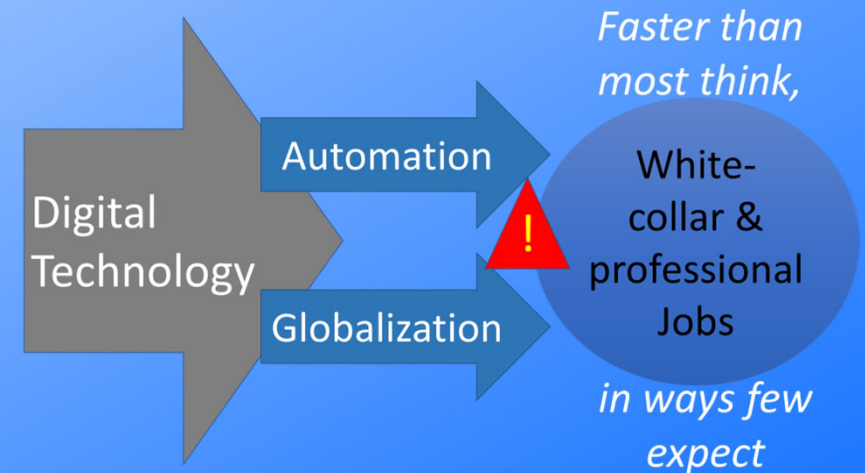


Globotics and macroeconomics: Globalisation and automation of the service sector

RICHARD BALDWIN
PROFESSOR OF INTERNATIONAL ECONOMICS

ECB Forum on Central Banking, Sintra, 28 June 2022

What is globotics?



Introduction & outline

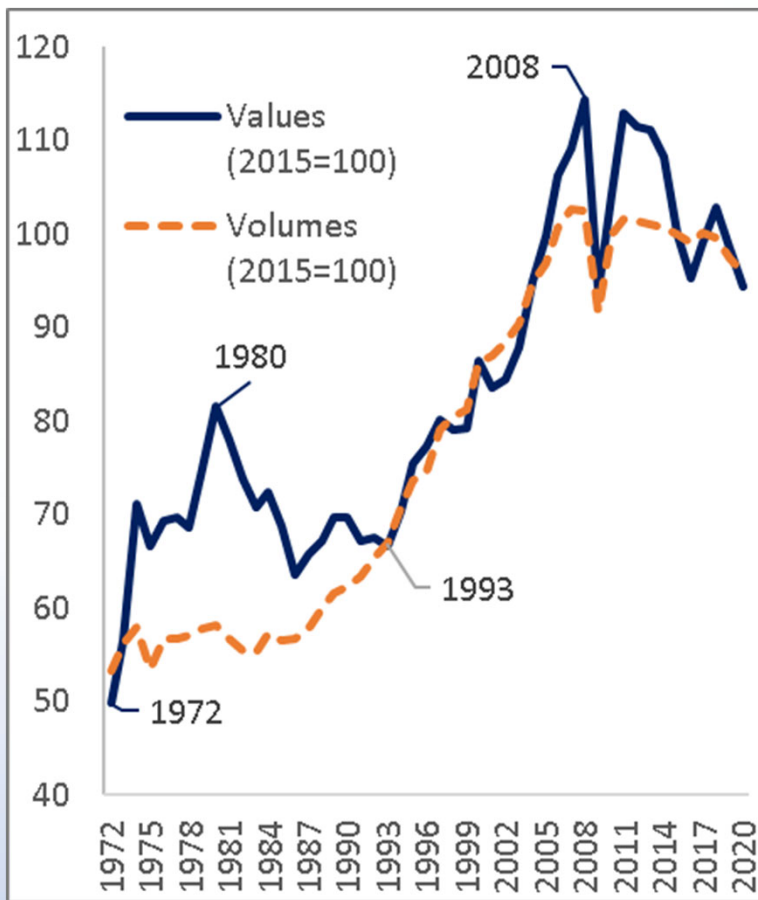
- Globalisation is changing
- Services are important but different
- Globotics, services, and HICP developments

Globalisation is
changing

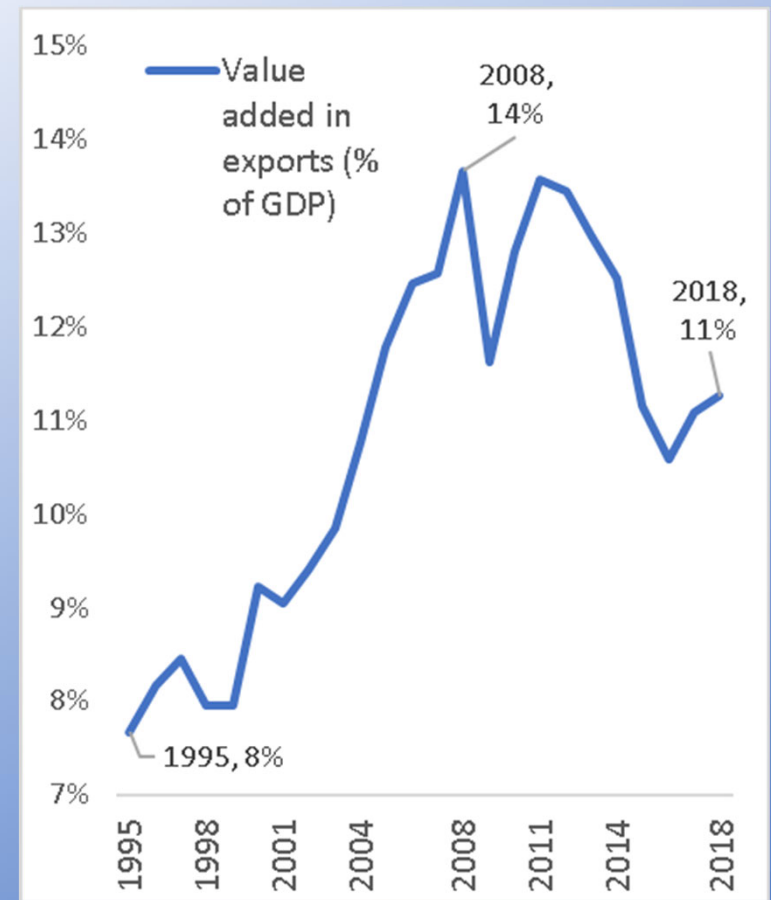
**Message:
Goods trade
globalisation
peaked or
plateaued**

Goods trade peaked: World goods exports/GDP

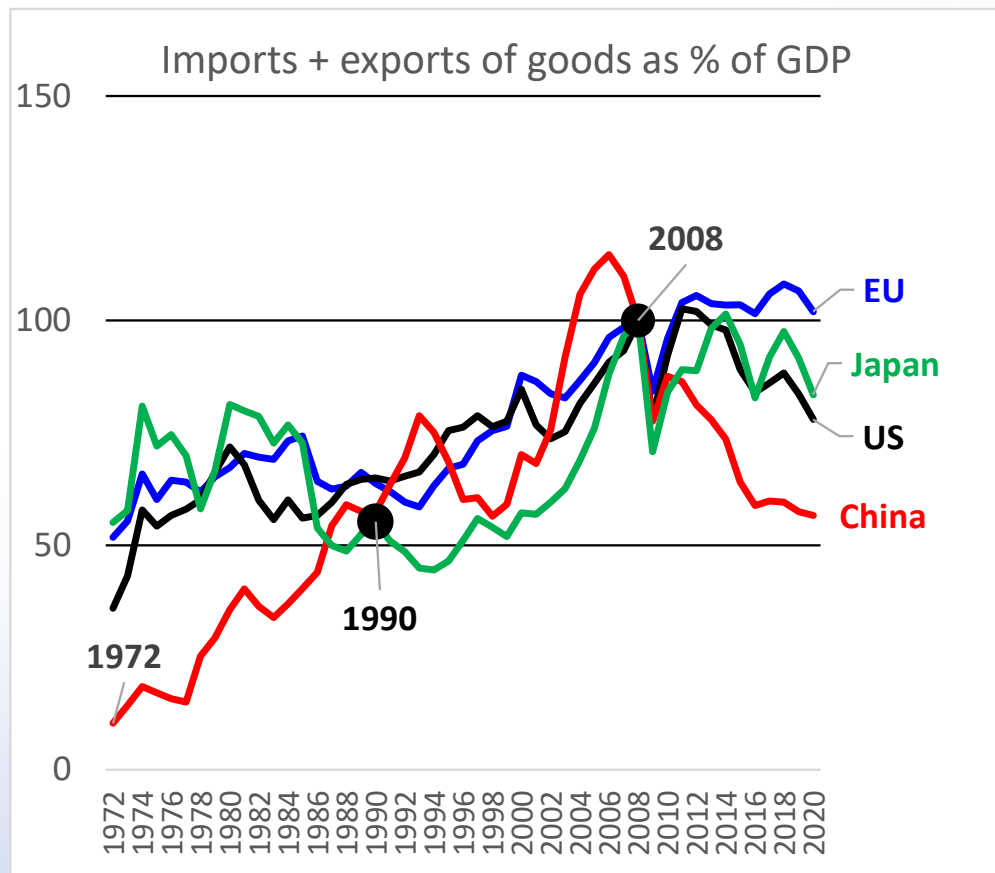
World goods trade ratio peaked in 2008 in value and volume terms



