RIETI World KLEMS Symposium

"Growth Strategy after the World Financial Crisis"

2014 May 20, JP Tower & Conference, Tokyo

Evolving Spatial Economy of Asia-Pacific and the Growth Strategy

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1. Introduction: The Three Priority Viewpoints of RIETI

In the face of rapid globalization, technological changes, and decreasing and aging population,

i. how to incorporate the growth of the world economy?

ii. how to develop new growth areas?

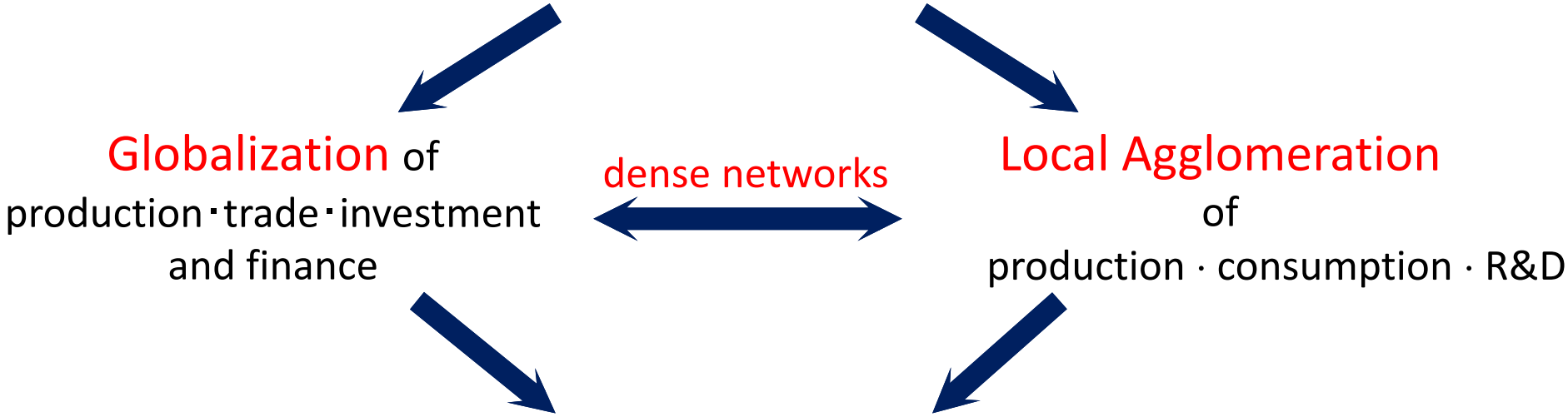
iii. how to create new economic and social systems for sustainable growth?

i · ii · iii → enhancing the productivity and vitality of the Japanese economy and society in the long-run

