

RIETI BBL Seminar Handout

June 29, 2015

Speaker: Prof. Richard E. BALDWIN

Servicification of manufacturing: Facts and reflections on policy implications

Richard Baldwin

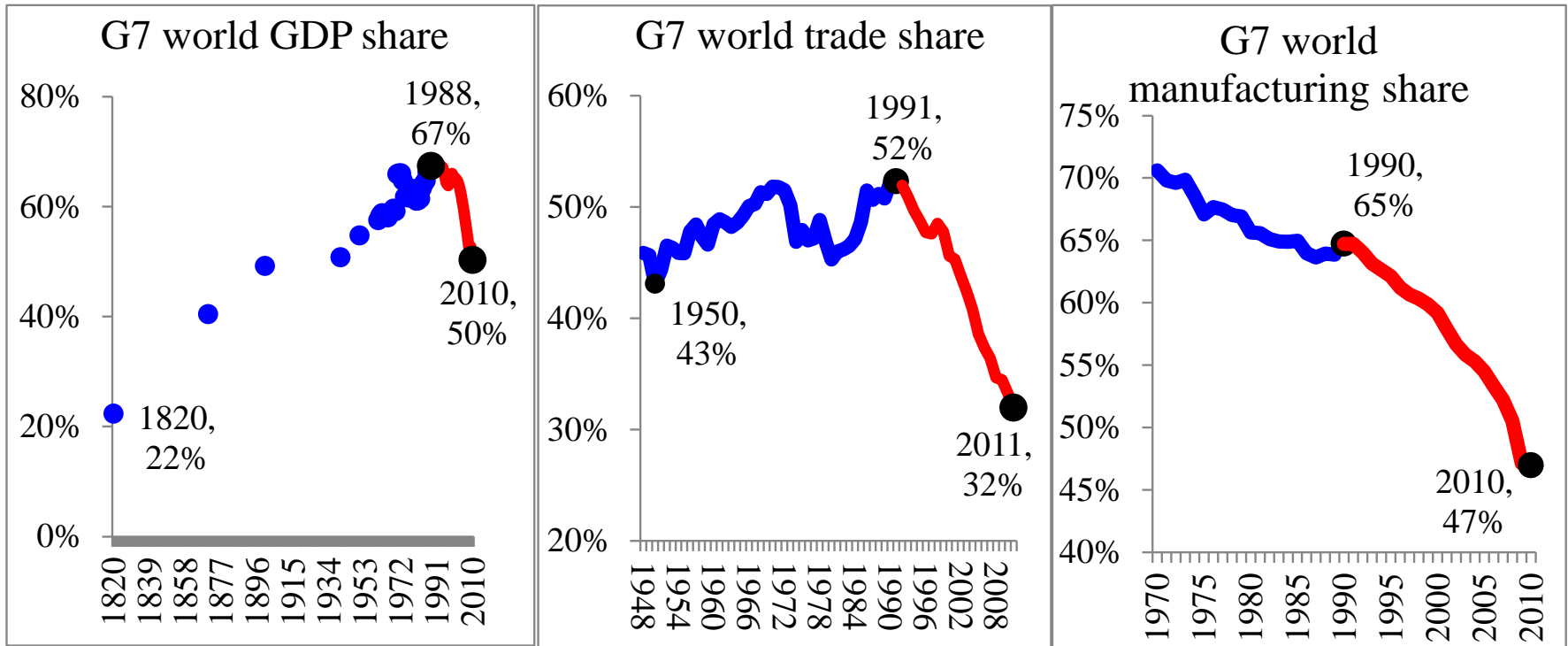
Graduate Institute, Geneva

Based largely on: Richard Baldwin, Rikard Forslid and Tadashi Ito, “Unveiling the evolving sources of value added in exports”, IDE manuscript, February 2015

Servicification & Smile Curve

- Closely related concepts.
- Idea:
 - Changes in globalisation changed production.
 - Value added shifted away from 'fabrication' towards service value-added activity.

