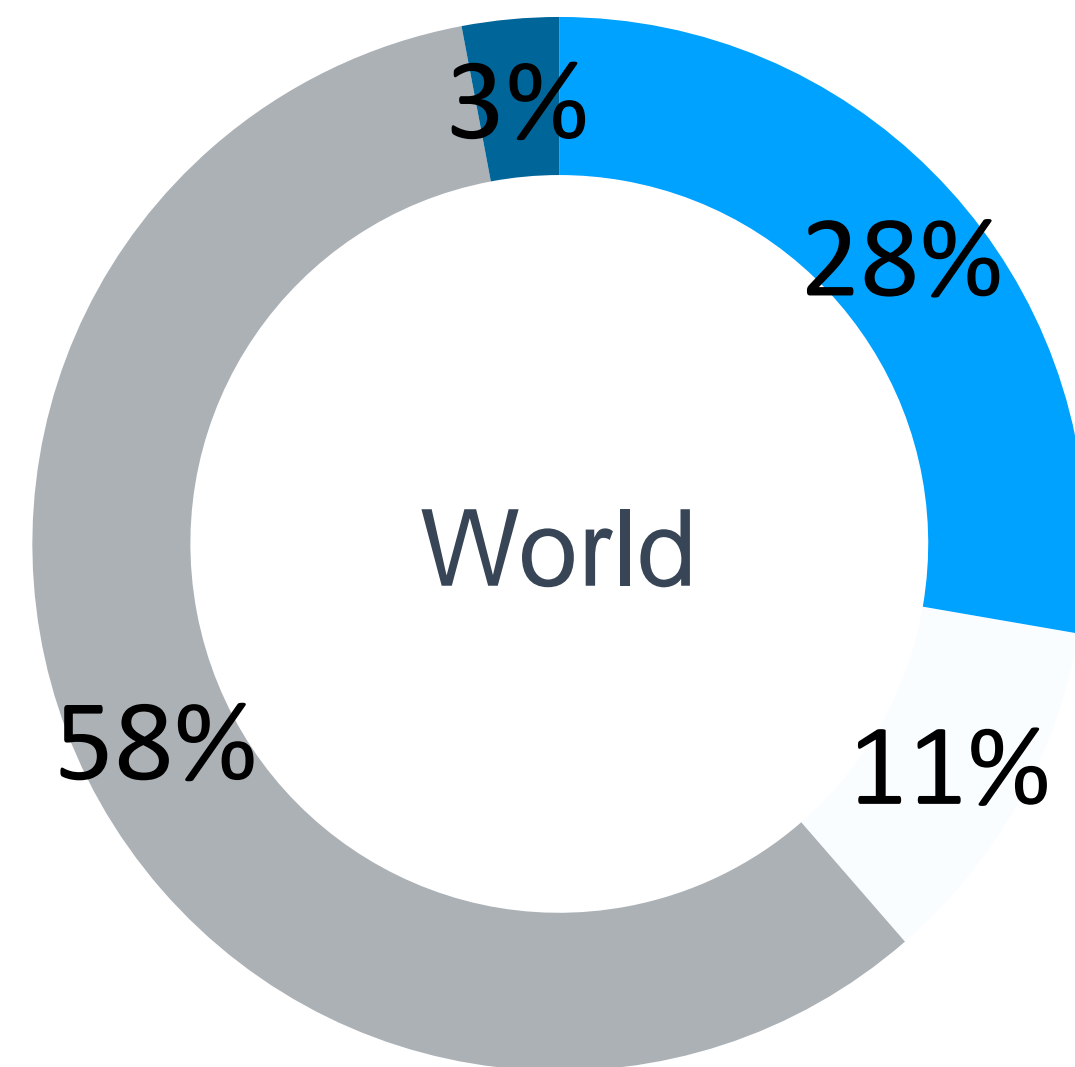


Mode 3 accounts for 57%

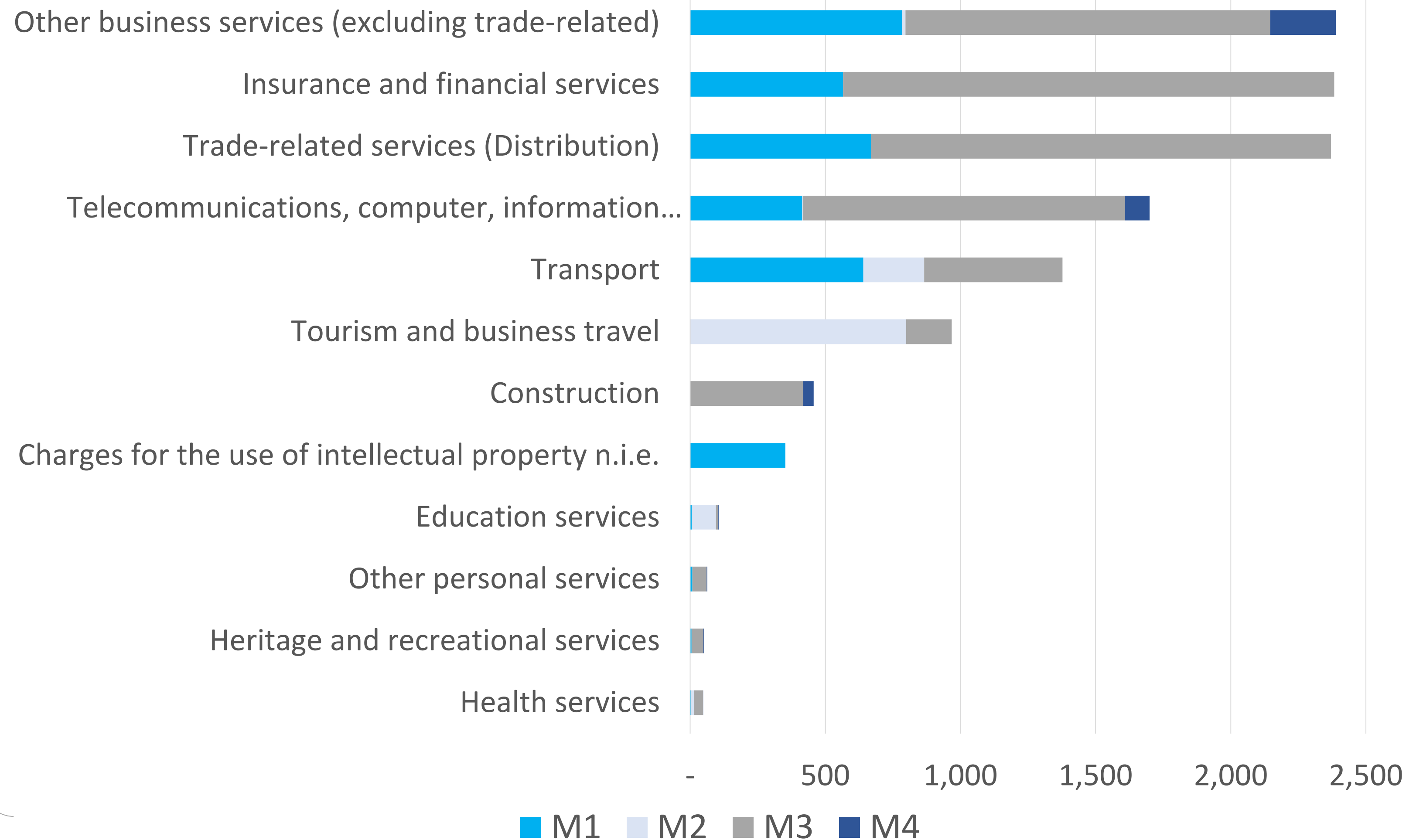
- Cross-border transactions (mode 1)
- Consumption abroad (mode 2)
- Commercial presence in another country (mode 3)
- Presence of individuals in another country (mode 4)