World goods trade (on a value-added basis) peaked in 2008 as % of world GDP

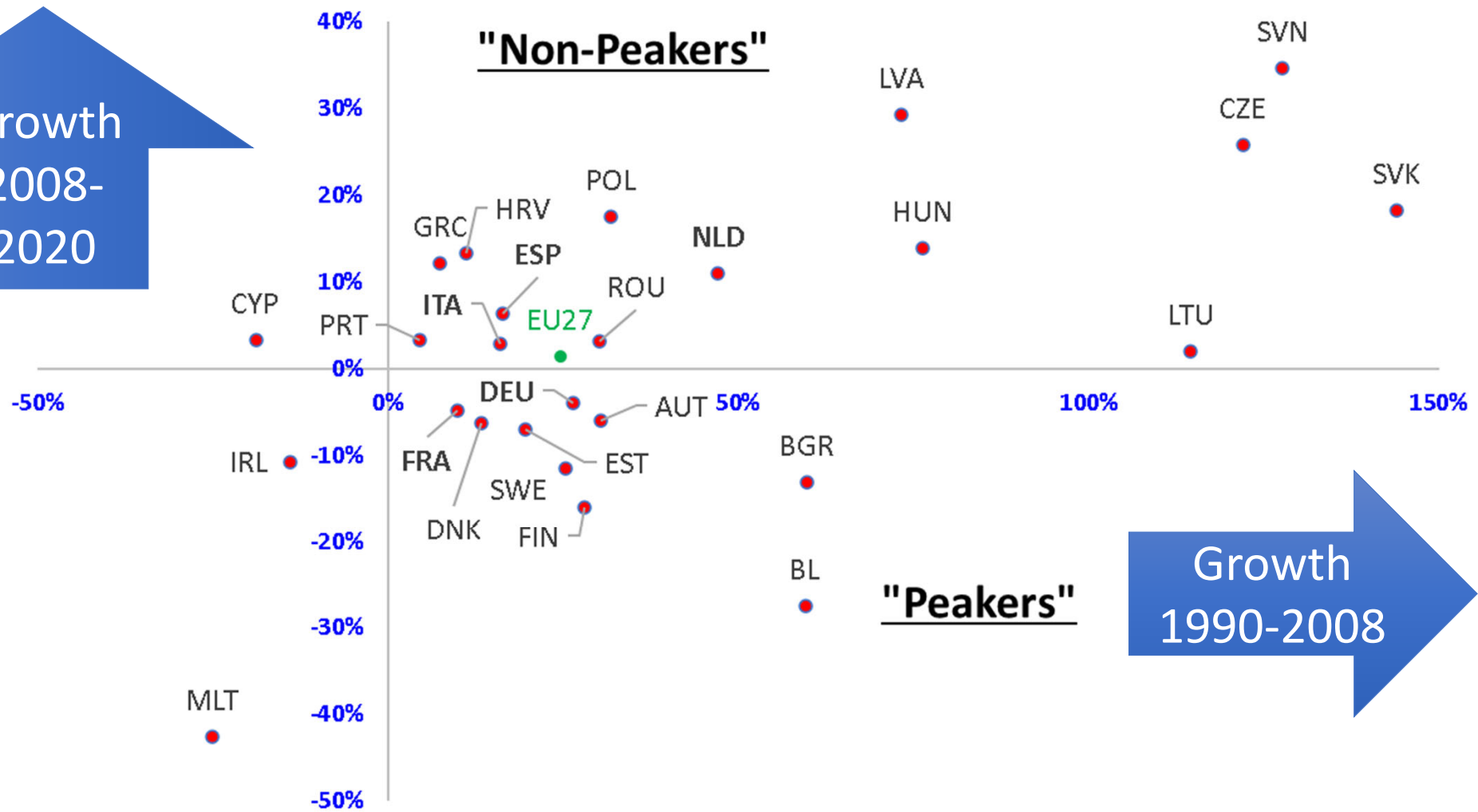


But beware false peaks & lazy narrative

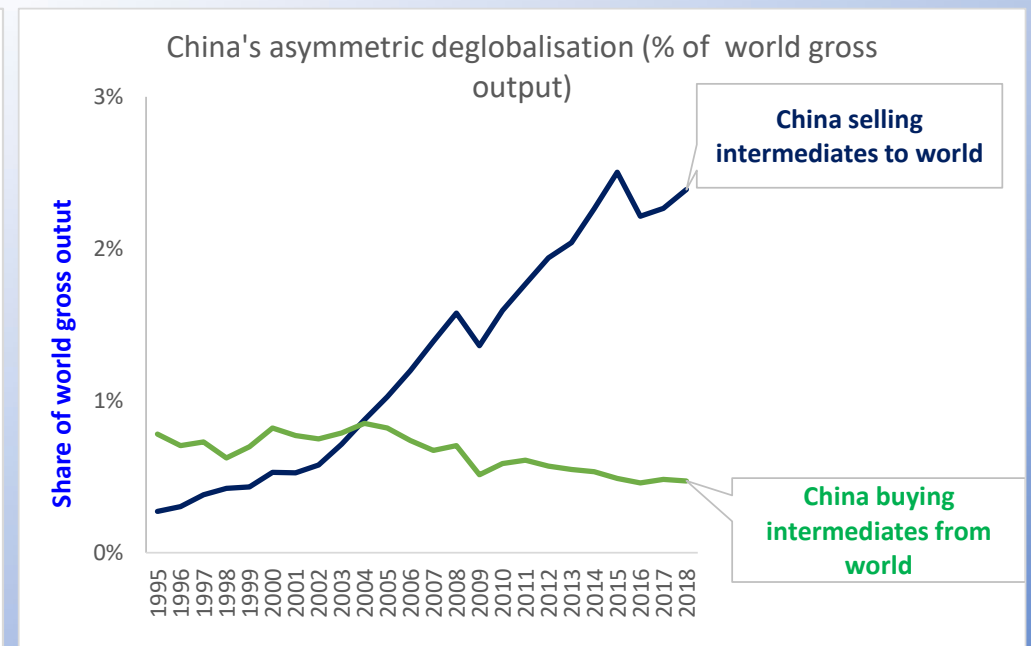


- China peaked 10yrs before Trump/Brexit
- US peaked 2011
- Jpn peaked in 2014
- EU has stagnated not peaked (mixed trends)

Percentage points change (1990 to 2008, x-axis; 2008 to 2020 y-axis)



China is key: Becoming normal mega-economies, but with asymmetric supply chain engagement



Beware of deglobalisation hype: it was mostly commodities & driven by prices

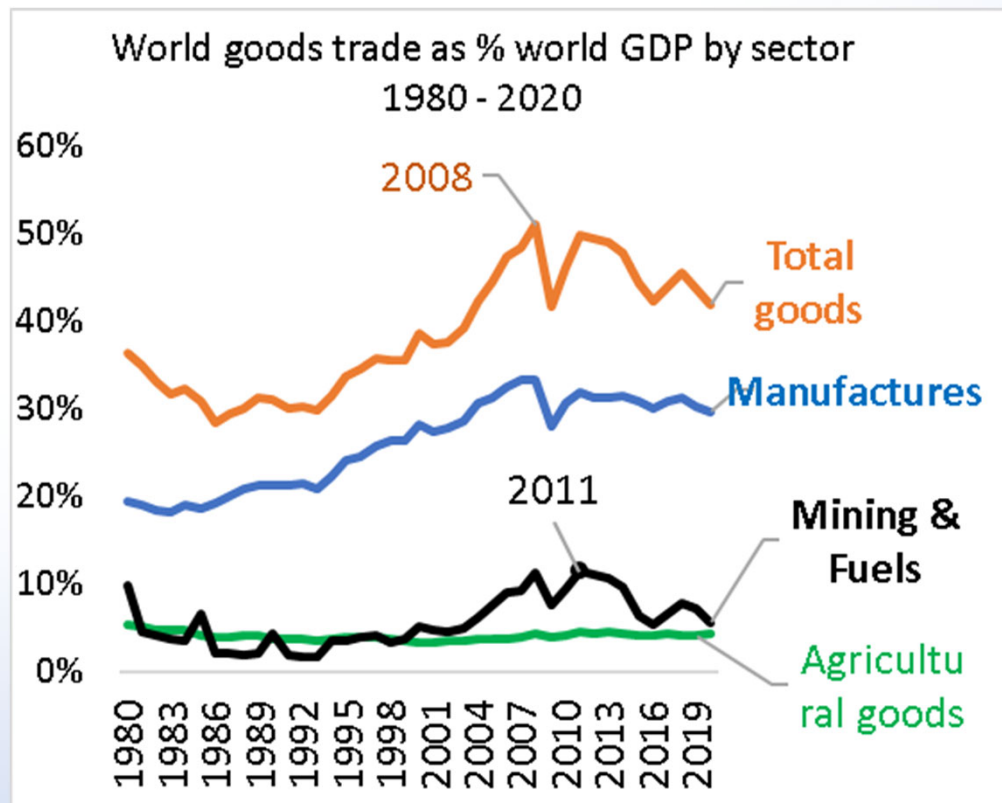
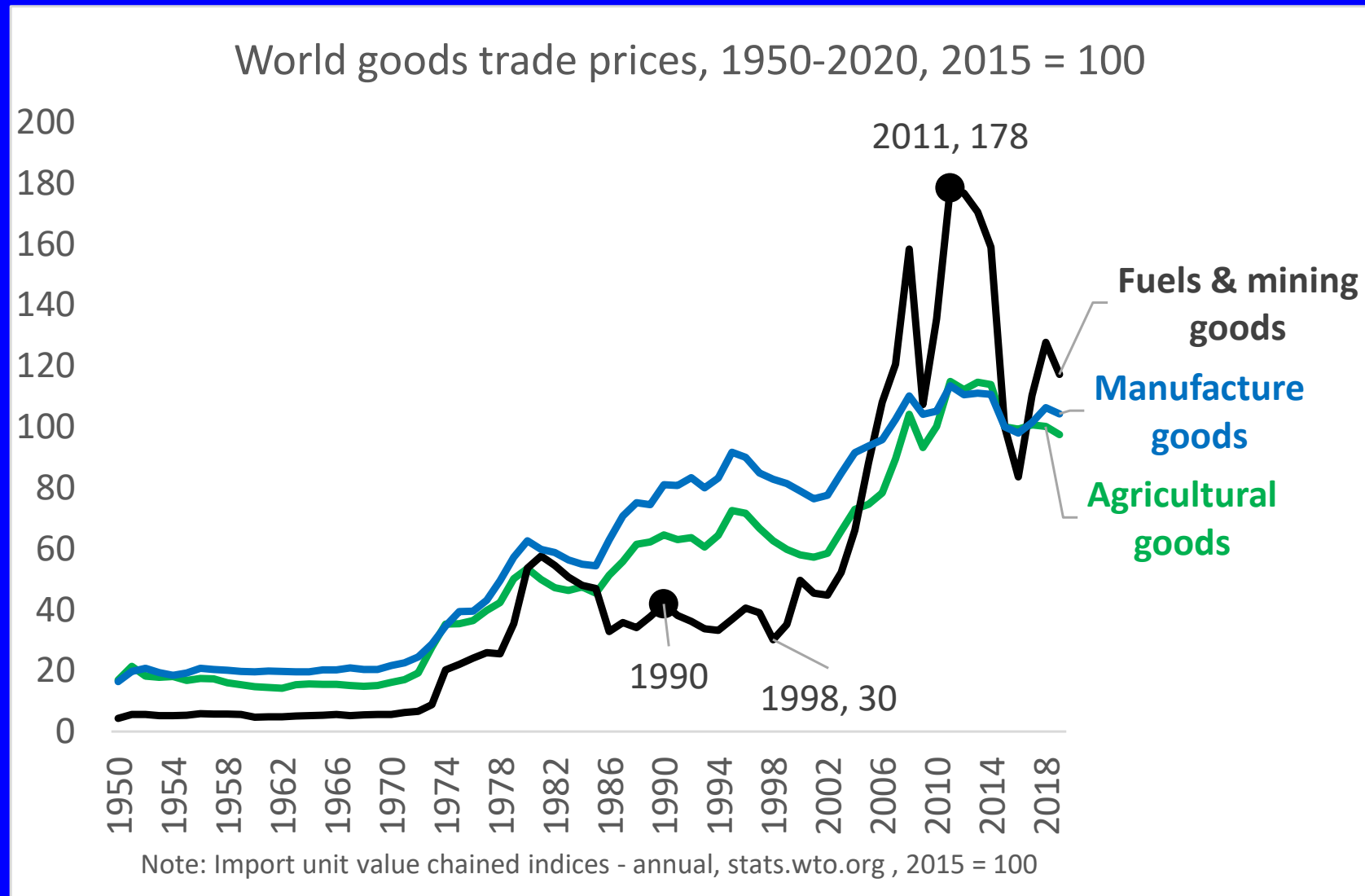


Chart: World goods trade as a share of world GDP, by sector, 1980 – 2020

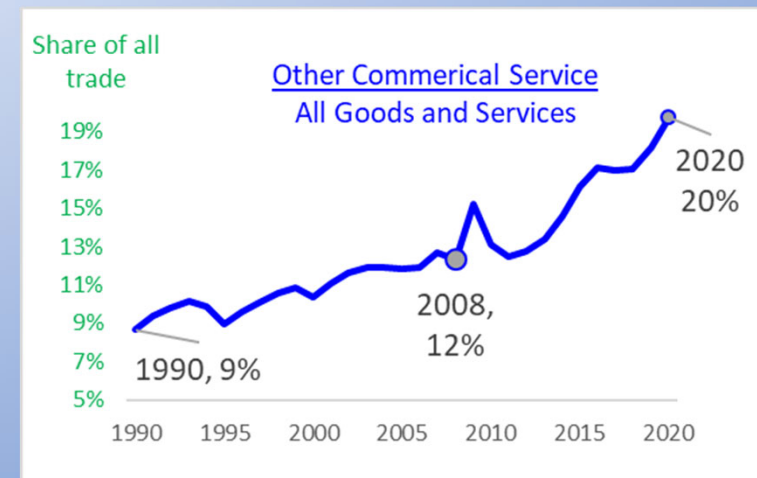
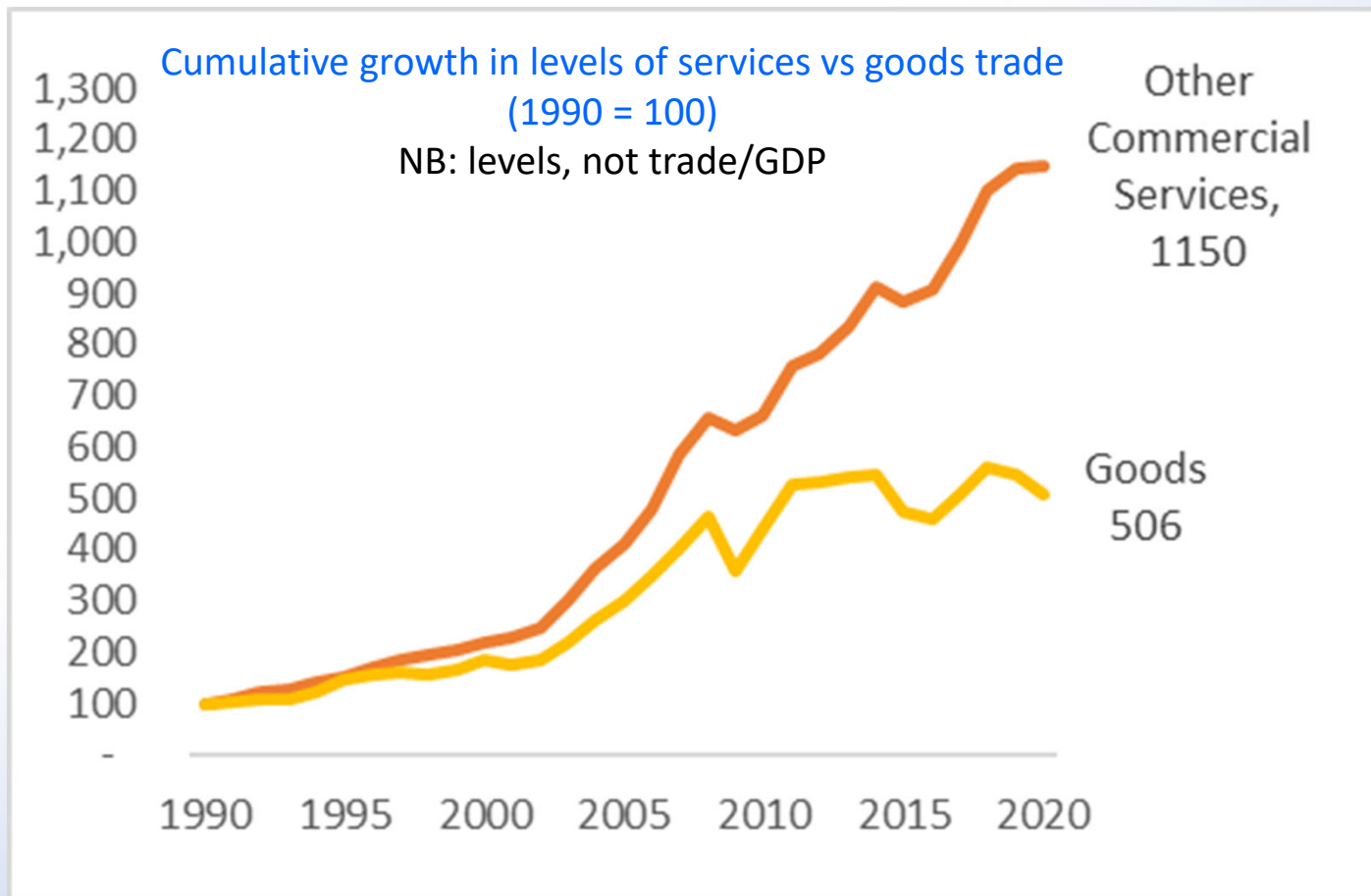
- About 60% of the drop in the ratio was due to mining and fuels
- About 40% due to drop in manufactures