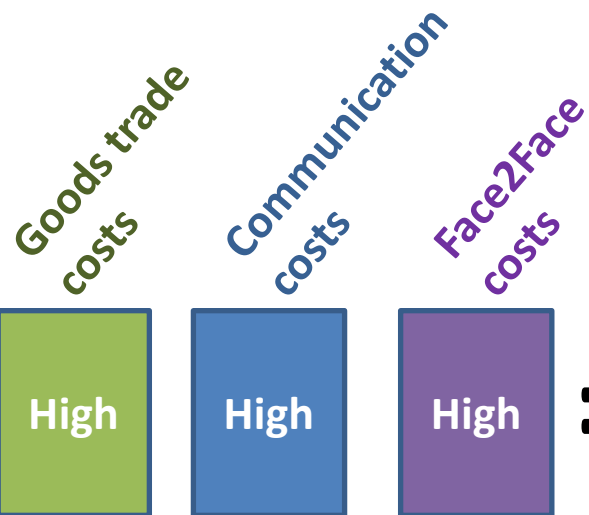
Globalisation changed around 1990



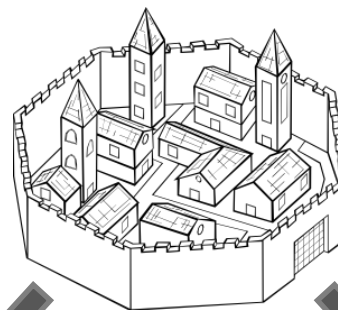
Globalisation as 2 processes, not 1



New globalisation narrative: 3 cascading constraints



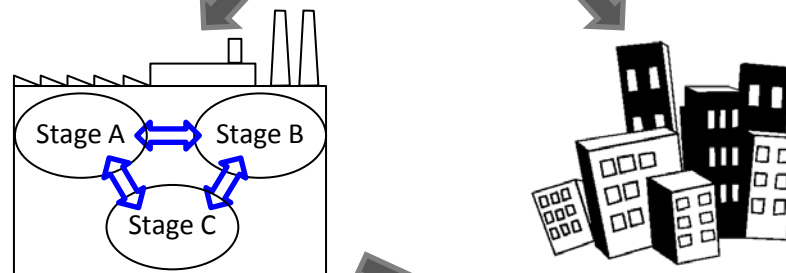
= Pre-globalised world



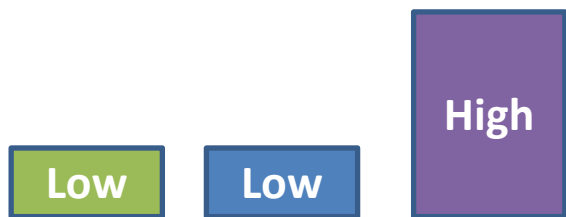
Steam revolution



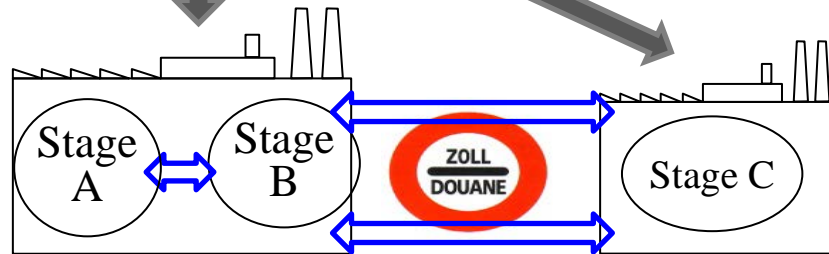
= 1st unbundling



ICT revolution

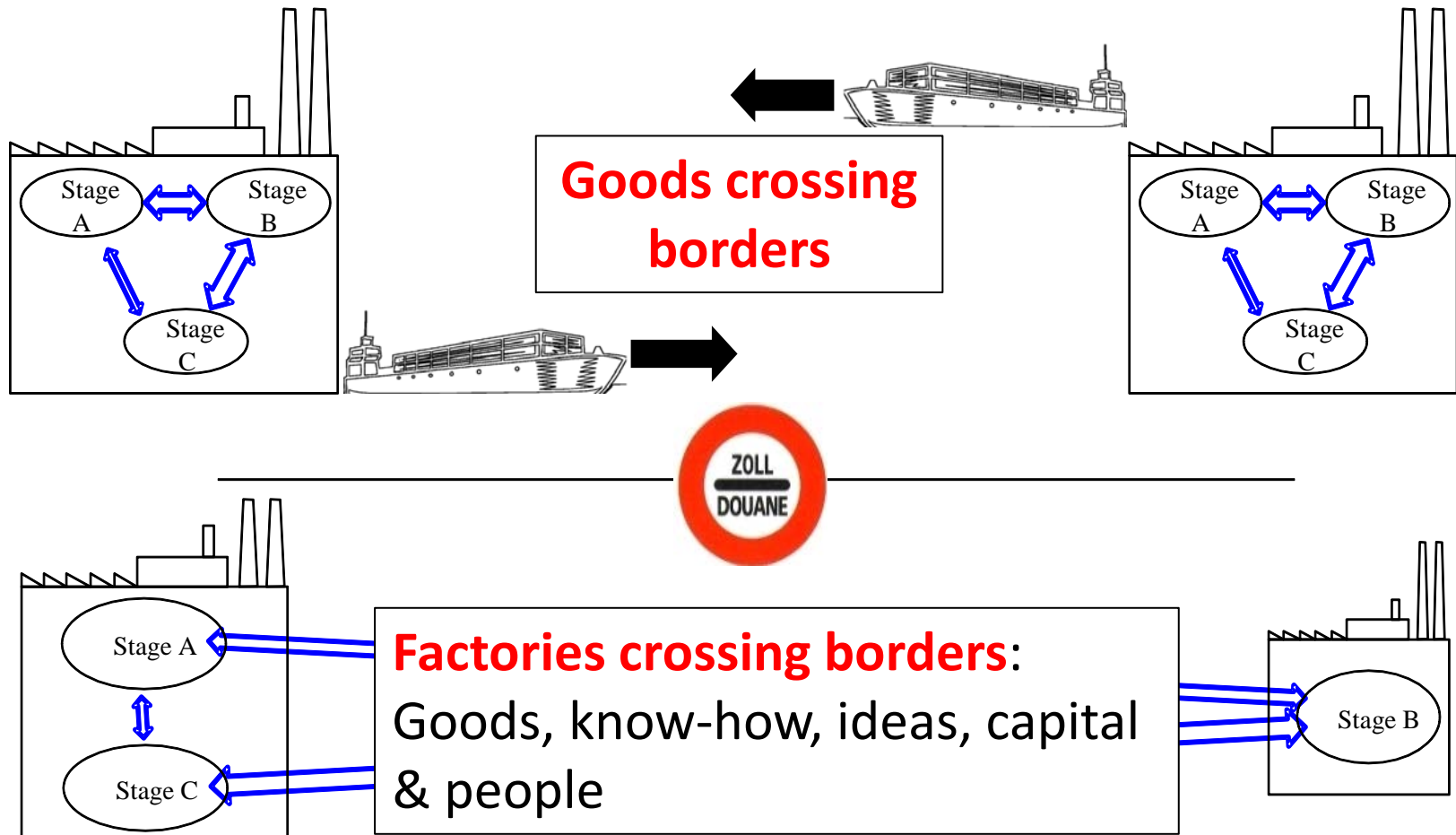


= 2nd unbundling



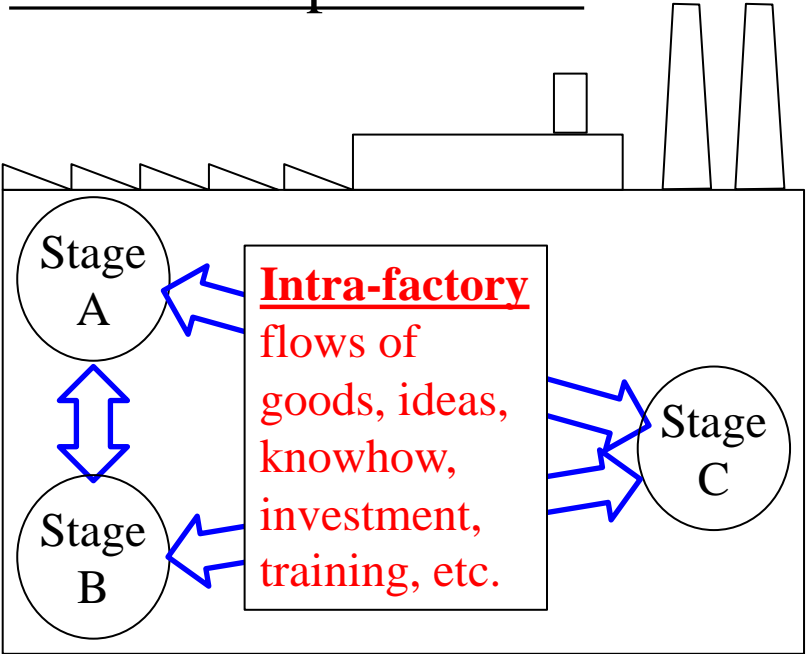
“2nd unbundling”: 3 basic differences

#1: Trade is not just “Goods crossing borders”, also “Factories crossing borders”

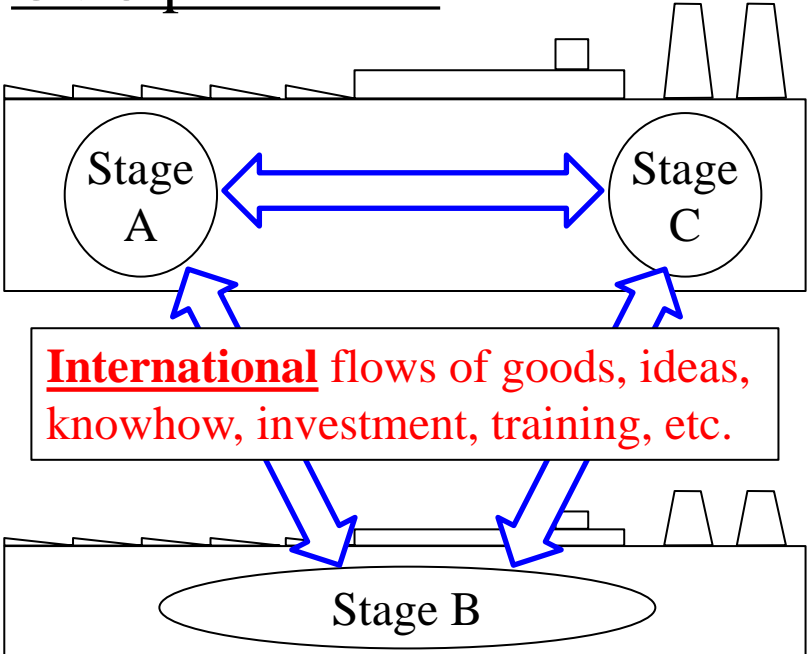


Why it matters: Technology boundaries

Traditional production



GVC production



#2: De-nationalised comparative advantage (Hi-tech goes to lo-wage)