# World trade in commercial services

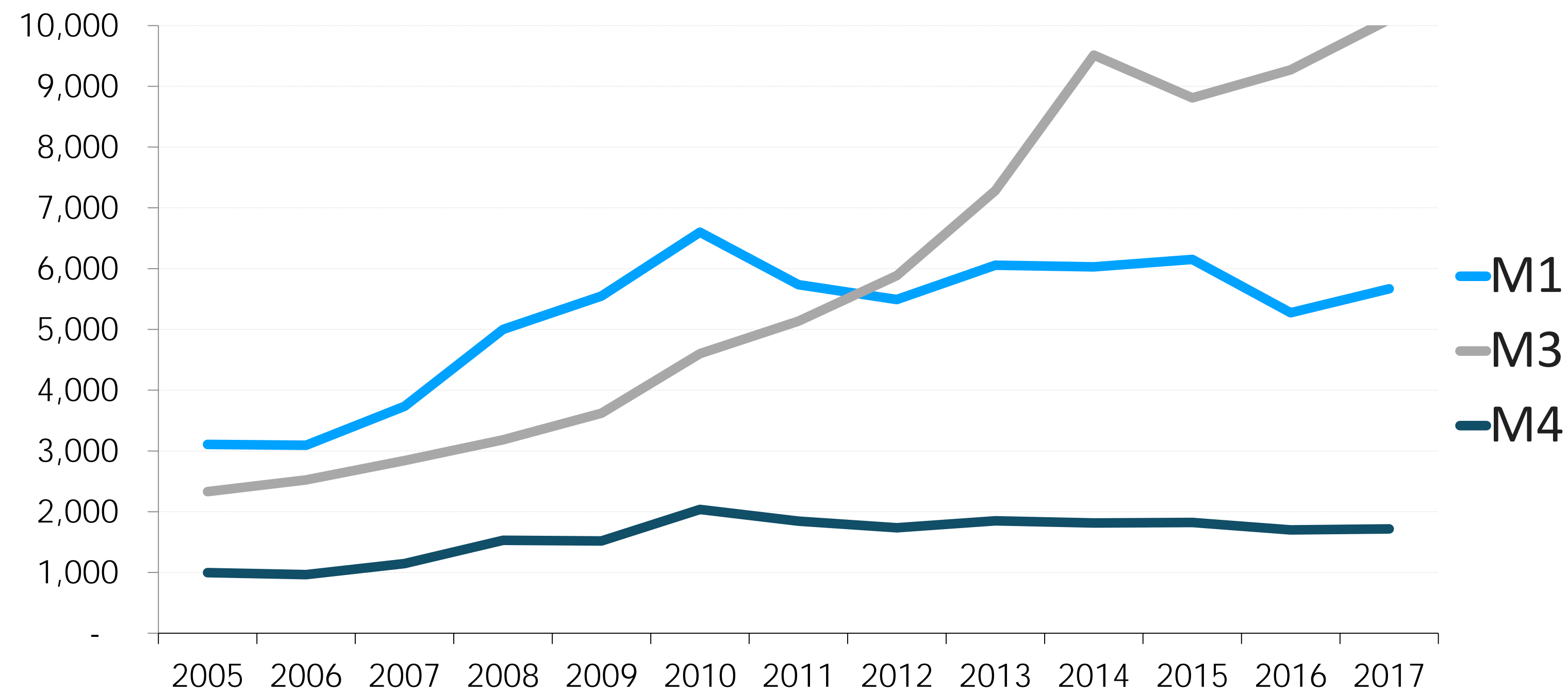
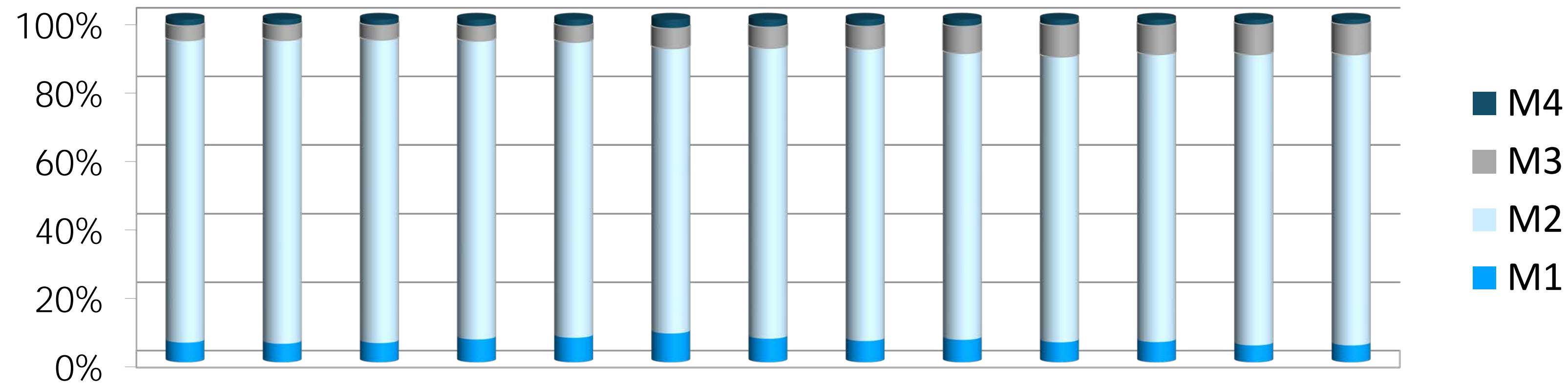
By mode of supply and by services sector, 2016