Traded goods prices peaked



**Message:
Service trade
globalisation
did not peak or
even slow**

Services trade didn't peak (WORLD)

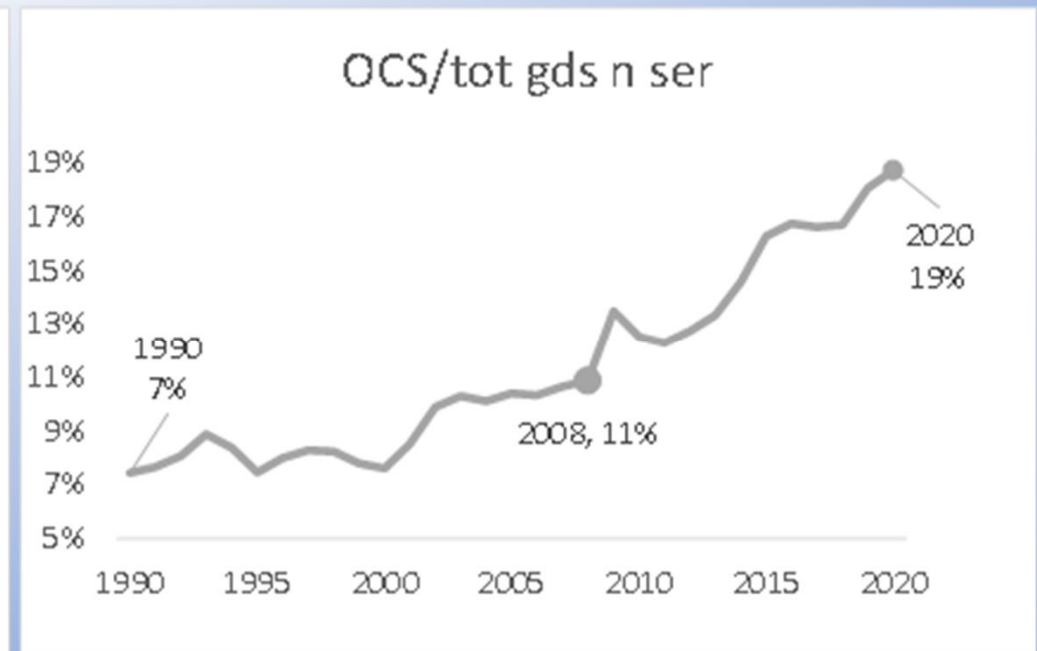
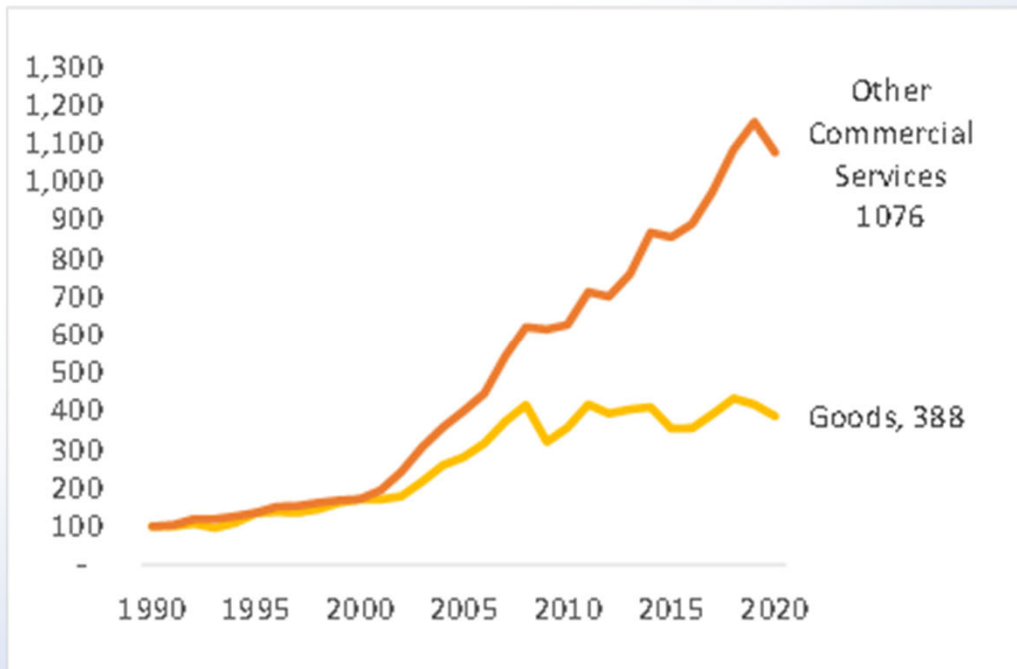


NB: 'Other Commerce Services' = All services less Transport & Travel/Tourism

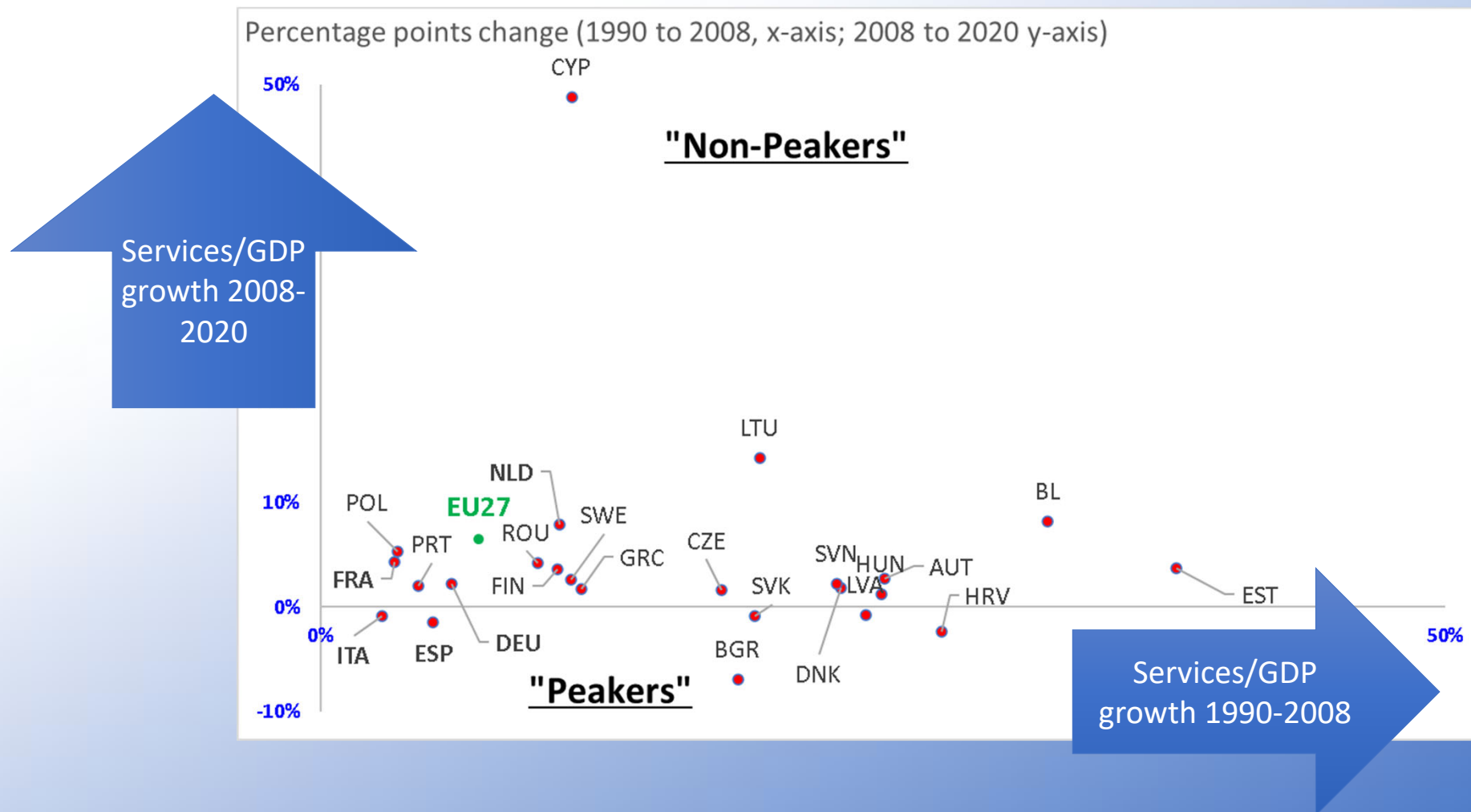
Services trade has not peaked (EA19)

Cumulative growth in levels of services vs goods trade
(1990 = 100)

NB: levels, not trade/GDP

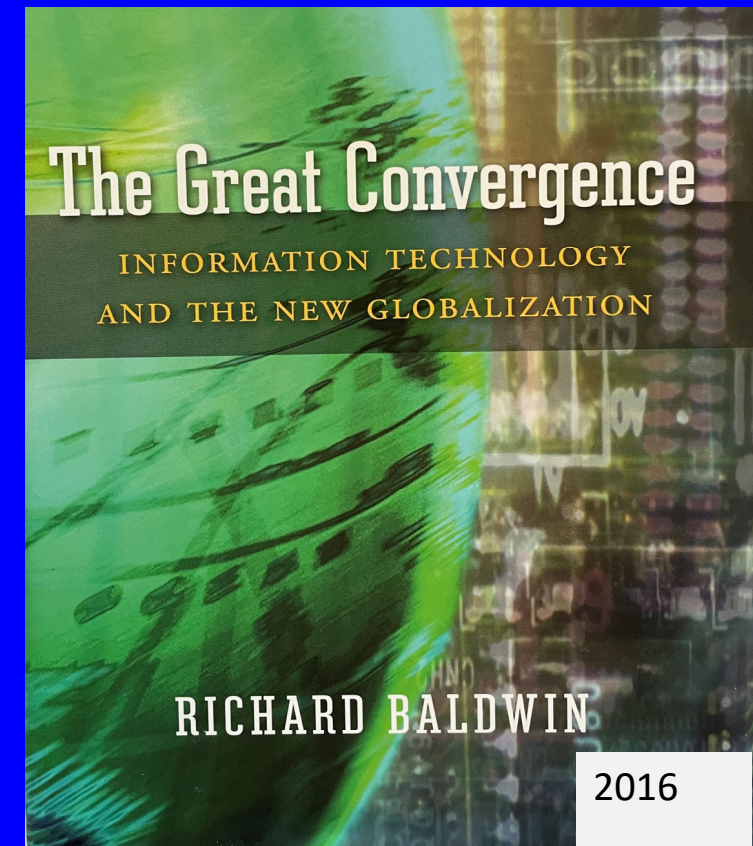


EU Service/GDP peakers & non-peakers



Goods peaked;
services didn't.