Apple IIc made in Dallas area, 1980s

Apple know-how + US labour



Now:

Apple's know-how + Chinese labour



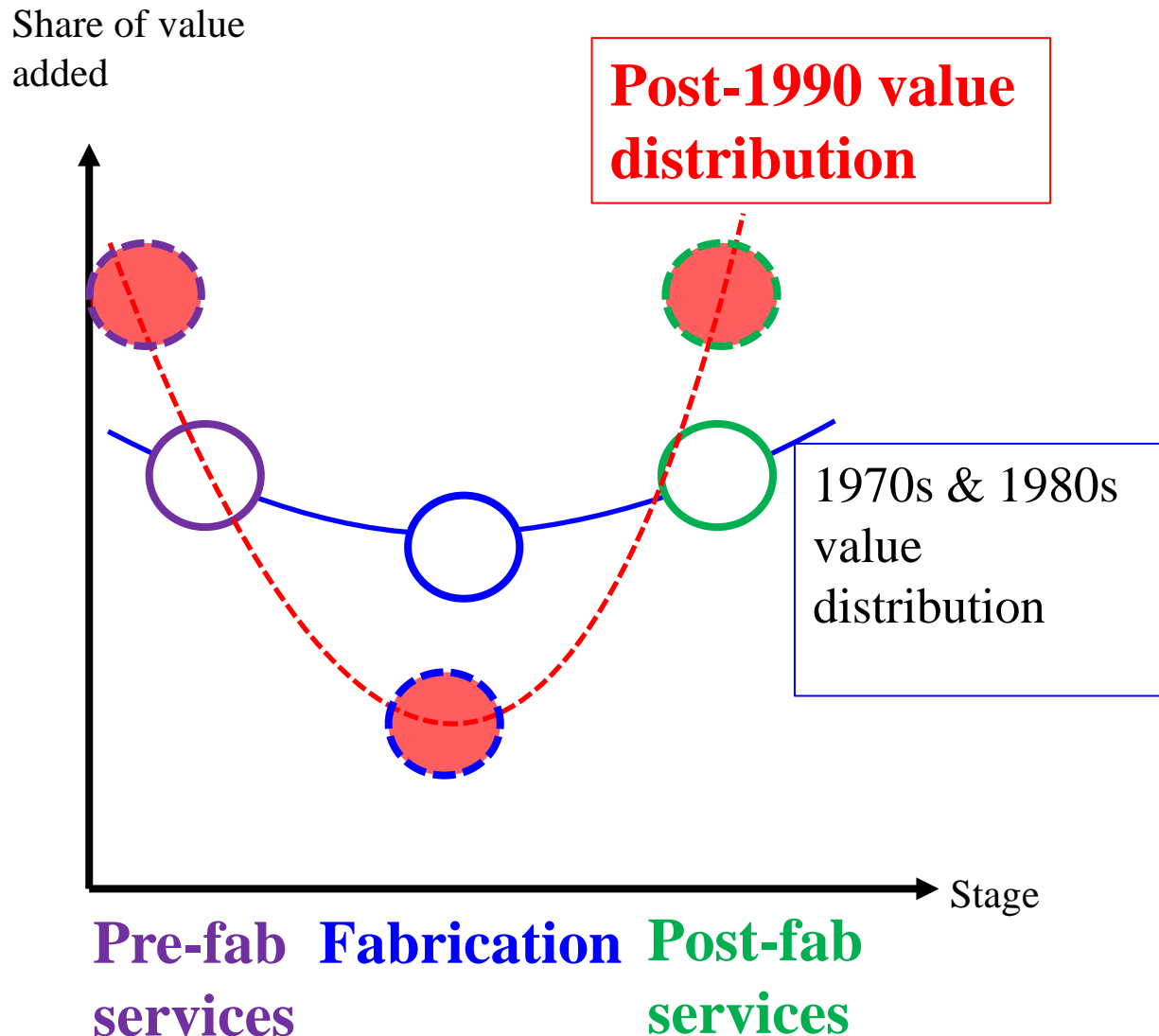
#3: Globalisation with “finer degree of resolution”

- Globalisation’s impact is:
- More sudden;
- More individual;
- More unpredictable;
- More uncontrollable.

This talk:

- Focus on 'smile curve' and 'service-ification' of manufacturing.
- Look to see if 2nd unbundling is associated with:
 - Total servicification in general;
 - Foreign sourcing of service value added.

'Smile curve': Distribution of value



Firm vs Economy-wide Smile Curve

- Problem: Economy-wide data is collected by sector, not by value chain stage.
 - One firm's downstream is another's upstream.
- Economy-wide 'Smile curve':
- We focus on sectoral value-added from:
 - Primary sectors;
 - Manufacturing sectors
 - Service sectors.
- Focus on exports rather than production.

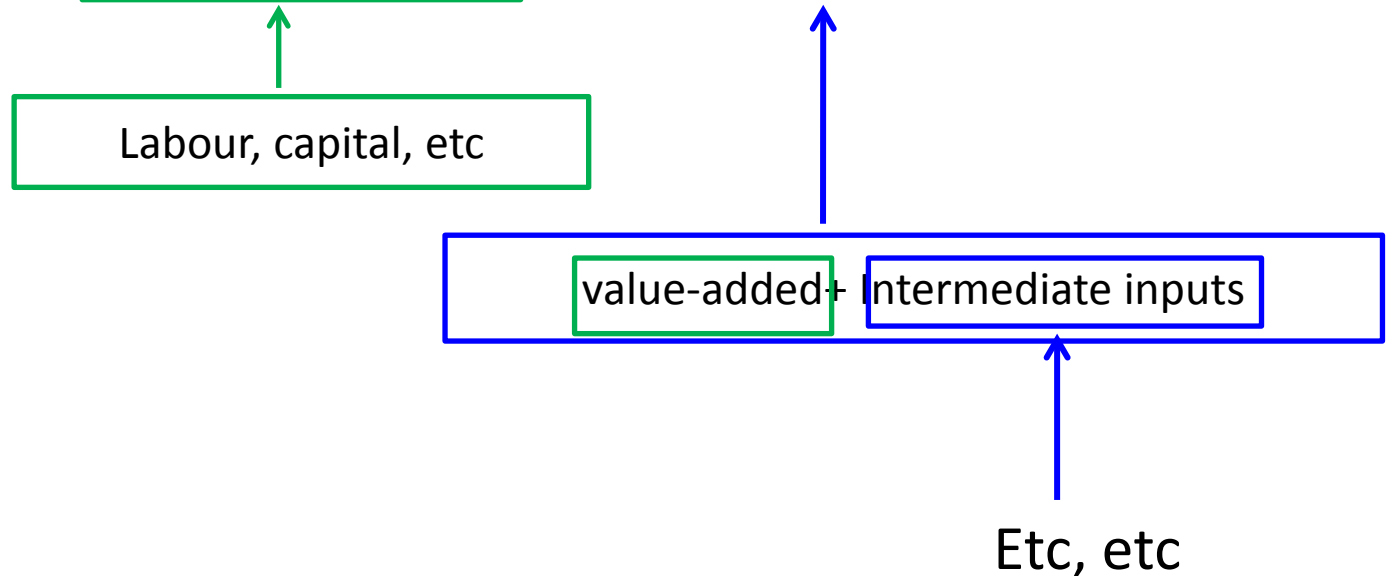
International dimension of Smile Curve

- Sub-theme of ‘smile curve’ writings is:
 - Fabrication stages go to developing nation factories;
 - Pre- & Post-fabrication stages go to developed-nation cities.
- We’ll look at an aspect of this in the empirics.