Mode 3 is estimated  
Bn USD 7,297  
Mode 3 accounts for 59%



# World trade by mode of supply – Education



## Key points

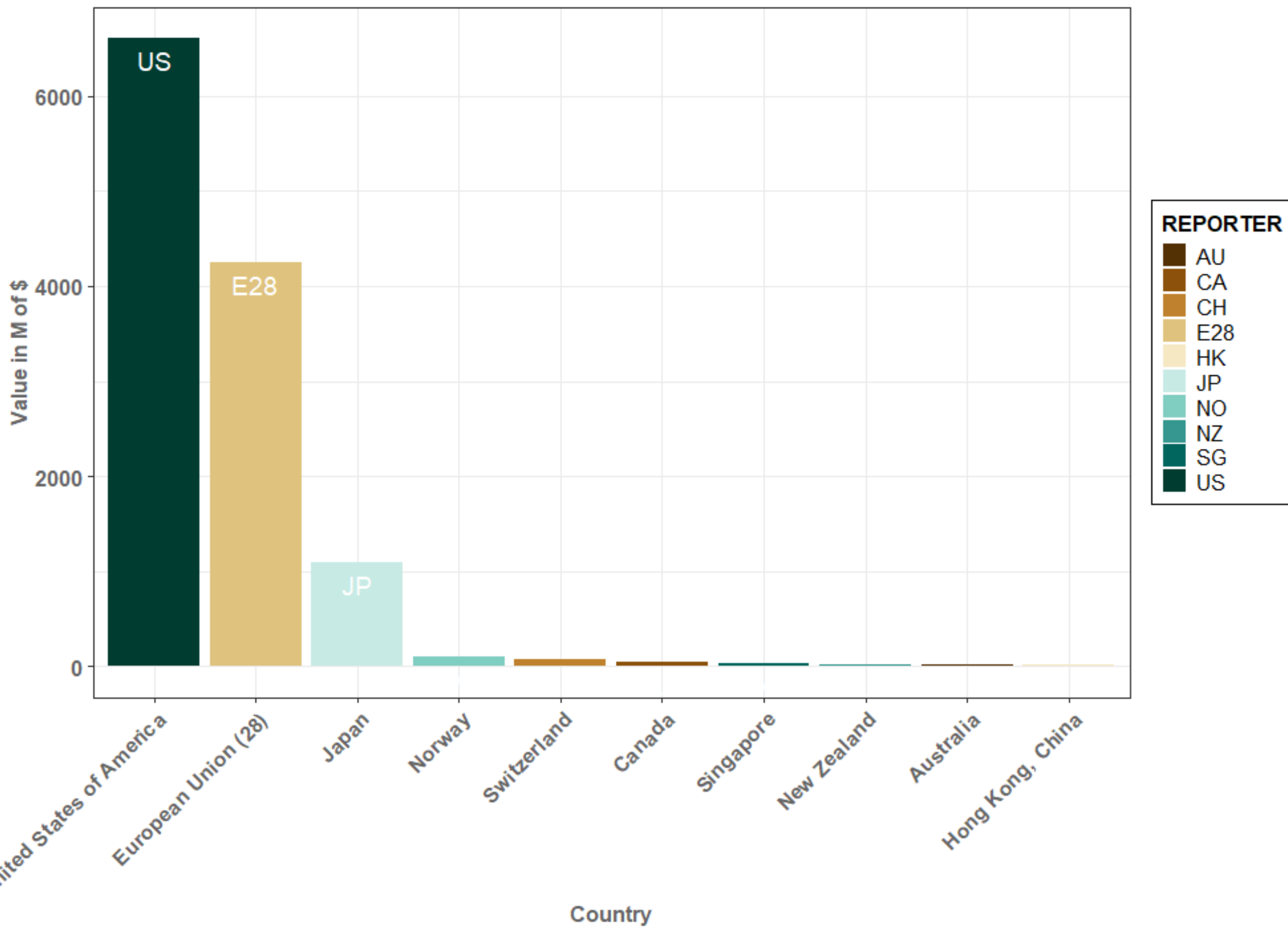
- Mode 2 is the dominant mode with more than 80%
- Mode 3 is more important than mode 1 in 2017
- Mode 4 has the slowest growth