→ Supporting the "Third Arrow" of "Abenomics" in the long-run

2. The evolution of the global economy in the recent past: from the viewpoint of spatial economics

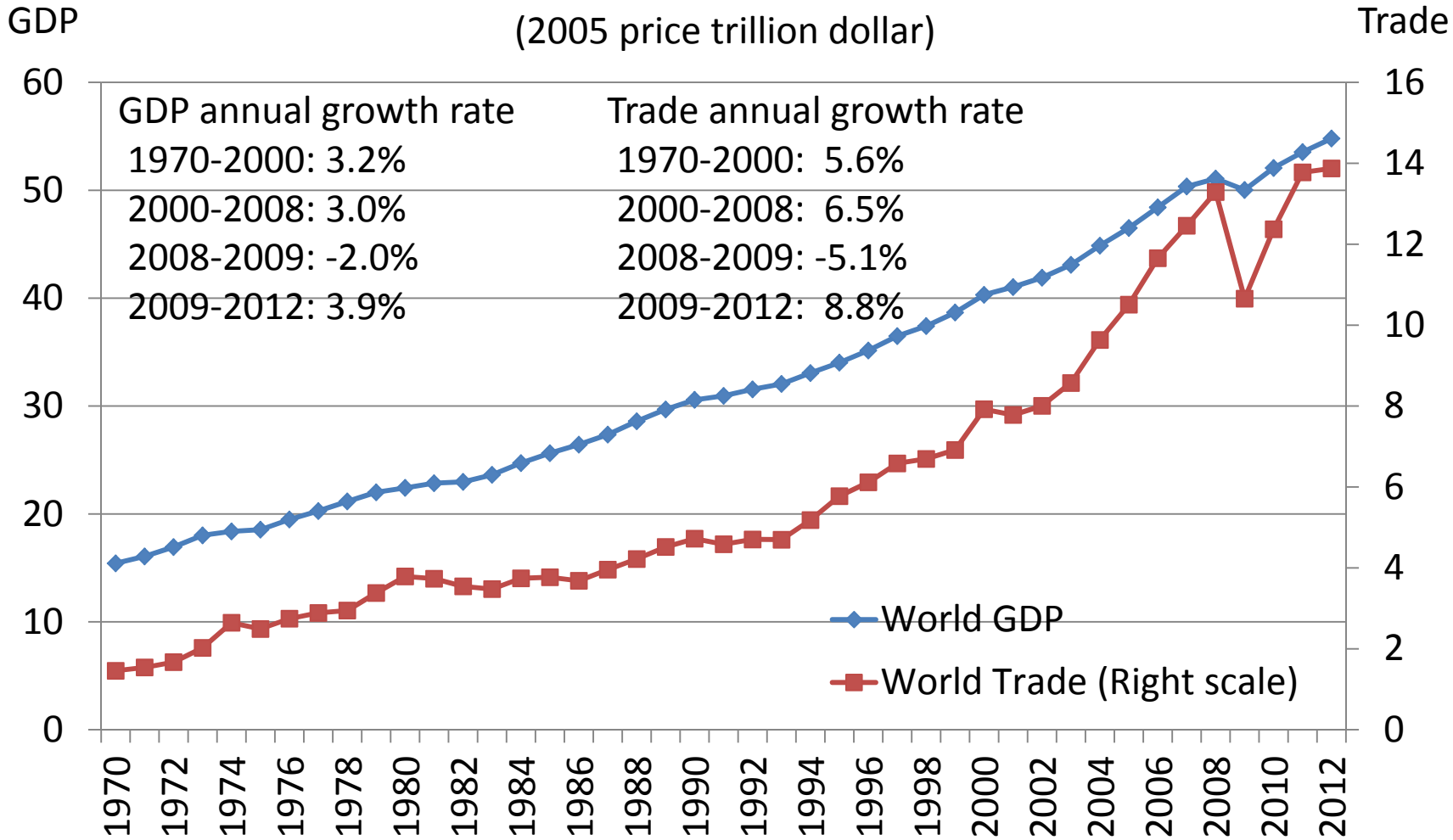
Rapid Progress in ICT and Transport Technology
together with the promotion of free trade through WTO・FTAs・EPAs



A Complex, Networked World

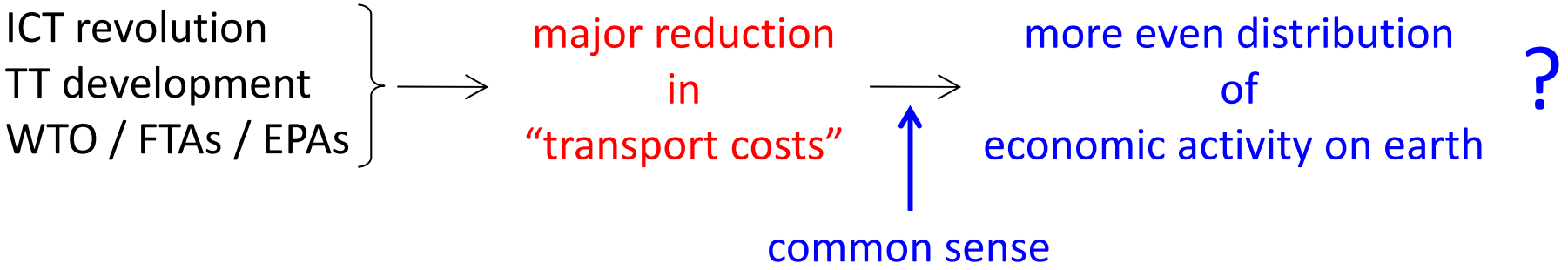
Efficient and growth-enhancing under normal conditions
but
Vulnerable to major local disasters / shocks

World GDP and Trade

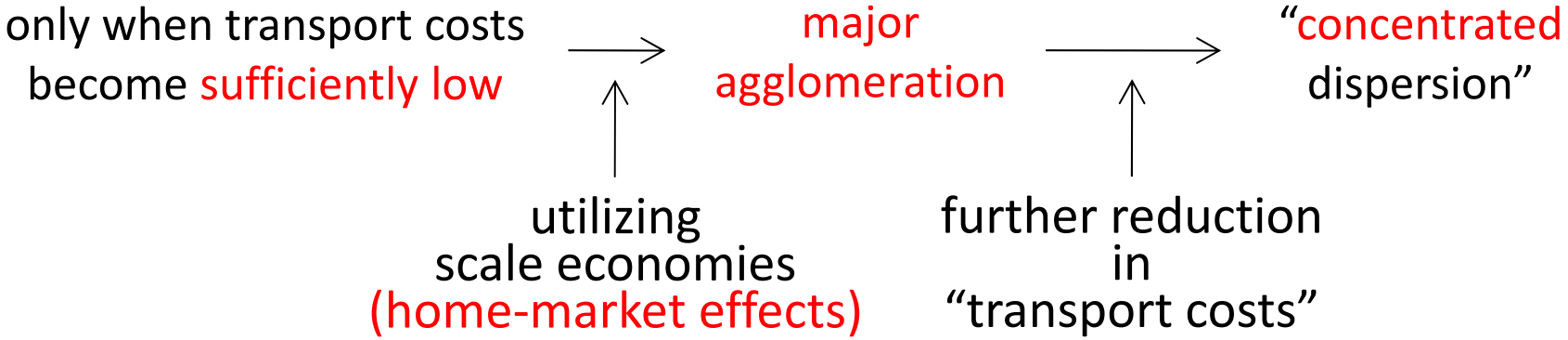


Source: UN National Accounts Statistics Database and WTO Time Series on International Trade