Background: Value-added trade computation

Export value =

the cost of value-added + intermediate inputs.



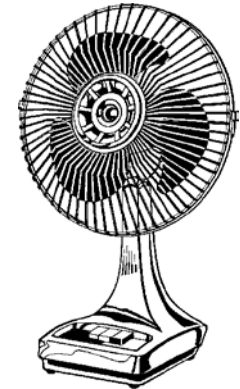
Iterate to converge (or matrix algebra)

Input sectors:

Output sector:

Manufactures

Electric fan



Input sectors:

Primary:

Copper, petroleum, etc

Value
added

Manufactures

Pressing, welding, etc

Value
added

Services

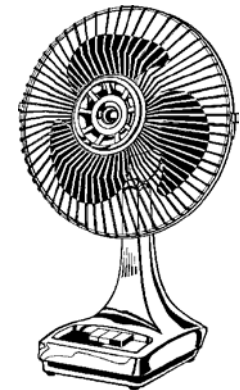
Design, retail, transport, etc

Value
added

Output sector:

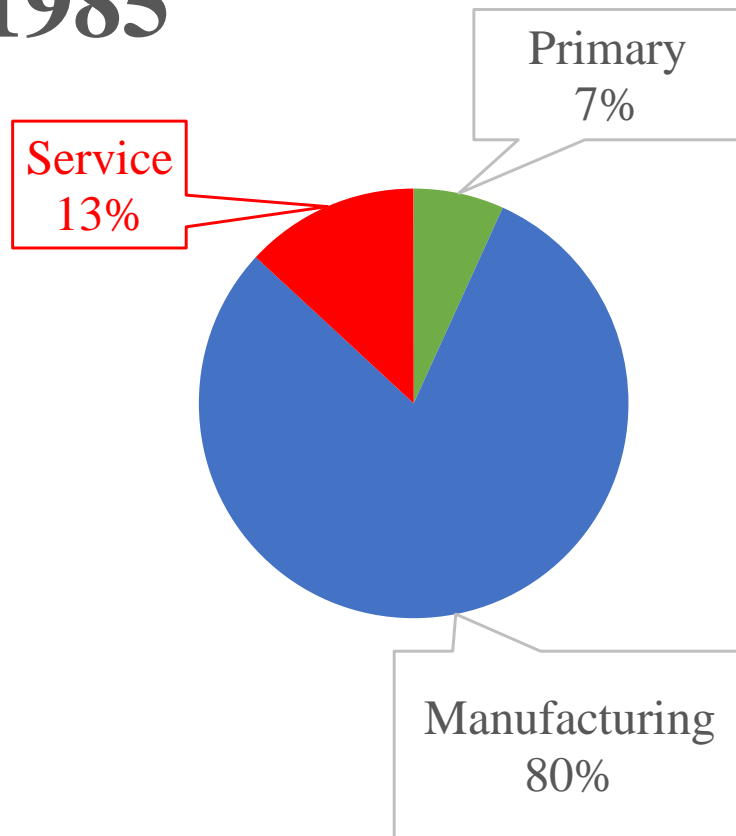
Manufactures

Electric fan

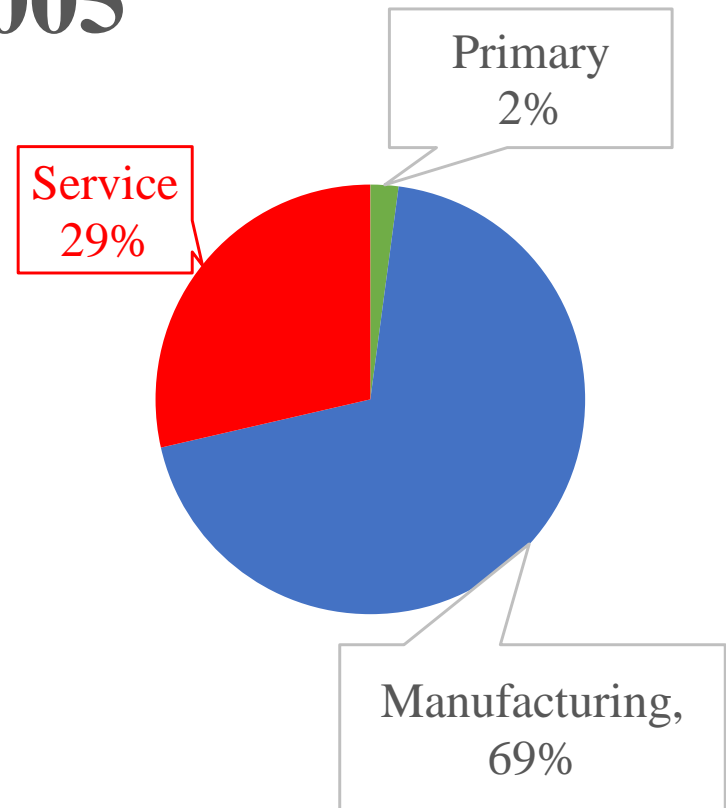


Example: Japanese exports, value added source sectors

1985

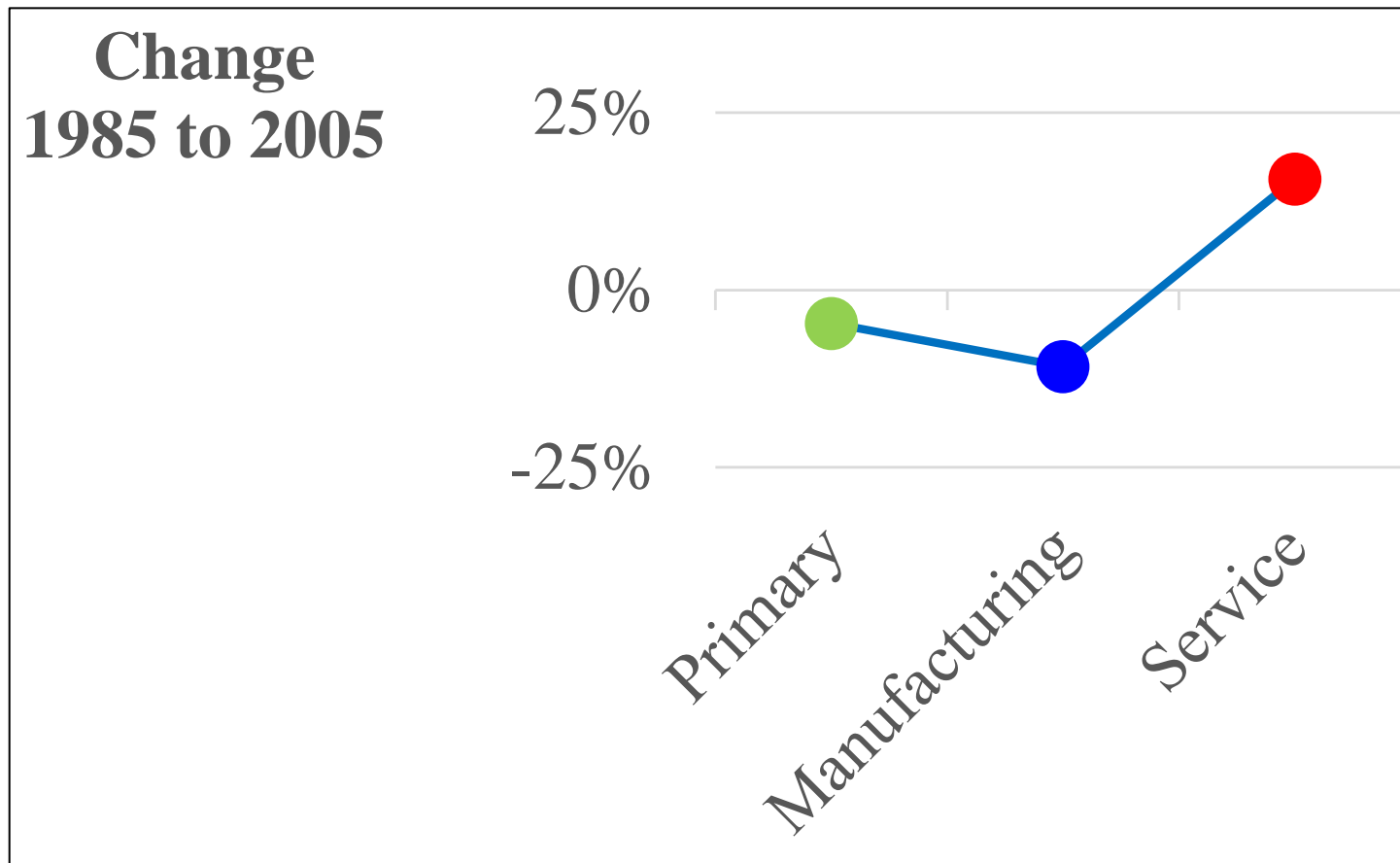


2005

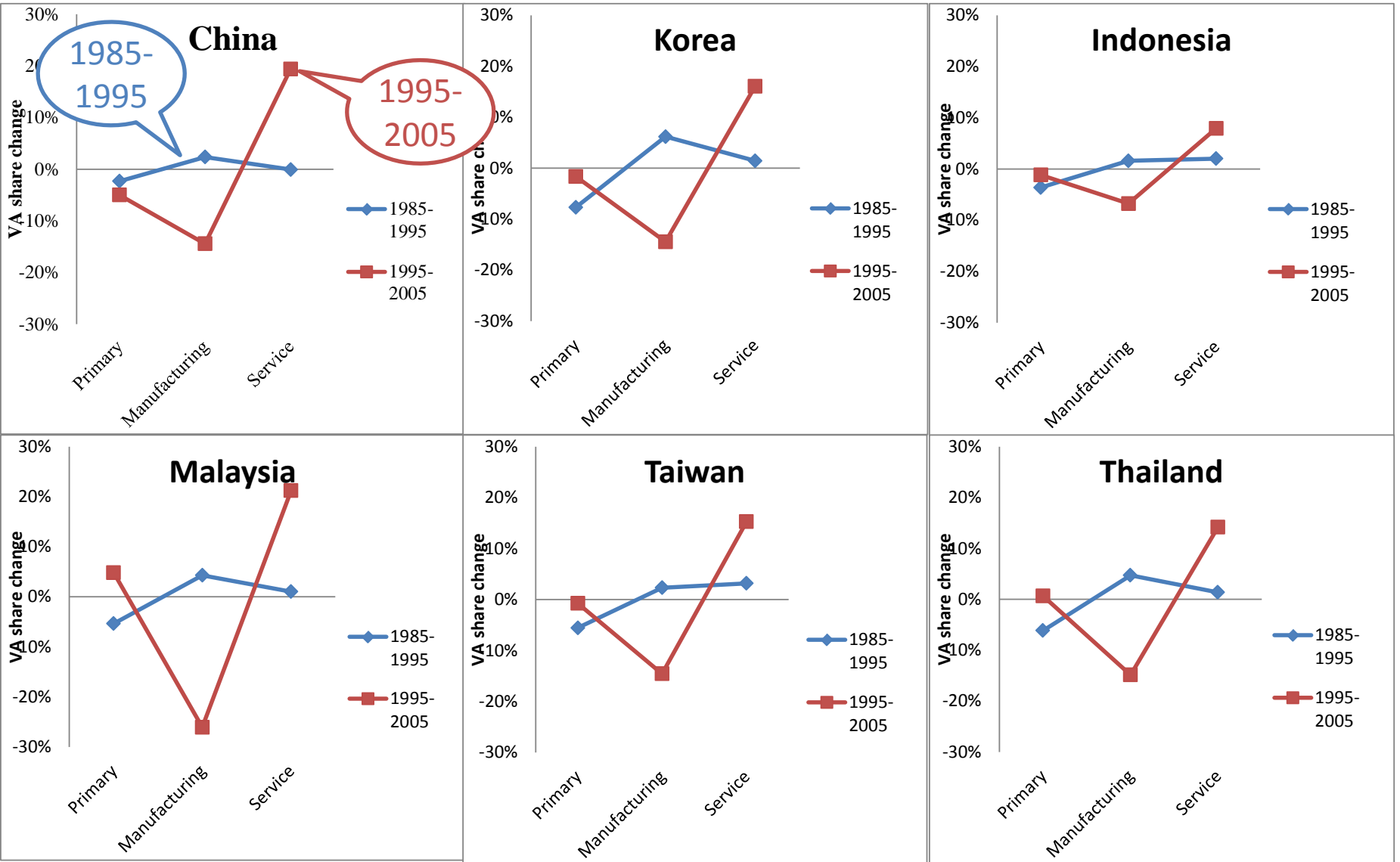


Source: Source: Richard Baldwin, Rikard Forslid and Tadashi Ito, "Unveiling the evolving sources of value added in exports", February 2015