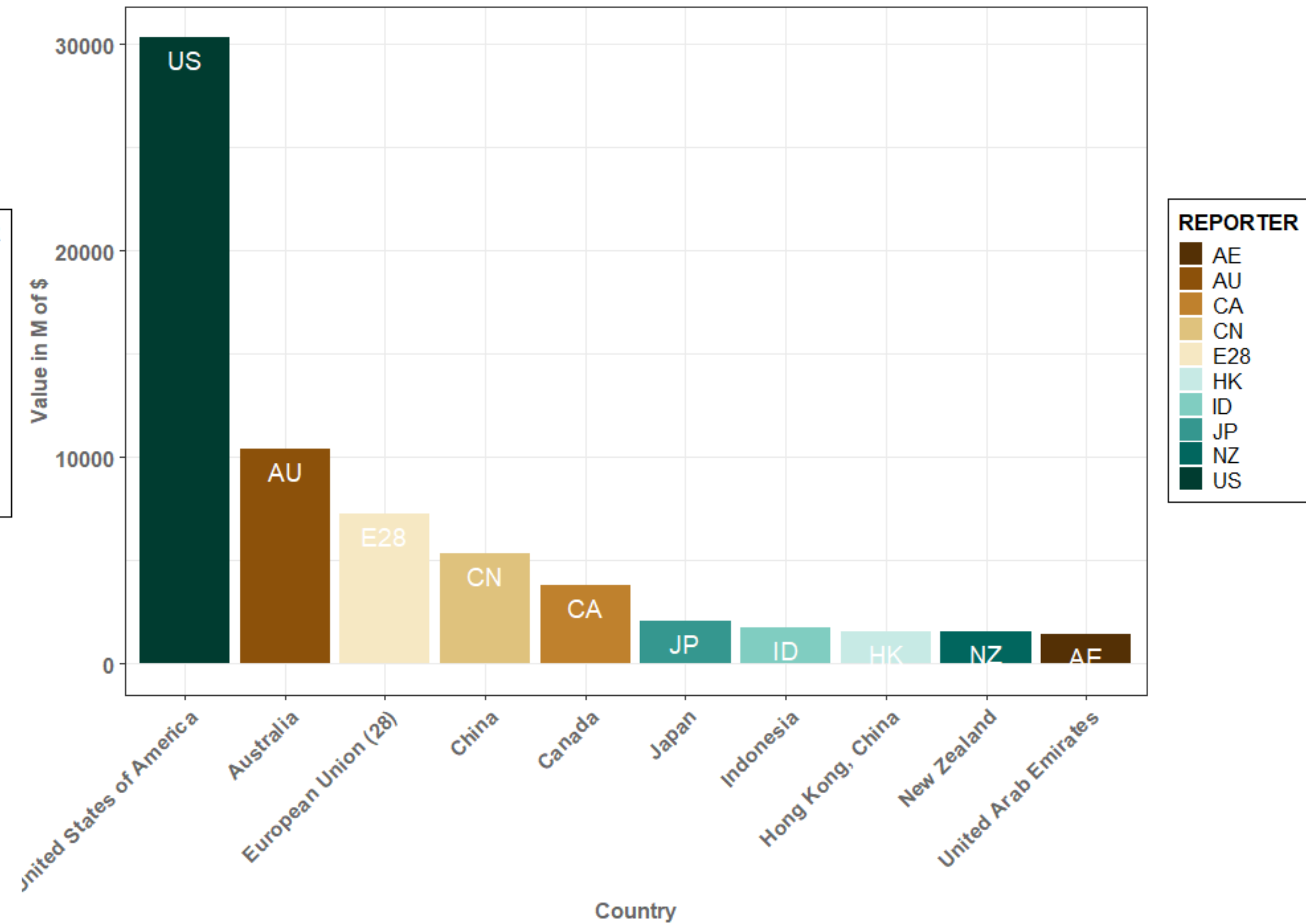
# Trade by mode of supply – Education

Top 10 traders

## Exports of Education services through M3 in 2016

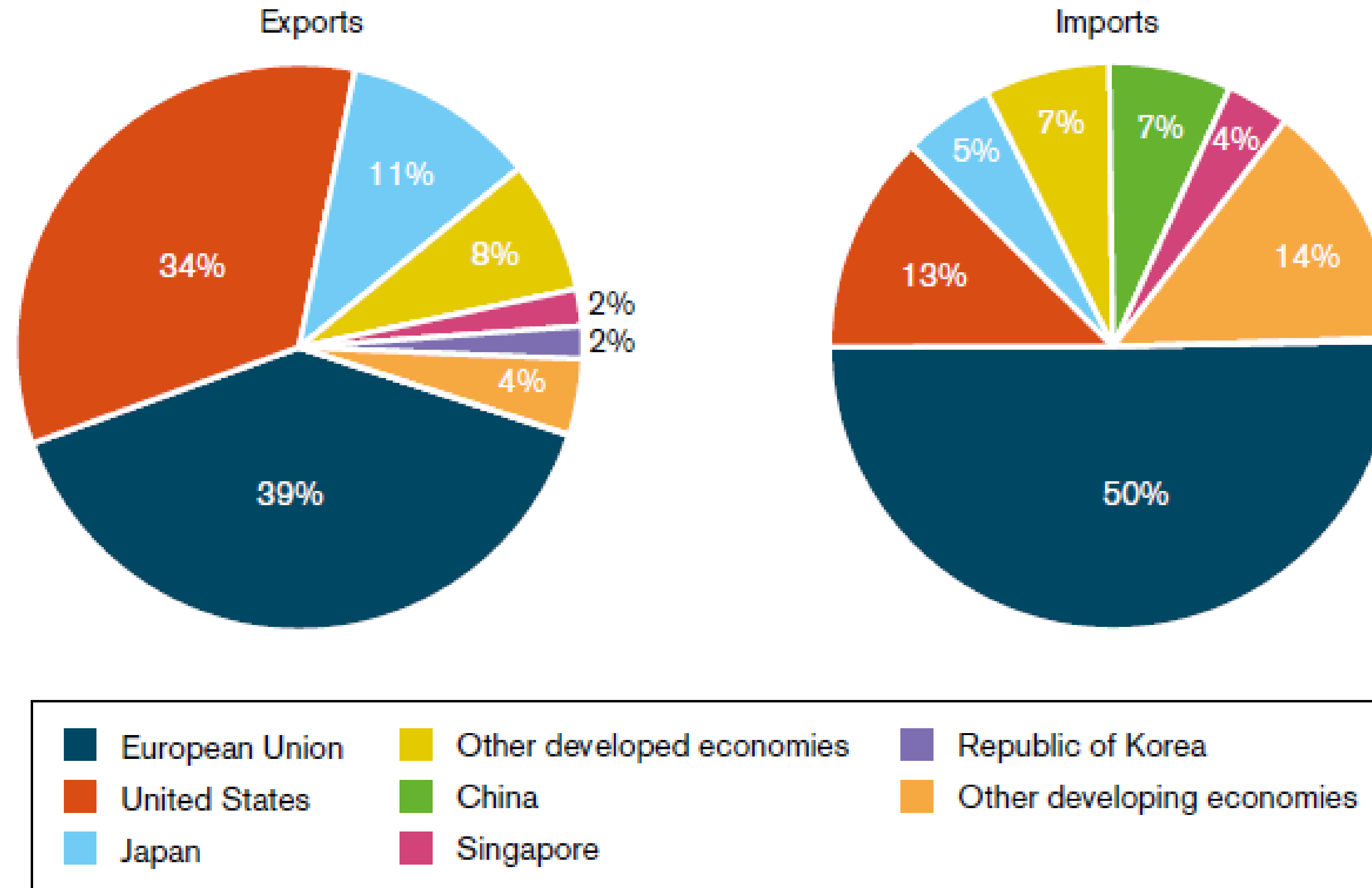


## Exports of Education services through M2 in 2016



# Corss-border trade in

IP-related services, 2017

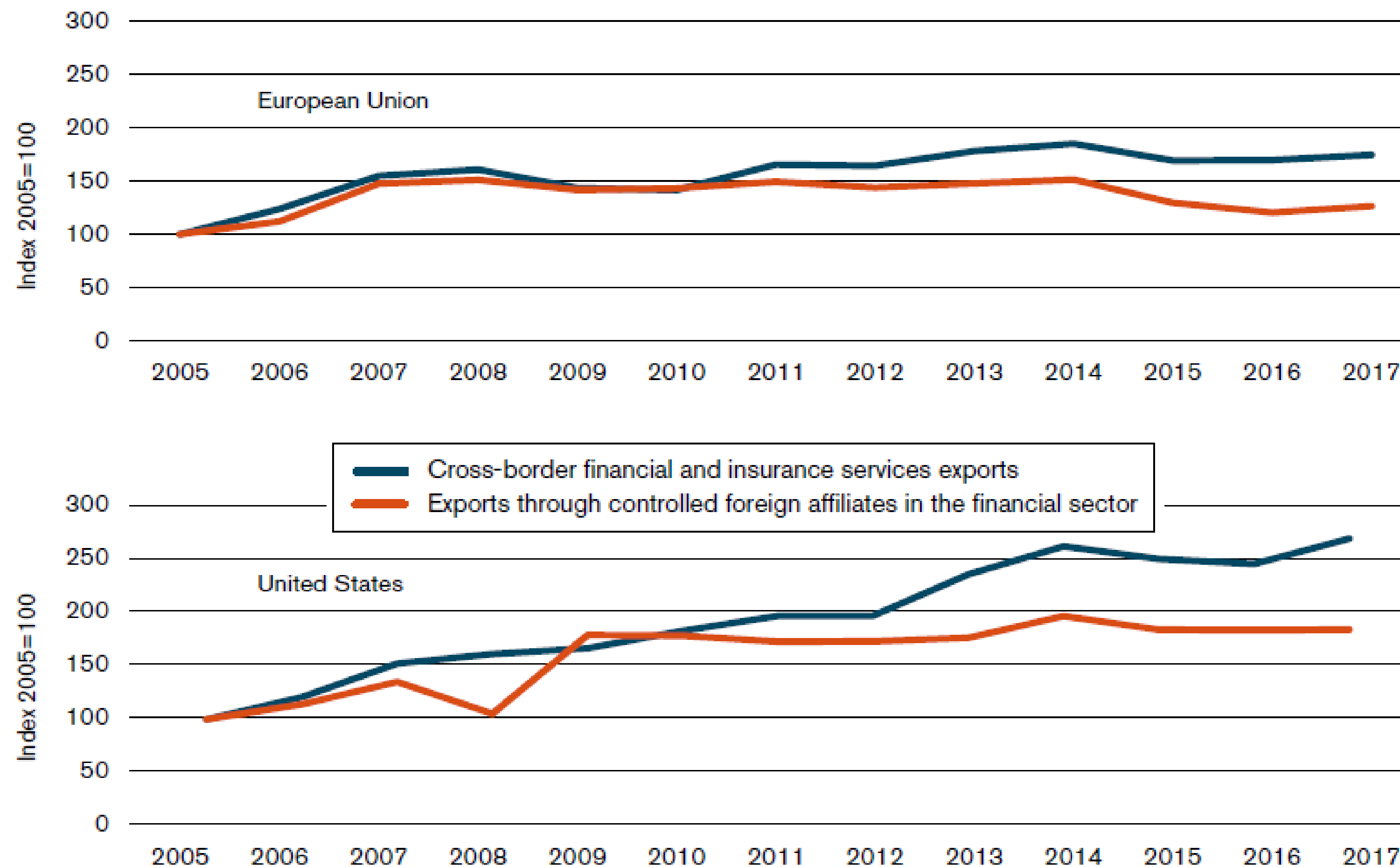


Source: WTO estimates (2019).

Note: The European Union is calculated as the sum of the EU member states and includes intra-EU trade.