'Big picture'
Why?



Arbitrage drives globalisation (constrained by 3 costs)

Trade costs



Goods

Communication costs



Knowhow

Face-to-face costs



Labour services

Comparative advantage changed c. 1990

Globalisation 1820-1990

G7 economies

High $\frac{\text{Knowhow}}{\text{Labour}}$ + High wages = G7 comparative advantage

EM economies

Low $\frac{\text{Knowhow}}{\text{Labour}}$ + Low wages = EM comparative advantage

*2-way flow
of goods*

Globalisation 1990-2008

G7 economies

High $\frac{\text{Knowhow}}{\text{Labour}}$ + High wages = G7 comparative advantage

EM economies

Low $\frac{\text{Knowhow}}{\text{Labour}}$ Low wages = hybrid comparative advantage

*1-way flows
of knowhow
&
2-way flow
of goods*

Digitech lowers face-to-face costs, labour services cross borders “telemigration”

Future globalisation

Headquarter Economies (G7)

High Knowhow
Labour

+ High wages

Factory Economies

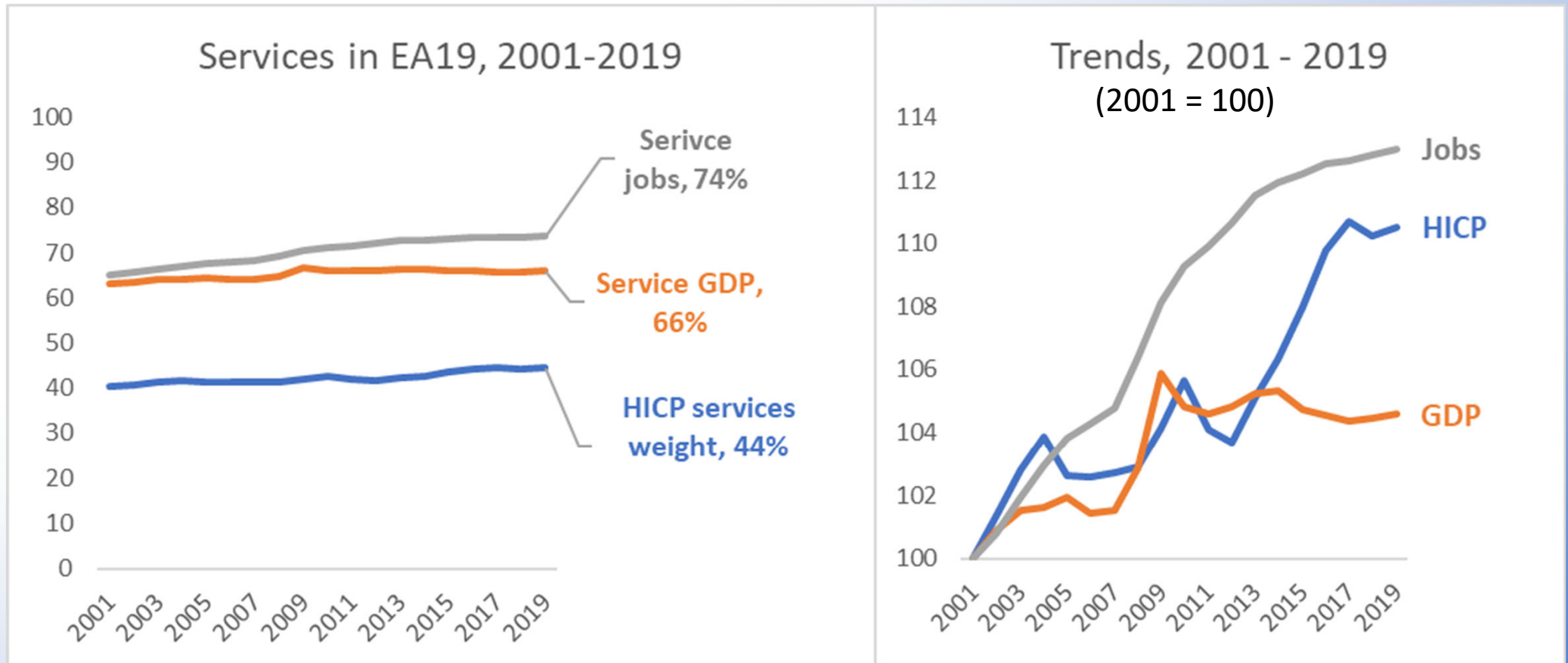
Low Knowhow
Labour

+ Low wages

Nature of globalisation changes again, 3rd unbundling

Services are
important but
different

1. Services in EA are important



2. Service automation & globalisation happening at job or task level – not product level

- Service sector automation varies by job (Frey & Osborne 2013)
- Service sector globalisation (teleworkability) varies by job (Dingel & Neiman 2020)
- By contrast, goods-sector globalisation and automation was at the product level – not job level.

**The future of
trade is
intermediate
services**

What are intermediate services?

- All the service tasks done in service sector, manufacturing sector, and primary sector that are not sold directly to customers.

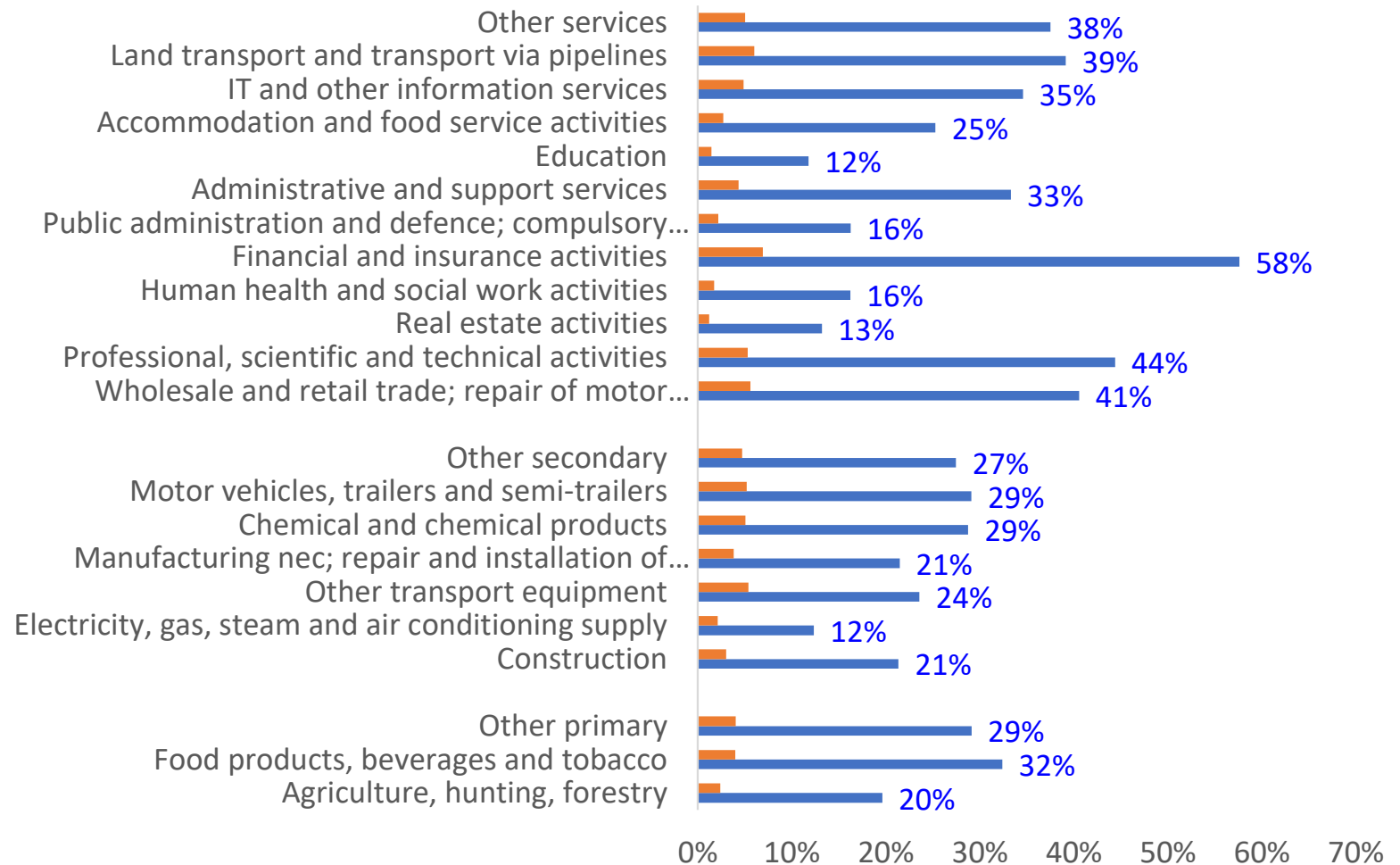
- For example:

tasks done by occupations like bookkeepers, forensic accountants, CV screeners, administrative assistants, online client help staff, graphic designers, copyeditors, personal assistants, corporate travel agents, software engineers, lawyers checking contracts, financial analysts writing reports, etc.

- In data, roughly Other Commercial Services (OCS, broad), or Other Business Services (OBS, narrow)

Every sector uses service intermediates

Service intermediates as share of sector's output



4 facts and a conclusion

1. Barriers to services trade are much higher than barriers to goods trade
2. Most barriers to trade in intermediate services are technology-linked, not policy linked
3. Digitech is lowering barriers to intermediate services at an explosive pace (+ Covid forced adjustment)
4. Demand is huge in rich nations; Capacity is huge in emerging markets

ERGO: Intermediate services trade will grow much faster than goods trade for foreseeable future

(NB: Already 2 to 3 times faster since mid 2000s)

1. FACT: Barriers to trade in services are much higher than barriers to trade in goods

- Benz and Jaax 2022, Economics Letters.
- So high that many economists view services as ‘non traded’

2. FACT: Most barriers to trade in intermediate services are technology-linked, not policy linked

- Most service barriers are regulatory, not tariffs
- OECD's 'Services Trade Restrictiveness Index' shows regulation for 'final services' like professional services
- Almost no regulation on intermediate services like back-office jobs, copyediting, CV screening, HR, marketing, etc

3. FACT: Digitech is lowering barriers to intermediate services at an explosive pace (+ Covid forced adjustment)

- Digitech is making remote workers less remote
- Machine translation is melting language barriers
- Covid-19 adjusted pushed us to the frontier

4a. Demand is huge in rich nations

Service intermediates are 3x more important than manufacturing intermediates in overall economy