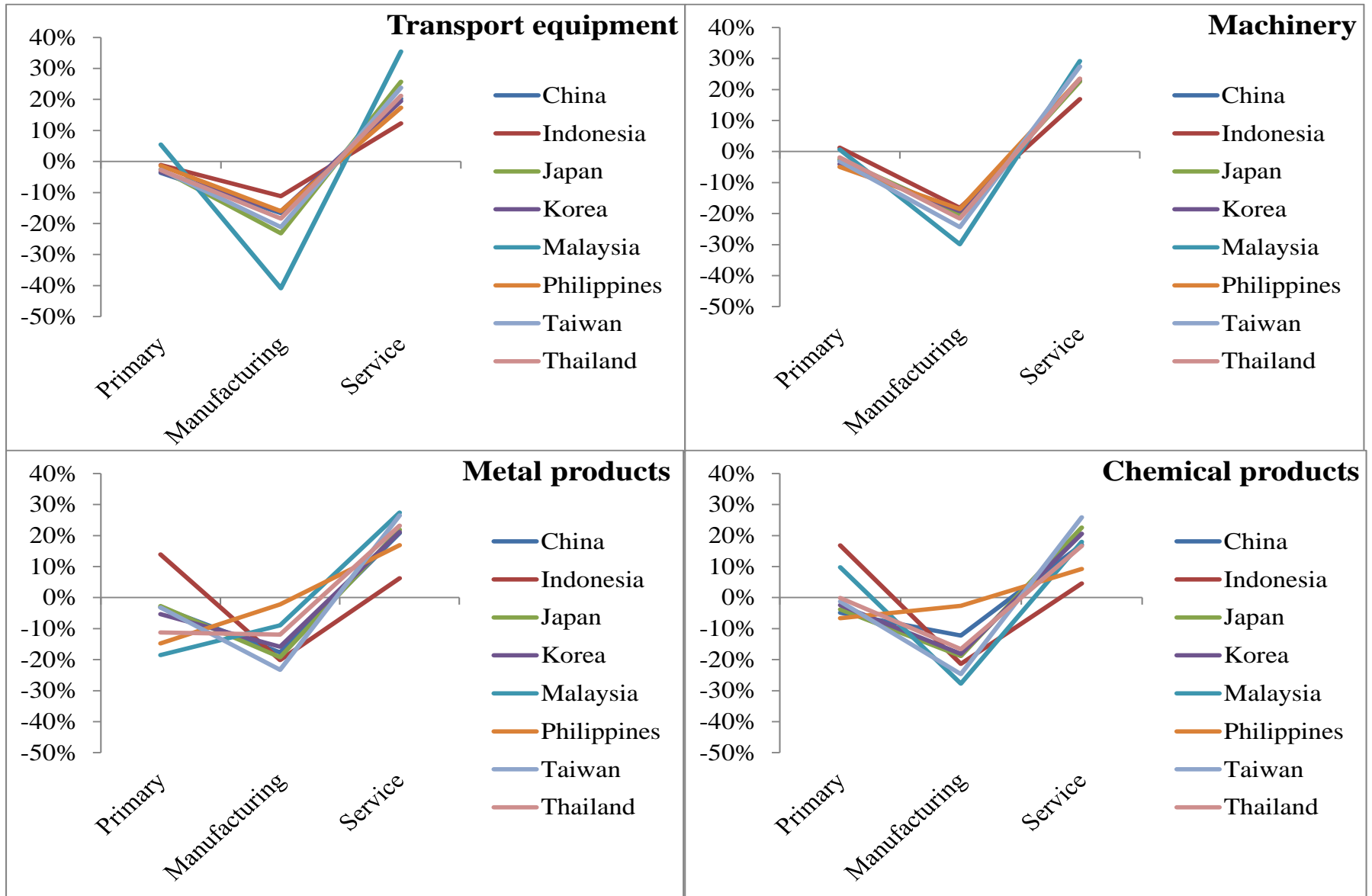
Smile curve: Look at the change in source sector value added



Servic-ifcaiton 1995



Smile curves by industry and nation



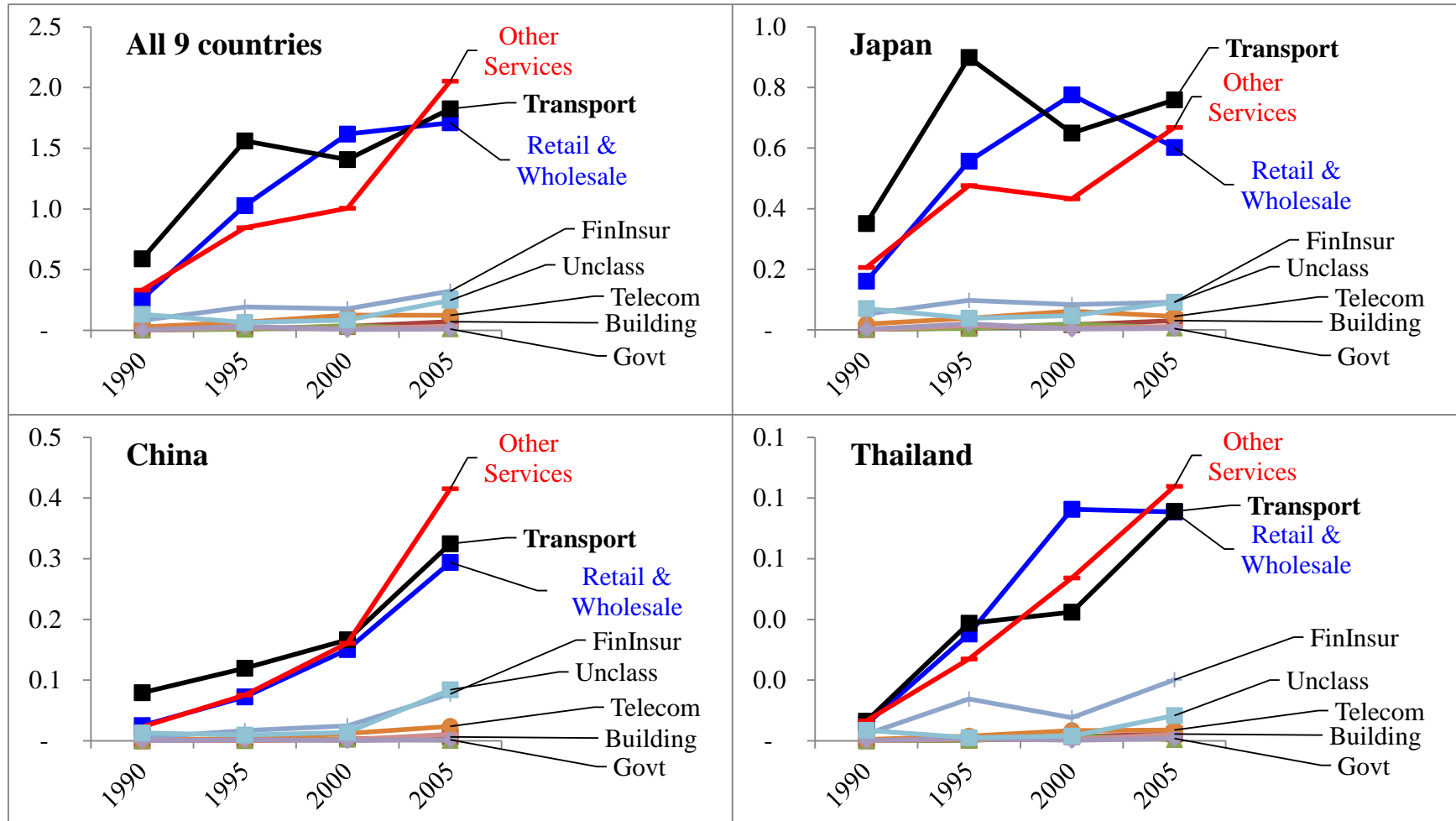
Why service-ification?