# EU and US cross-border exports

financial and insurance services and  
exports through controlled affiliates abroad (mode 3), 2005-17



Source: WTO estimates (2019).

Note: The European Union is calculated as the sum of the 28 EU member states and includes intra-EU trade.

# Where to find TISMOS

- ▶ [Data](#) files, containing the reported and estimated trade values, for imports and exports according to the four modes of supply.
- ▶ A [codes](#) file, which explains the codes used in the data file for the different variables.
- ▶ The [methodological paper](#), which describes how TISMOS was built.
- ▶ Addendum: a [worldwide FATS output dataset](#), covering 200 economies, 13 service sectors and the period 2005-2017.



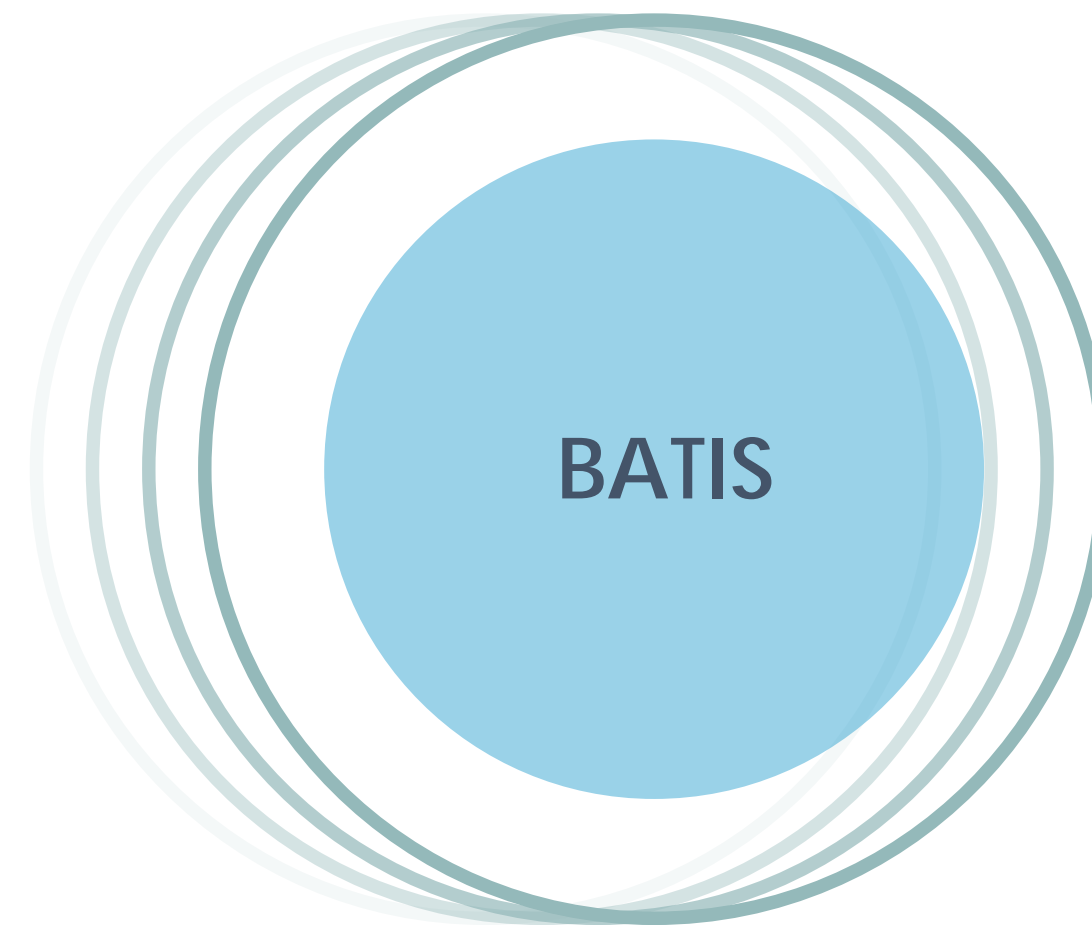
A global trade in services data set by sector and by mode of supply