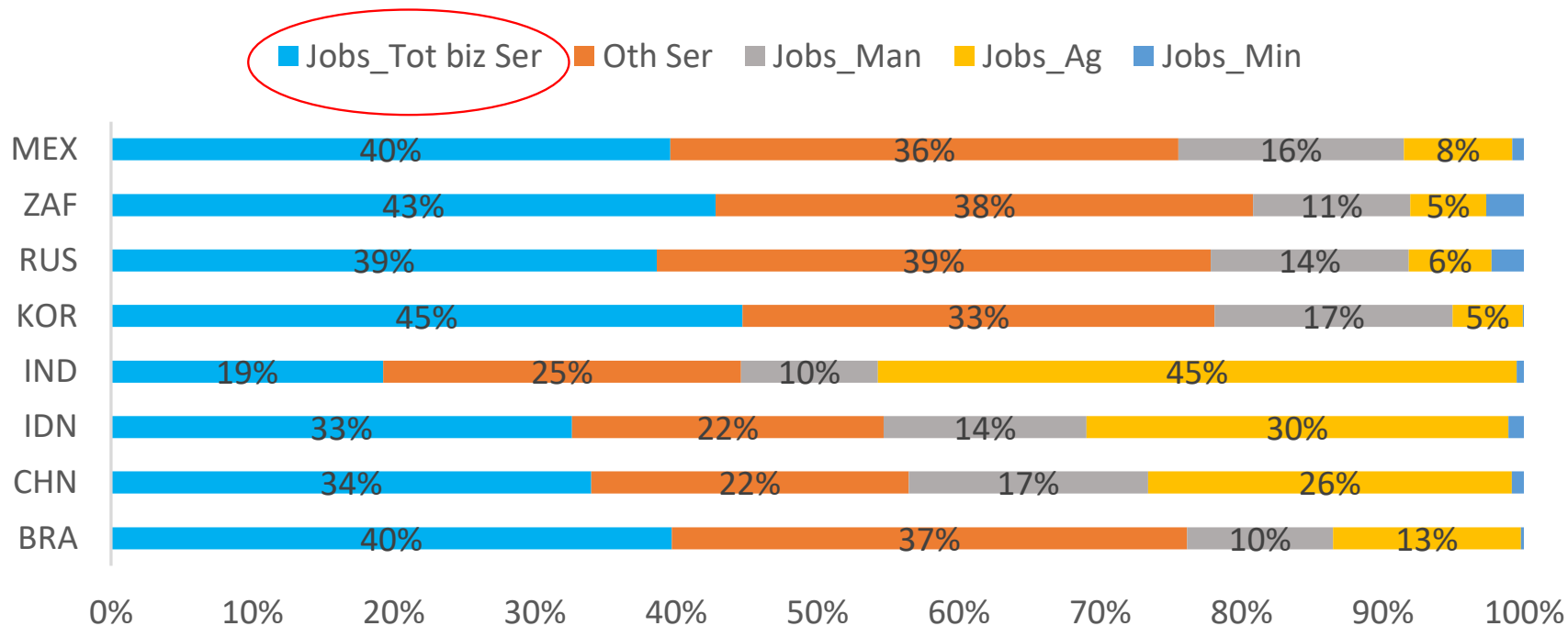
| <i>Column sector's inputs into row sector (gross output) 2018</i> | Service intermediate inputs | Manufactures intermediate inputs | Sector share of total gross output |
|---|-----------------------------|----------------------------------|------------------------------------|
| Service sector | 32% | 5% | 68% |
| Manufacturing sector | 24% | 25% | 26% |
| Total economy | 30% | 11% | 100% |

French economy as an example; source TiVA database

4b. FACT: Supply is huge in EMs

(BRIICKS = Brazil, Russia, India, Indonesia, China, Korea, South Africa)

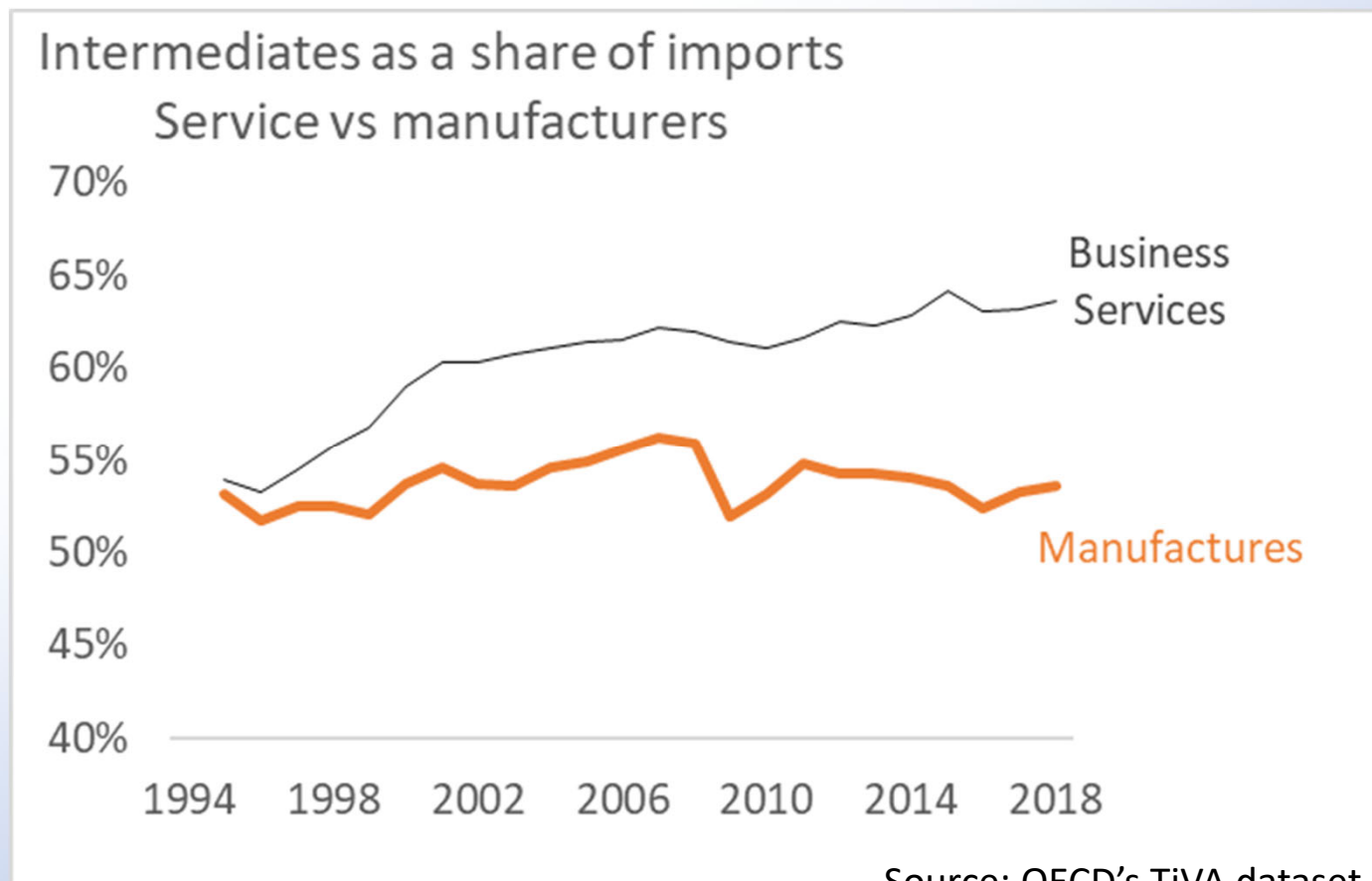
Share of jobs by sector, 2018, BRIICKS nations



Source: OECD's Trade in Employment dataset

**Other
unexpected
facts about
intermediate
services**

FACT: Intermediate inputs are more important in services imports than manufactures imports



Source: OECD's TiVA dataset

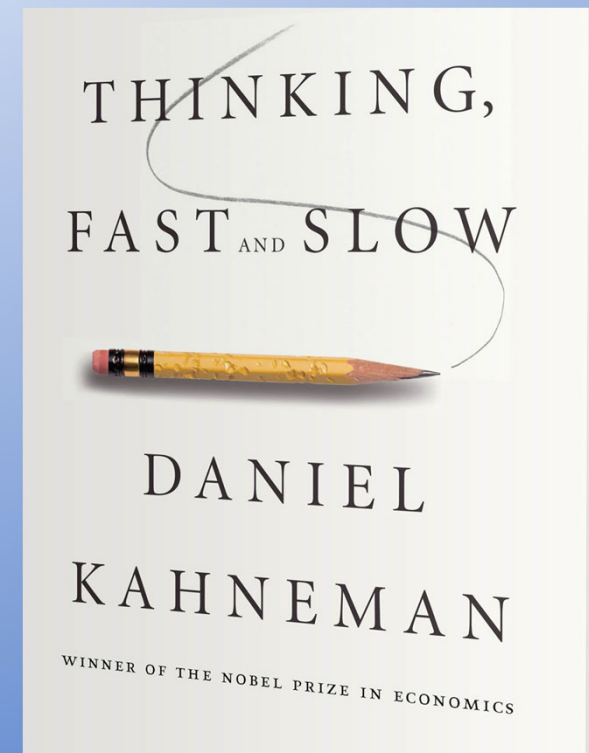
Service automation is different: “White collar robots”

- Computers acquire new cognitive skills since 2016 due to machine learning.
- New skills are automating service sector tasks
 - RPA, Virtual Assistants, IBM Watson, scheduling apps, etc
- What changed?

The programming changed

- Coding = thinking slow

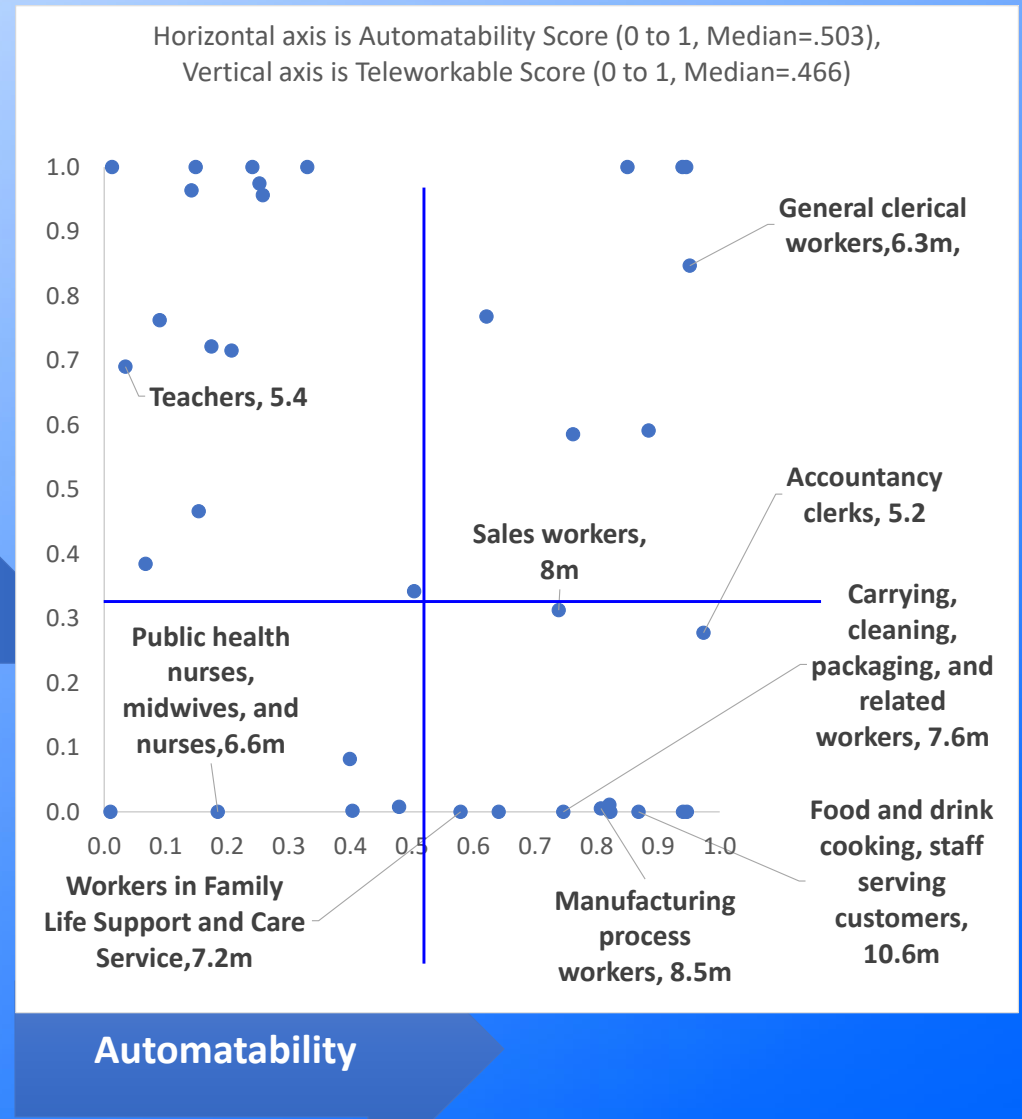
Machine learning = thinking fast



‘globotics quadrant’