- **Reclassification with outsource.**
 - **Outsource marketing.**
- **More services embedded in the good itself.**
 - **More design & technology, e.g. Uniqlo ‘heat tech’; more software in autos, ovens, etc.**
- **More services in production process.**
 - **Domestic & foreign outsourcing -> more coordination and transportation services.**
- **Commoditization of fabrication.**
 - **Hi-tech + low wages radically reduces cost of fabrication, but not service inputs.**

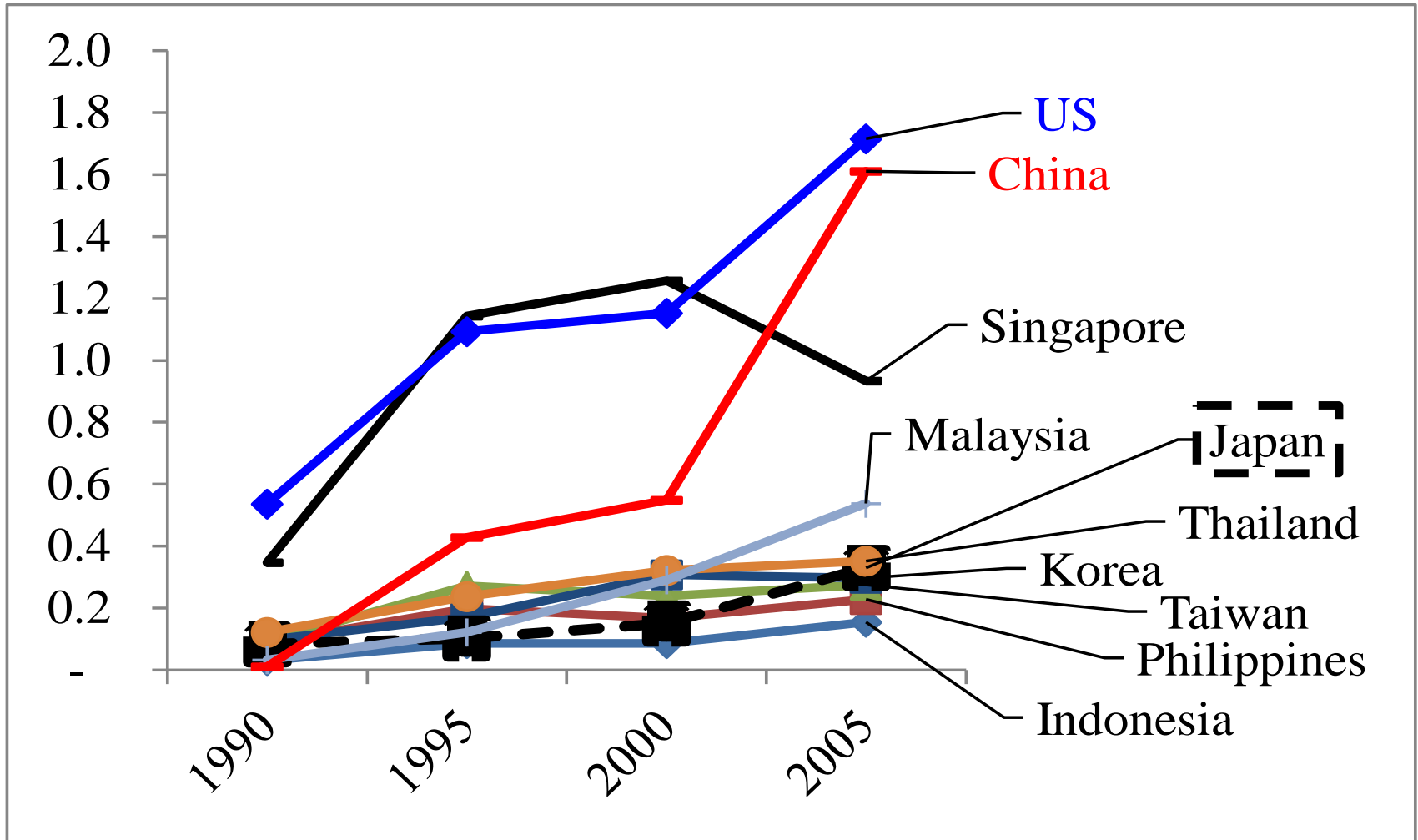
EVIDENCE SUGGESTING AN EMPIRICAL STRATEGY

By sector, by source nation

Which service sectors are most important in providing export value added?



Which Asian service suppliers are most important in servicification?



Empirical analysis

- What determines servicification? Focus on 3 possible determinants:
 1. Reclassification.
 2. Changes in the nature of production, especially GVC production.
 3. Changes in the nature of goods.

Result so far are only partial.

GVC participation & servicification

Empirical measures of GVC participation:

- 1) 'Importing to produce' (I2P), i.e. share of imports used as intermediate goods.
- 2) 'Importing to export' (I2E), i.e. share of imports used in goods the importing nation exports.
- 3) Related to I2E on the 'selling side' is 'Exporting to re-export' (E2R), i.e. Japan's exports of parts to China that are embodied in China's exports.

Total servicification

$$\Delta \text{Service VA share}_{ijt} = \beta_0 + \beta_1 \Delta \text{GVC Partic}_{ijt} \\ + \text{fixed effects} + \varepsilon_{ijt}$$

- Looking for a gross correlation between servicification and GVC participation
- OLS, diff-in-diff approach.

Total
servicification
with broadest
measure of
GVC
participation:
I2P

	(1)	(2)	(3)
	Change in Total Service Value- added share	Change in Total Service Value- added share	Change in Total Service Value- added share
Change in Import-to- Produce	-0.00656 (-0.11)	-0.00468 (-0.03)	0.0111 (0.17)
Change in Import-to- Produce* developing countries		-0.00205 (-0.01)	
I2P*Machinery			-0.255 (-0.79)
I2P*Motor vehicles			-0.755 (-1.94)
I2P*-Electronics			0.0313 (0.12)
I2P*Plastic products			0.00350 (0.01)
I2P*Metal products			0.0908 (0.26)
I2P*Wearing apparel			0.0675 (0.19)
Observations	1124	1124	1124
R ²	0.080	0.080	0.084