Short term

- Validate the results
- Receive feedback from people

Long term

- Gather feedback on the data set
- Build consensus on the assumptions made
- Include country experiences
- Improve the estimations



The OECD-WTO Balanced Trade in services database

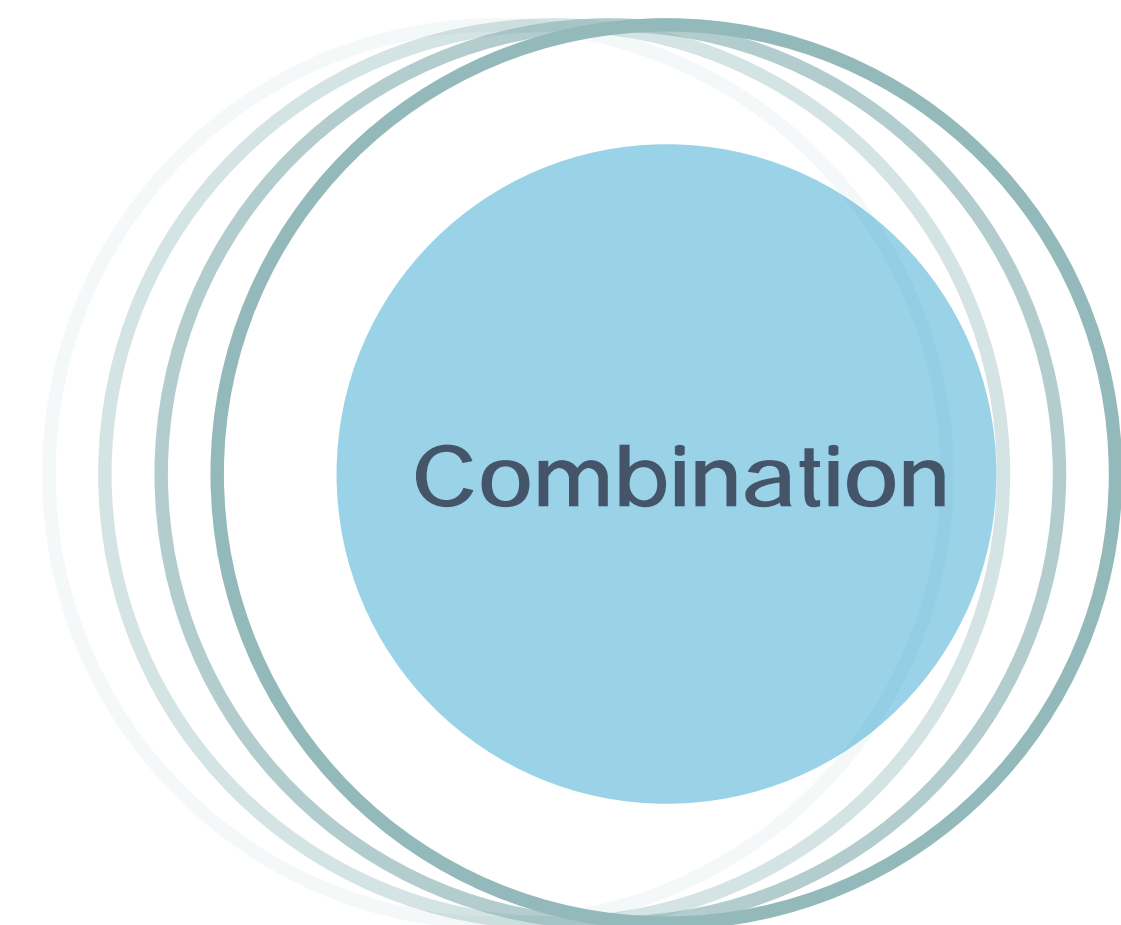
Only BOP data

Short term

- Apply developed methodology to BPM6
- 12 main EBOPS items
- Balancing

Long term

- Gather feedback
- Validate the data set



A trade in services dataset broken down by modes and by partner

- The **bilateral FATS data set** will be balanced and adjusted using a quadratic optimization procedure
- TISMOS methodology will be applied on the completed bilateral trade in services data sets





# Thank You

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