Susceptibility by occupation

x-axis = automation
y-axis = globalisation



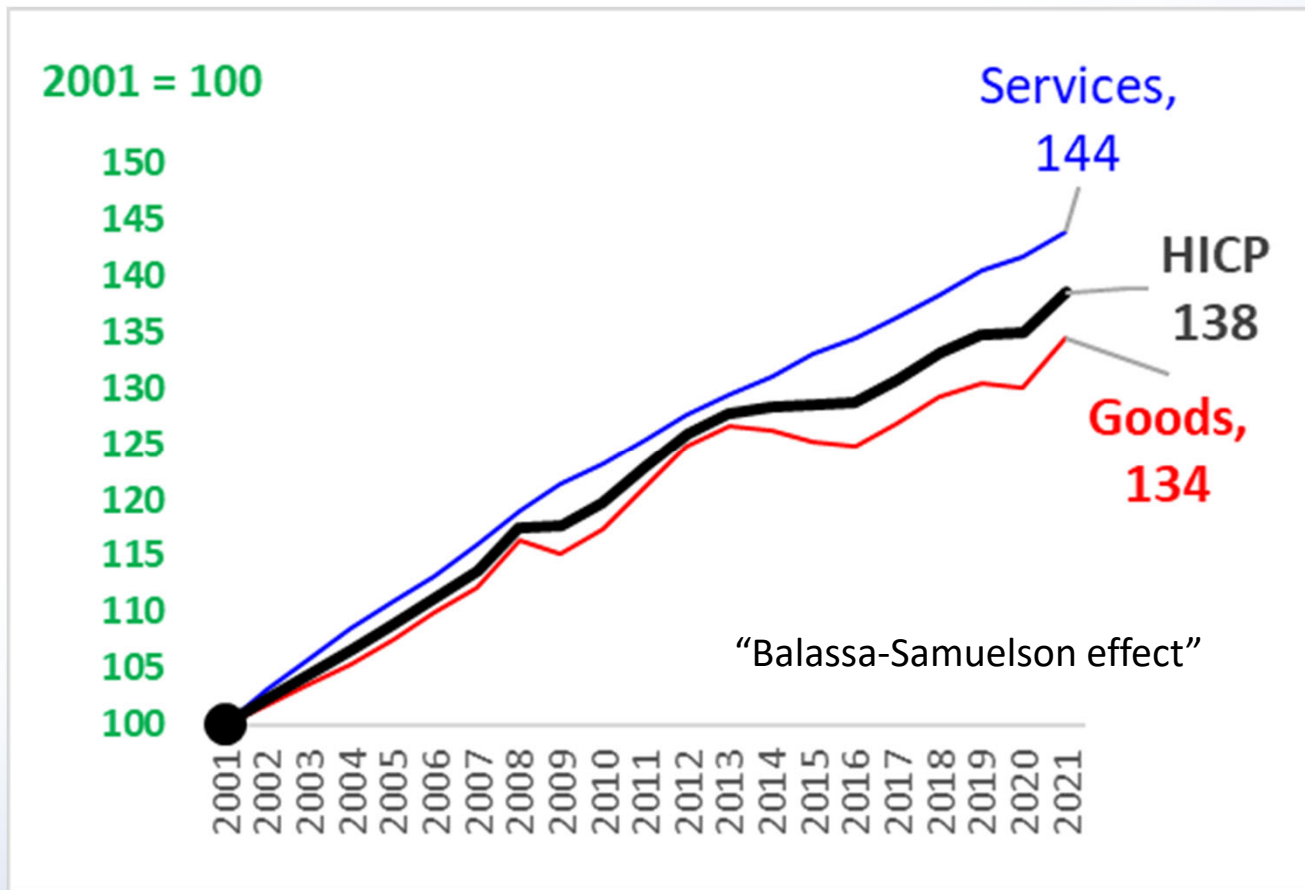
Million jobs per quadrant: NW = 57, NE = 11, SW = 16, SE = 20

Occupations by quadrant with number of jobs

| NW quad | Million jobs | NE quad | Million jobs | SW quad | Million jobs | SE quad | Million jobs |
|--|--------------|---|--------------|---|--------------|---|--------------|
| Food and drink cooking, staff serving customers | 10.6 | General clerical workers | 6.4 | Public health nurses, midwives, and nurses | 6.6 | Workers in religion | 0.1 |
| Manufacturing process workers | 8.6 | Management, finance and insurance professionals | 1.6 | Security workers | 2.8 | Authors, journalists, editors | 0.2 |
| Sales workers | 7.9 | Sales clerks | 1.3 | Medical Technology and Healthcare Professionals | 1.8 | Artists, designers, photographers, film operators | 0.6 |
| Carrying, cleaning, packaging, and related workers | 7.6 | Transport and post clerical workers | 0.5 | Occupational health and hygiene service workers | 1.8 | Architects, civil engineers and surveyor | 0.6 |
| Workers in Family Life Support and Care Service | 7.2 | Outdoor service workers | 0.4 | Professional social welfare workers | 1.7 | Legal Professionals | 0.8 |
| Accountancy clerks | 5.2 | Manager of residential facilities and buildings | 0.4 | Doctors, dentists, veterinarians, and pharmacists | 0.9 | Researchers | 1.0 |
| Transport and machine operation workers | 3.8 | Office appliance operators | 0.2 | | | Other specialist professionals | 1.1 |
| Construction and mining workers | 3.4 | | | | | Manufacturing engineers | 1.4 |
| Production-related clerical workers | 1.1 | | | | | Management and business consultants | 1.4 |
| Other service workers | 1.0 | | | | | Administrative and managerial workers | 2.5 |
| Agriculture, forestry and fishery workers | 0.5 | | | | | Data processing and communication engineers | 4.6 |
| Agriculture, forestry, and fishery engineers | 0.0 | | | | | Teachers | 5.4 |
| | 57.0 | | 10.7 | | 15.6 | | 19.8 |

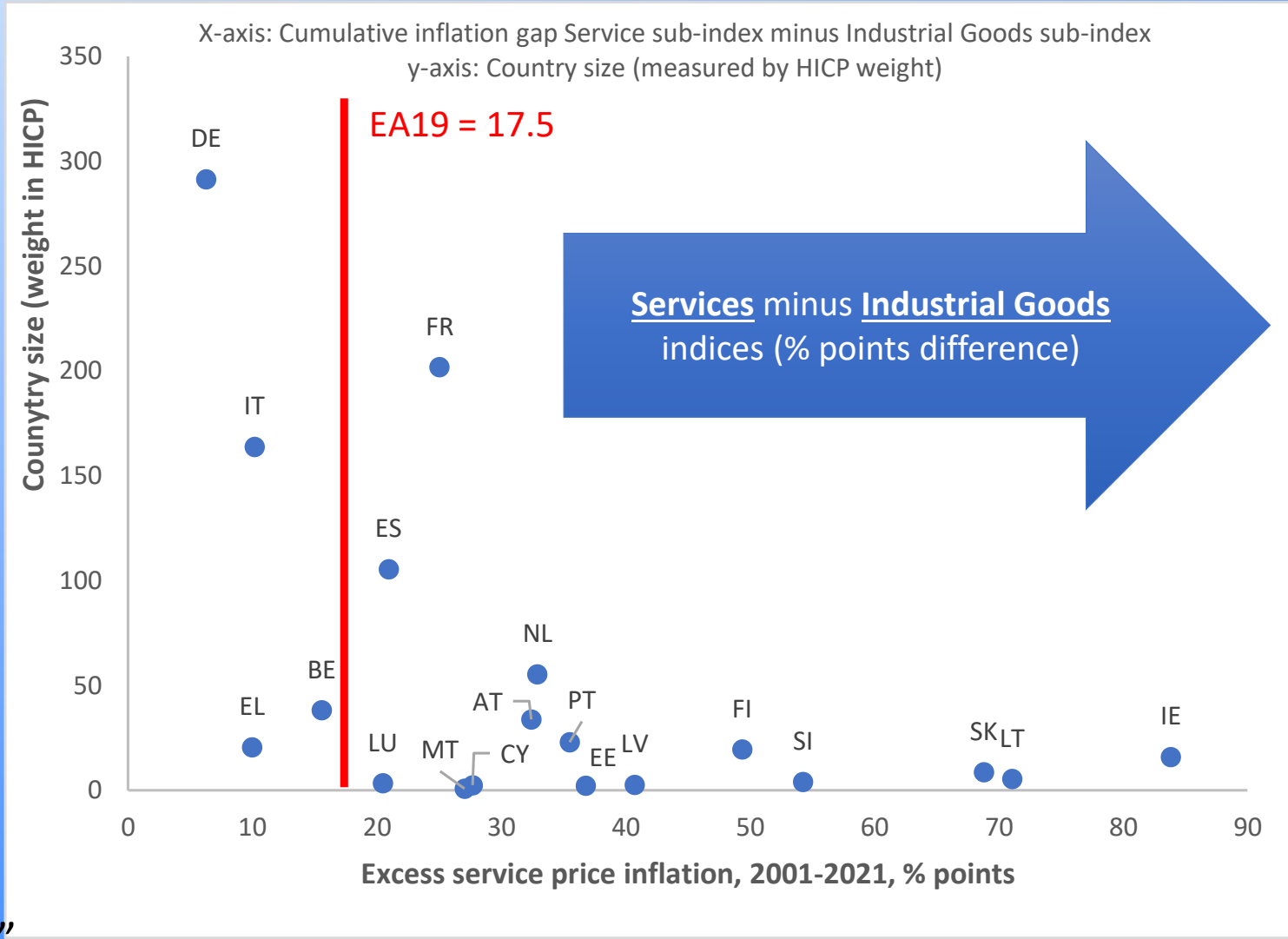
Globotics and HICP developments

Services inflation: higher but less volatile



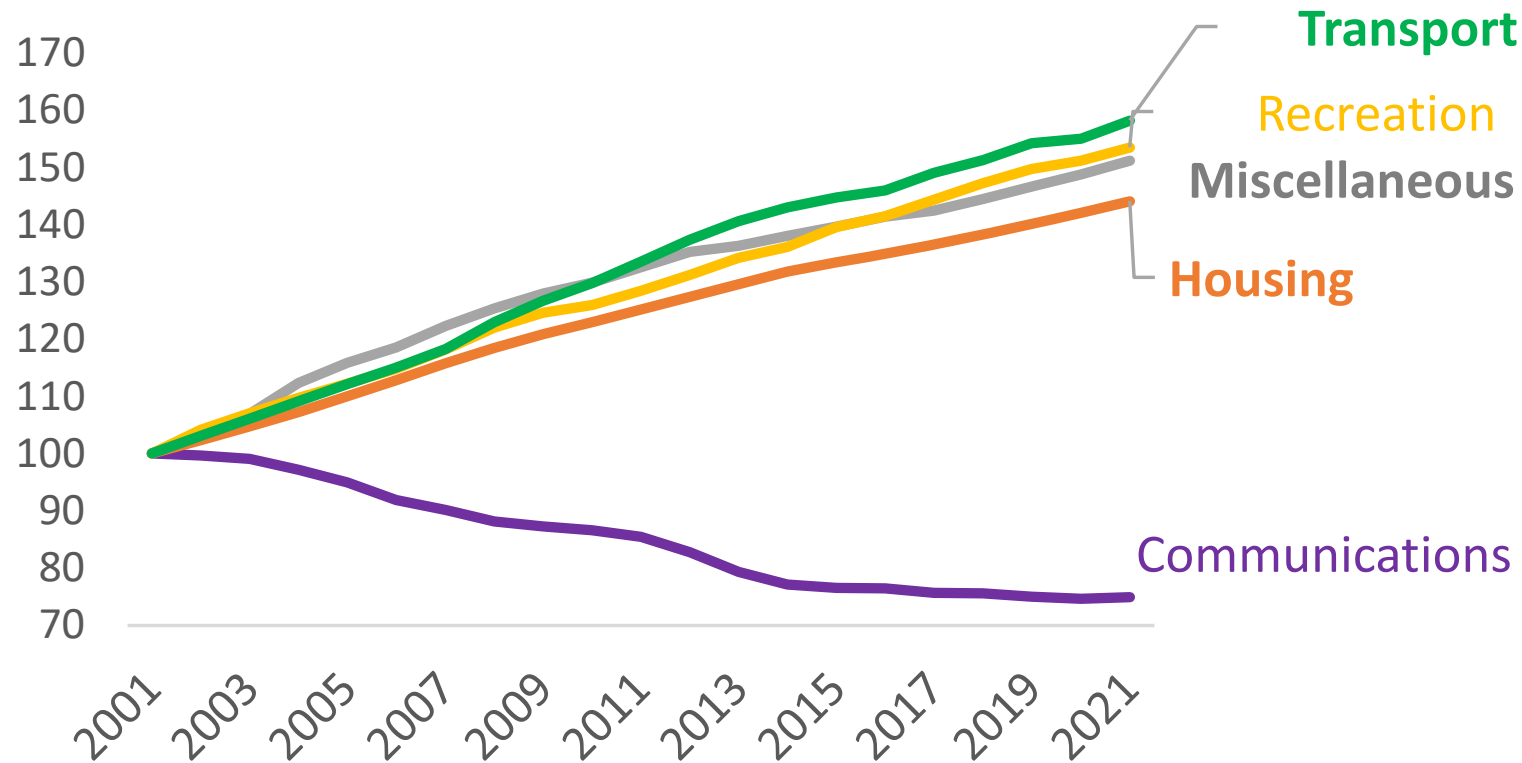
Excess services inflation by EA nations – 2001 to 2020