Nothing is
significant

Other GVC measures: Don't work

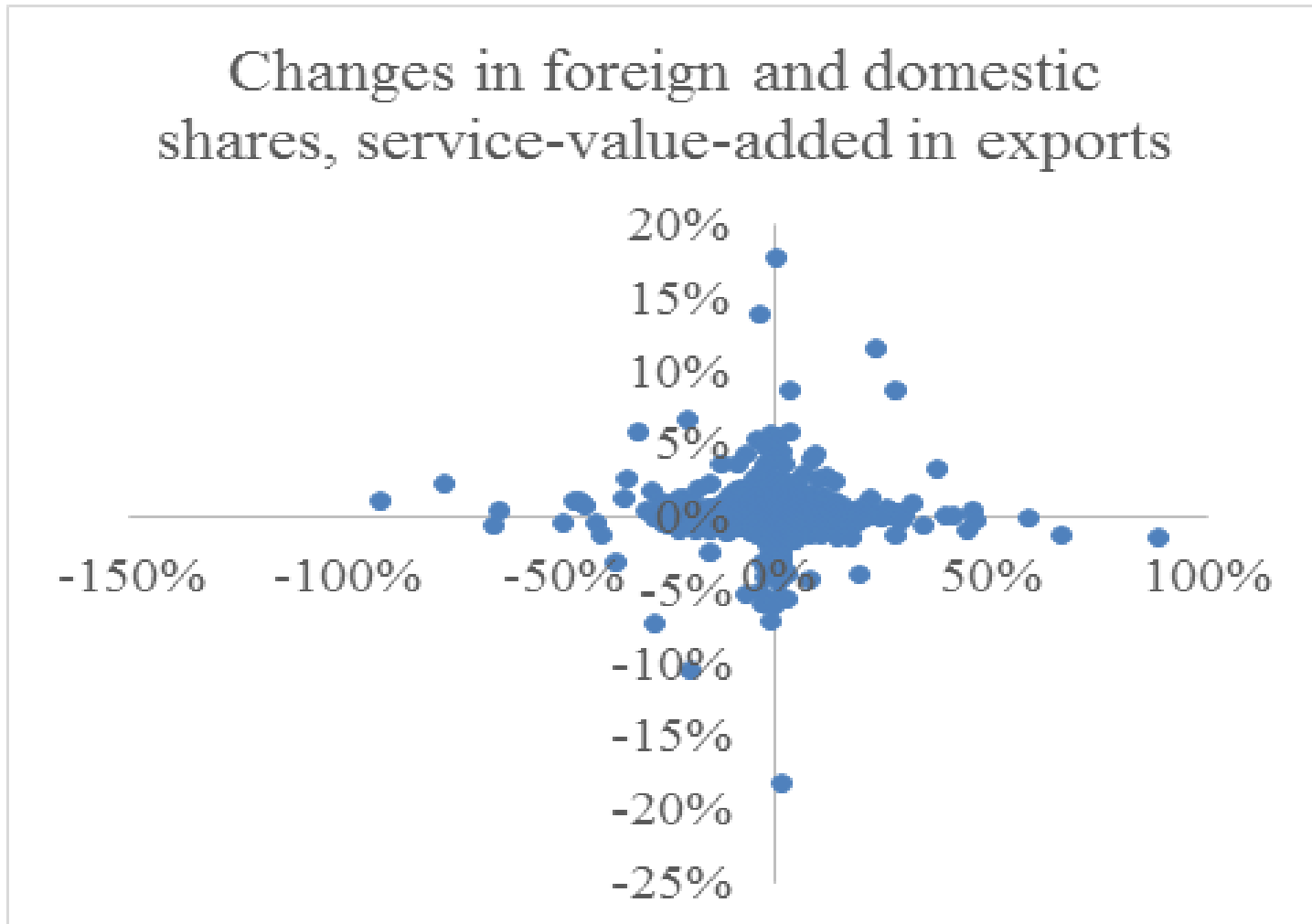
- Total servicification with narrower measures of GVC participation:
 - I2E (importing to export)
 - E2R (exporting to re-export).
- Signs are mostly negative (wrong sign for simple theory).
- Maybe more elaborate mechanism explains this (e.g. selection with aggregates).
- But overall, best to admit 'defeat' on 'total servicification'
 - Can't separate out GVC participation for other effects.
 - Would need more data on things that measure reclassification, etc.

Foreign servicification results

- Closer to the international smile curve interpretation is ‘foreign servicification’.
 - Hypothesis: GVC participation moves fabrication to developing nations and pre- and post-fabrication services to developed nations.

Important fact:

Lack of correlation between foreign and domestic
servicification



GVCs boost foreign service sourcing, especially in developing nations (smile-like result)

Use domestic
servicification as a
control

Change in Foreign service value-added share	Column 1	Column 2	Column 3	Column 4
Change in Import-to-Produce	0.0206*	0.0206*	-0.0278	0.0105
	(2.45)	(2.44)	(-1.19)	(1.16)
Change in Import-to-Produce*developing countries			0.0528*	
			2.23	
Change in Domestic Service Value-added share		-0.000822	-0.000723	-0.000384
		(-0.19)	(-0.16)	(-0.09)
I2P*Machinery				0.0182
				(0.4)
I2P*Motor vehicles				0.0116
				(0.21)
I2P*Electronics				-0.00493
				(-0.14)
I2P*Plastic products				0.123***
				(3.42)
I2P*Metal products				0.208***
				(4.17)
I2P*Wearing apparel				-0.00761
				(-0.15)
Observations	1124	1124	1124	1124
R^2	0.046	0.046	0.05	0.071

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Other GVC measures

- Importing to export doesn't raise foreign service sourcing.
- Exporting to re-export does.
- No difference developed and developing.

	Column 1	Column 2
Change in GVC I2E	-0.00041 (-0.50)	0.00116 -0.23
I2EChange*developing countries		-0.00162 (-0.32)
Change in GVC E2R	0.0917*** -16.71	0.0705*** -4.81
E2RChange*developing countries		0.0247 -1.57
Change in Domestic Service Value-added share	0.00672 -1.69	0.00702 -1.76
Observations	1124	1124
R ²	0.241	0.242

Policy response

- Fabrication workers in Japan are competing with robots at home & China abroad.
 - Never again have abundant jobs for low-education workers.
 - “Good” manufacturing jobs will be in services, not fabrication.
- Excellent services: New source of comparative advantage in manufacturing.
- Service excellence & diversity in cities:
 - Cities as 21st century industrial districts.

Cities are 21st century factories

- Factories were a major source of base jobs in 20th century.
- Traded services are & likely to be largest source of base jobs going forward.
- Skilled workers meet, produce and innovate mostly in cities.
- ERGO: cities are factories of the 21st century.
 - “Cities = Industrial parks” is a more precise analogy.
- ERGO: Urban policy is part of ‘industrial policy’.

Policy implications

- Should change the way we think about trade policy, development and job creation.
- But need to understand analytic underpinnings of our thinking.

Trade policy

- On trade policy, need to address trade in service barriers (as well as goods barriers)
- There will be a positive feedback effect between trade policies that facilitate the export of goods and the imports of services.
- For many nations, this means that opening up their markets to direct and embodied foreign services is key to making their manufactured goods competitive.

Jobs policy

- Pervasive servicification, measure job creation looking beyond their manufacturing sectors;
- Exports directly creates high-skill service-sector jobs.

Industrial policy

- 2UB globalisation:
 - North tech increasingly combines with South labour.
 - Nationally optimal policies must be more nuanced.
 - R&D subsidies, tax breaks, etc.
 - Consider ‘stickiness’ of economic activity.
- Manufacturing becomes comufacturing.
 - Good for high-skills, high-tech, capital abundant nations (like Japan).

Manufacturing without factory jobs

“Members of the workforce busy on the factory floor in the 1960s”



“A \$38 million GE investment turns a vacant US factory into a vibrant, high-tech manufacturing operation”



A \$38 million dollar GE investment turns vacant U.S. factory into vibrant, high-tech manufacturing operation.



END

- Thank you for listening.
- NL 2040