“Balassa-Samuelson effect”



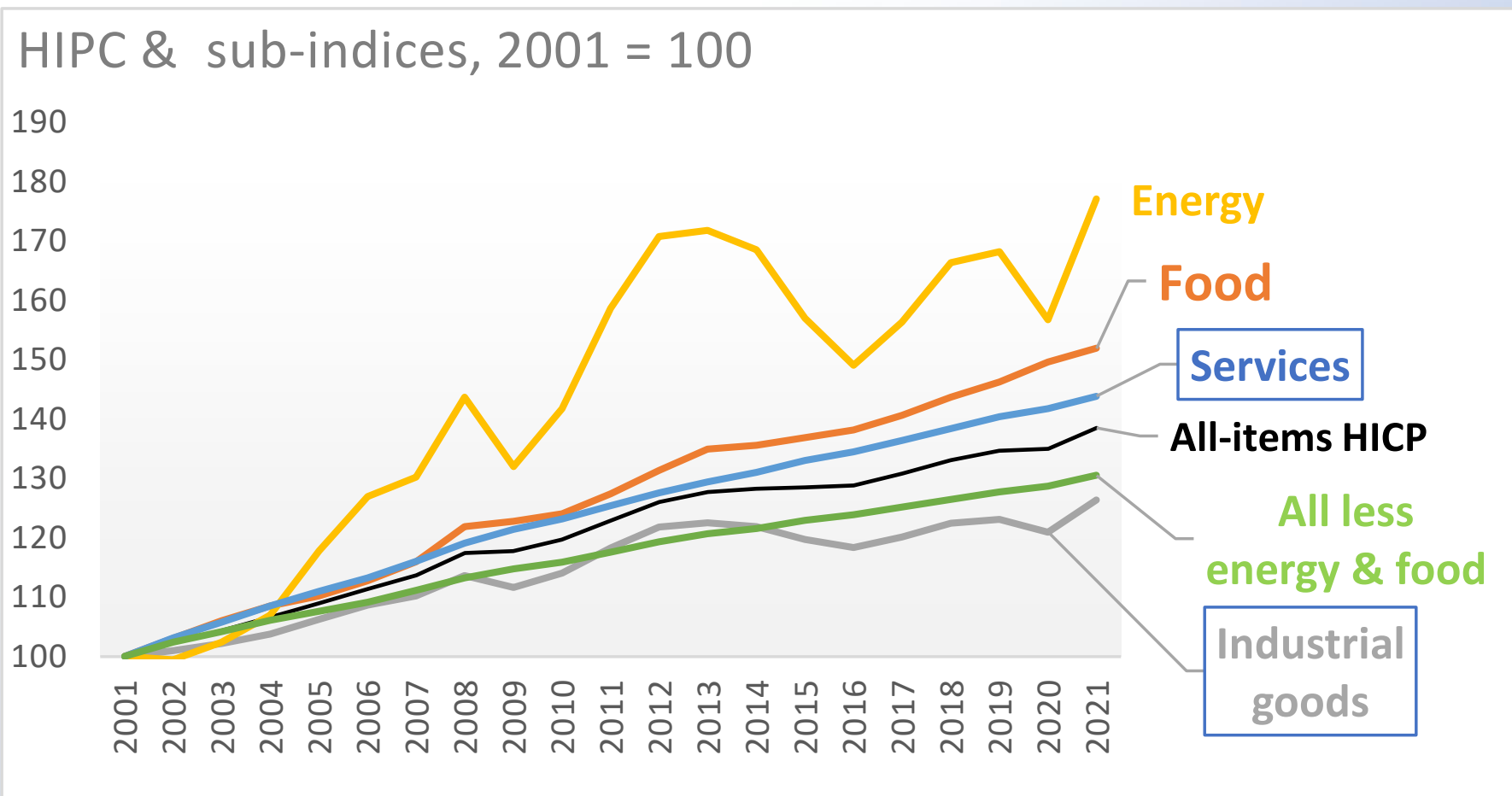
Services sub indices: fairly homogenous except communications

Service sub-indices, 2001 = 100



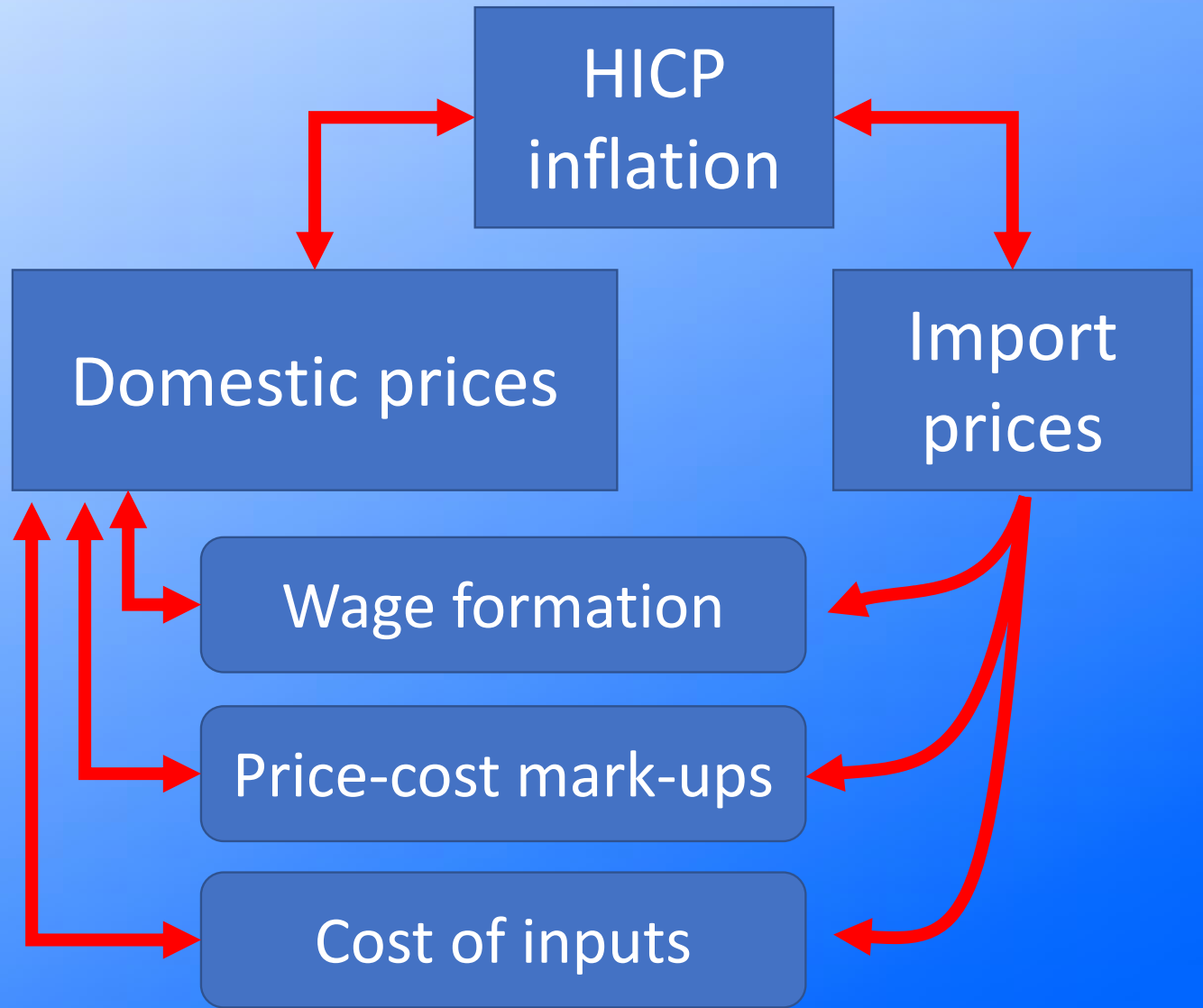
| | HICP Weight (bp) |
|----------------|------------------|
| Housing | 110 |
| Miscellaneous | 84 |
| Recreation | 153 |
| Transport | 72 |
| Communications | 26 |

Services inflation in context

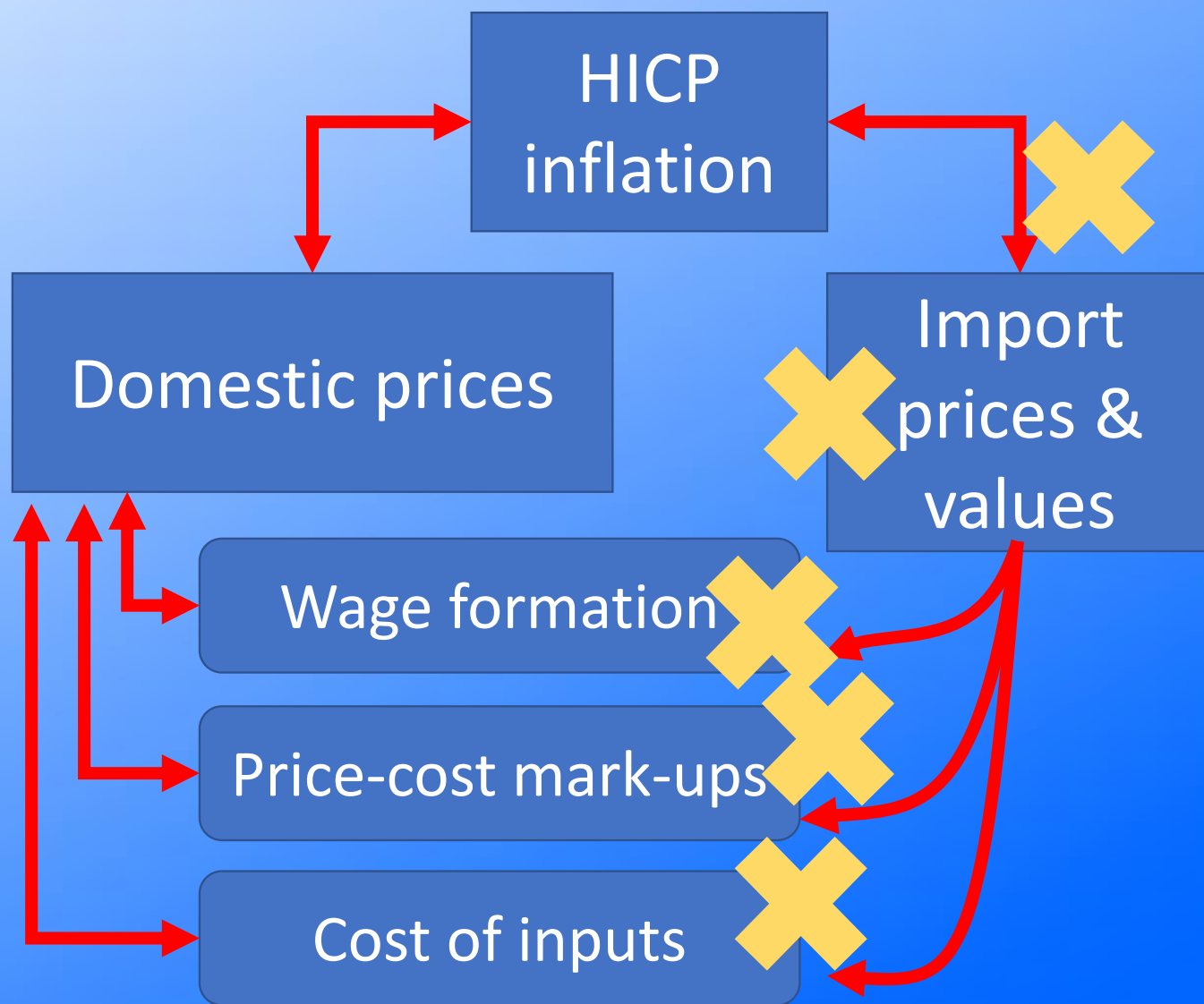


Calculation I
would have liked
to have done

Calculating the impact of service-sector globalisation



Missing data & mappings



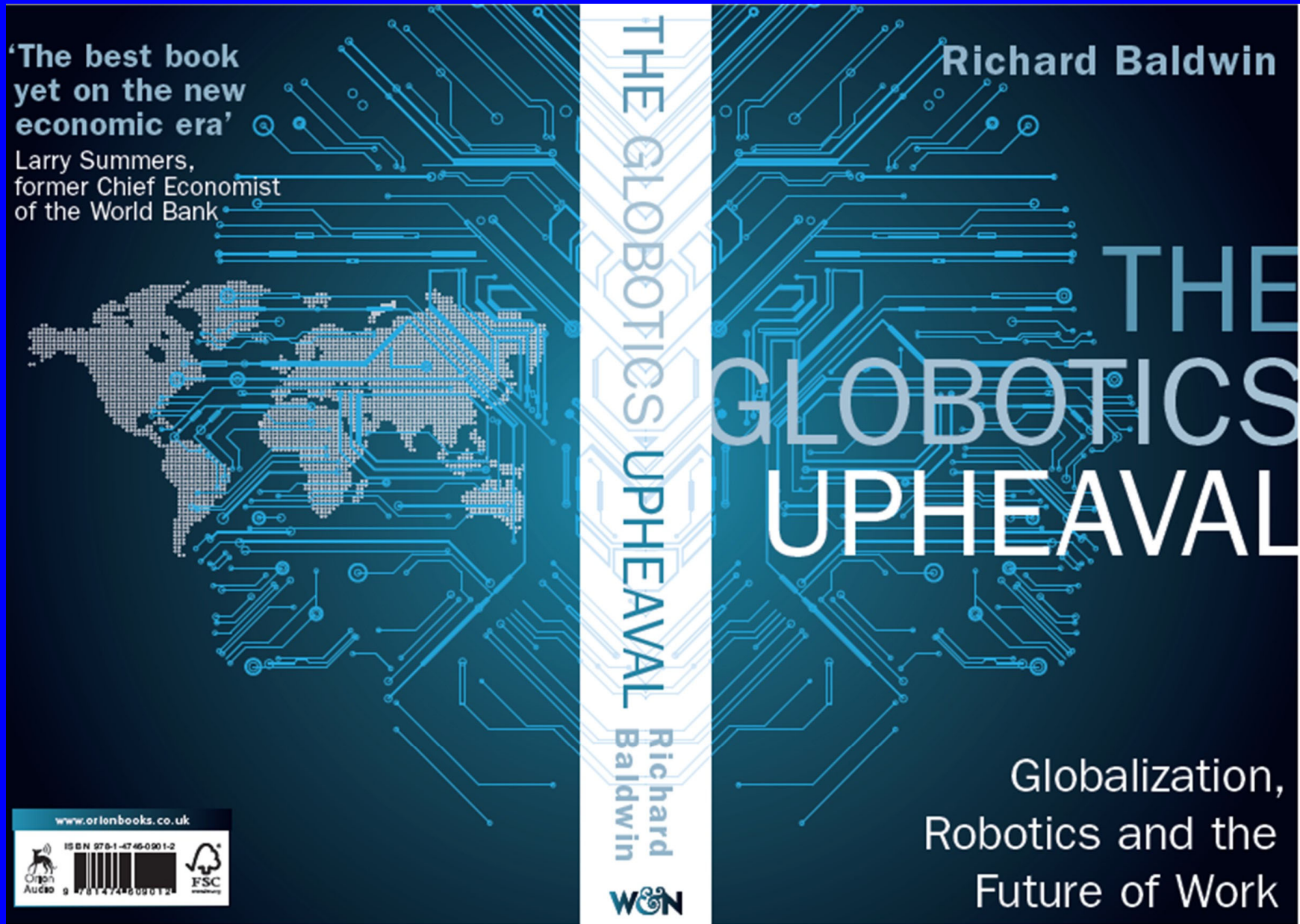
A forward looking research work programme?

- Need price data
- Need mapping of imported services to domestic sectors & jobs

Key points

- Services are important in HICP (45%) and rising
- Service inflation generally higher but steadier
 - “Balassa-Samuelson effect”
- Communication services are very different
- Lots of heterogeneity across euro area members

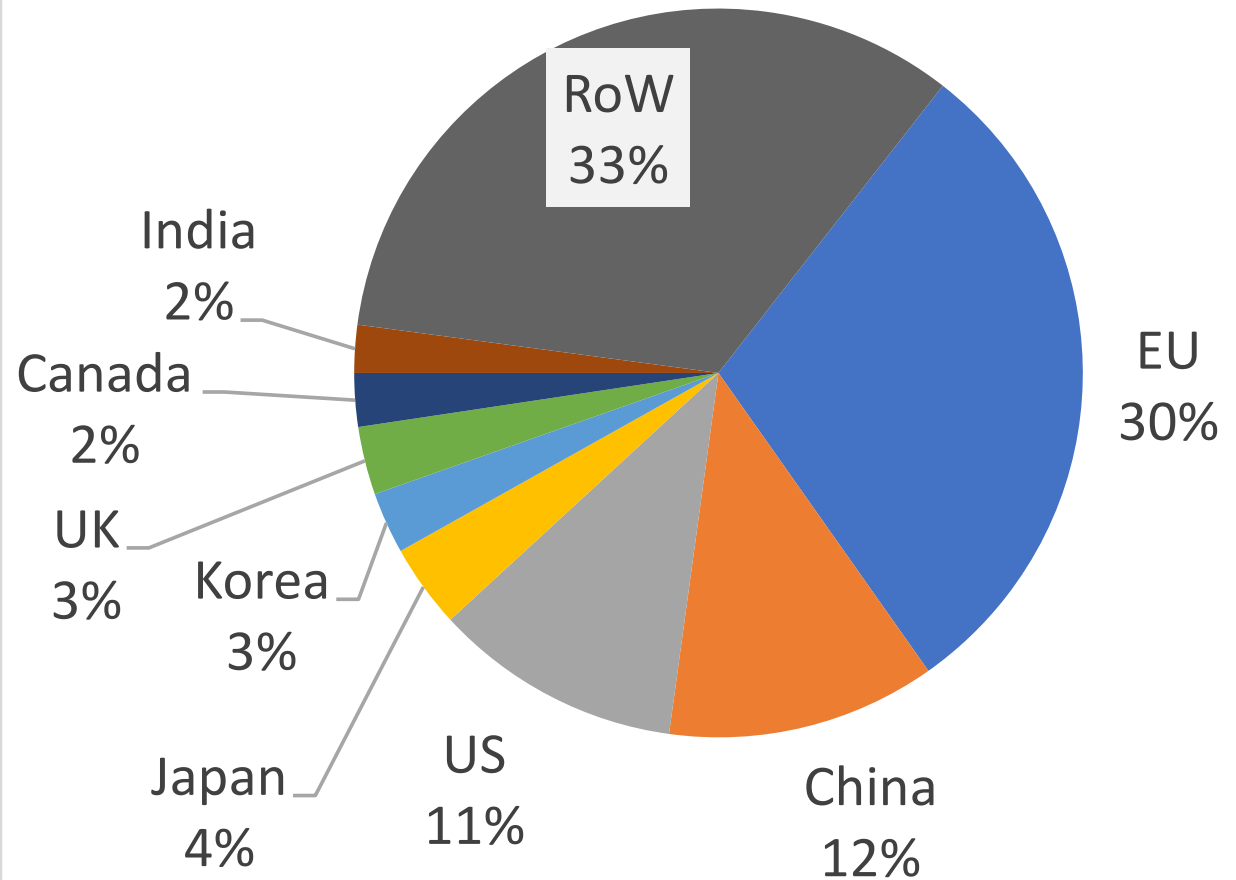
Thanks
for
listening



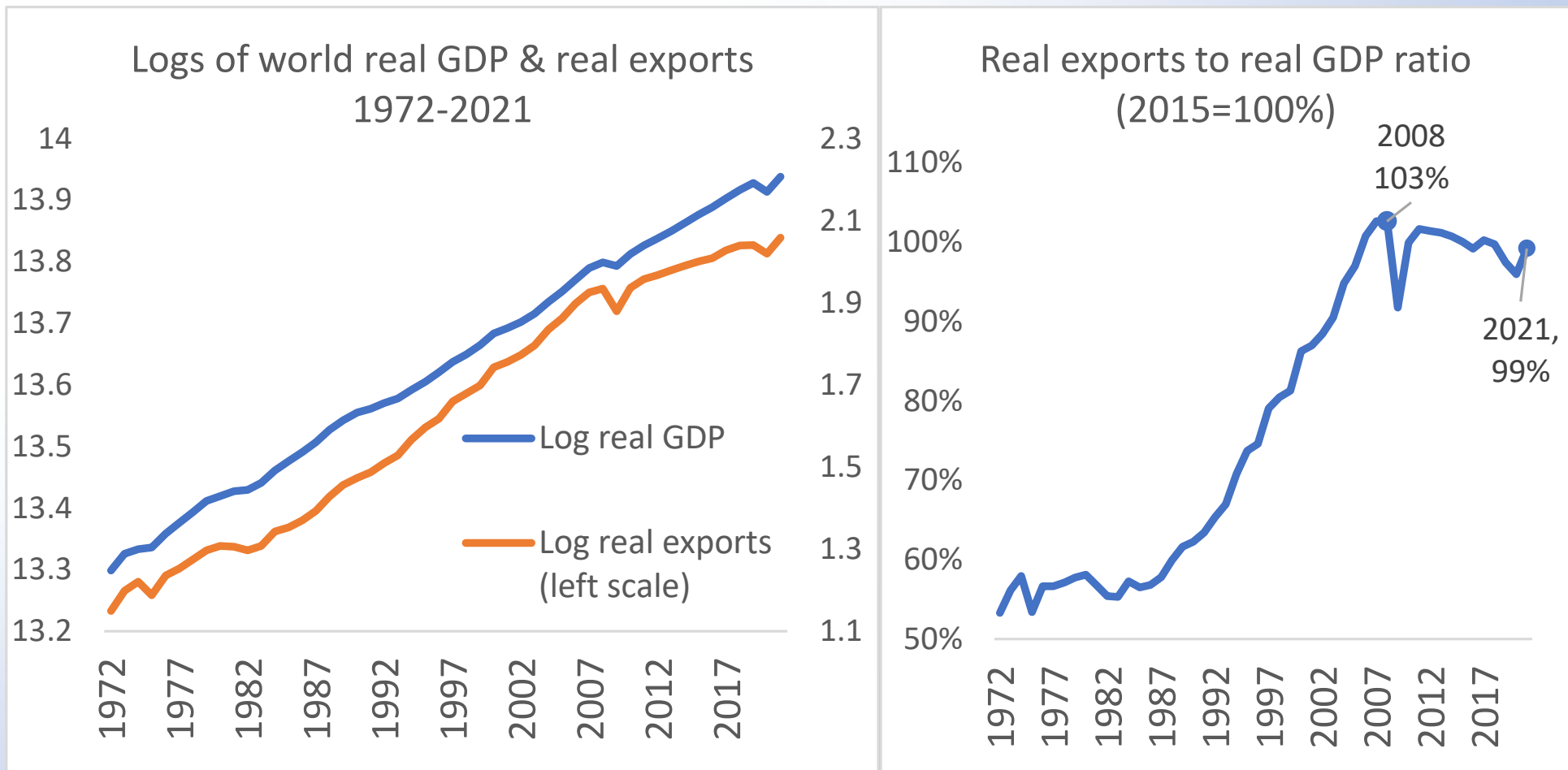
Slides for Q&A

Big traders

Largest traders of goods,
2019



#5. Goods trade volume didn't fall; GDP rose faster



4a. FACT: Demand is huge in rich nation

Table 2: Intermediate services and manufacturing in the French economy, 2018

| Sector | Services inpts | Manufacturing inputs | Imported services inputs | Imported manufacturing inputs | Sector share of total gross output |
|---------------|----------------|----------------------|--------------------------|-------------------------------|------------------------------------|
| Service | 32% | 5% | 4% | 2% | 68% |
| Manufacturing | 24% | 25% | 4% | 13% | 26% |
| Primary | 28% | 17% | 3% | 5% | 6% |
| Total economy | 30% | 11% | 4% | 5% | 100% |

Source: Authors' calculations based on underlying data from 2021 edition of OECD ICIO Tables. Note: Table appears as Table 1 in Baldwin (2022c).