Impact of Decreasing "Transport Costs"



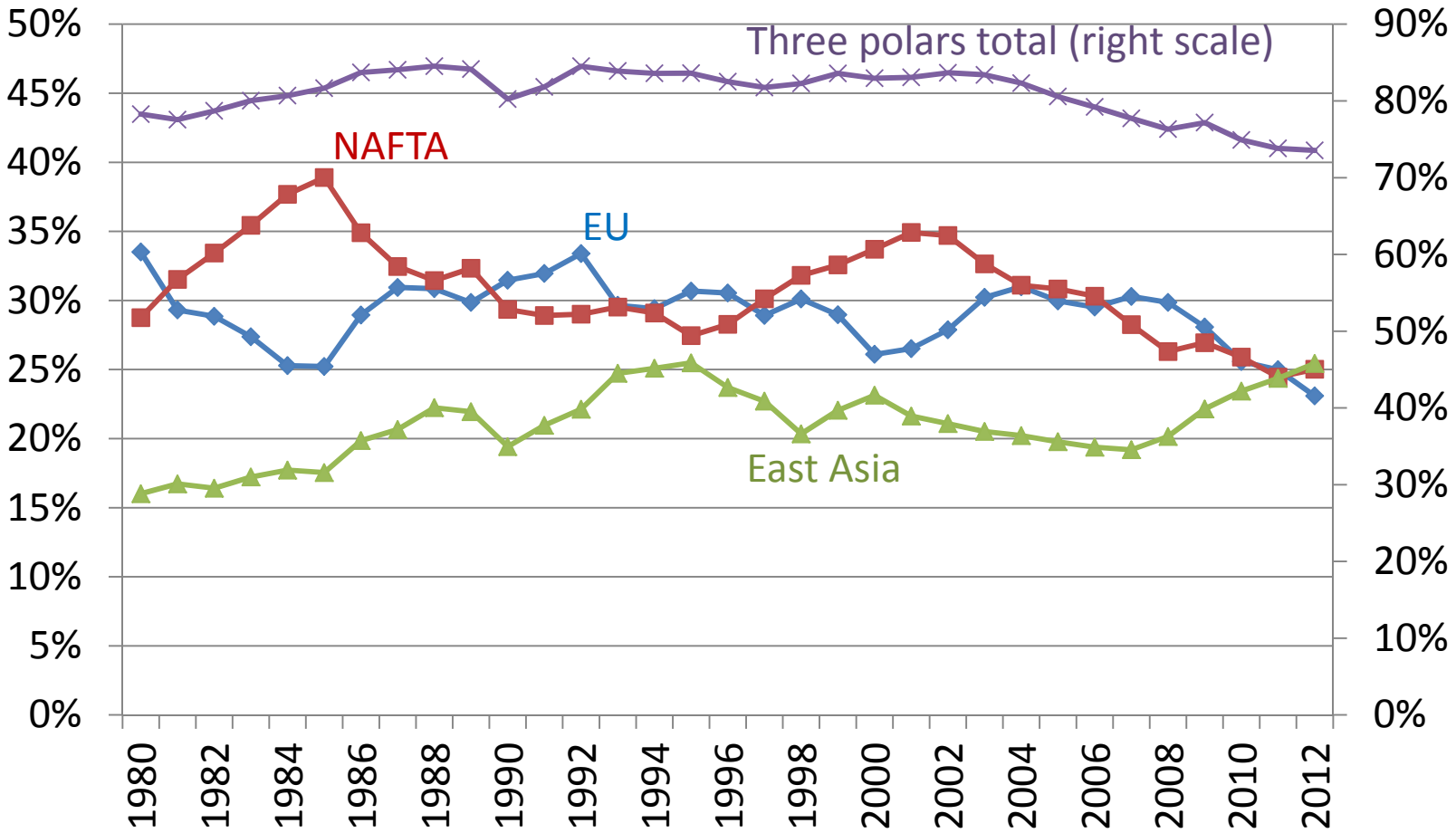
the prediction of spatial economic theory



Regions shine in the night.

Source: the Earth at night 2012, NASA Earth Observatory/NOAA NGDC (http://earthobservatory.nasa.gov/Features/NightLights/)

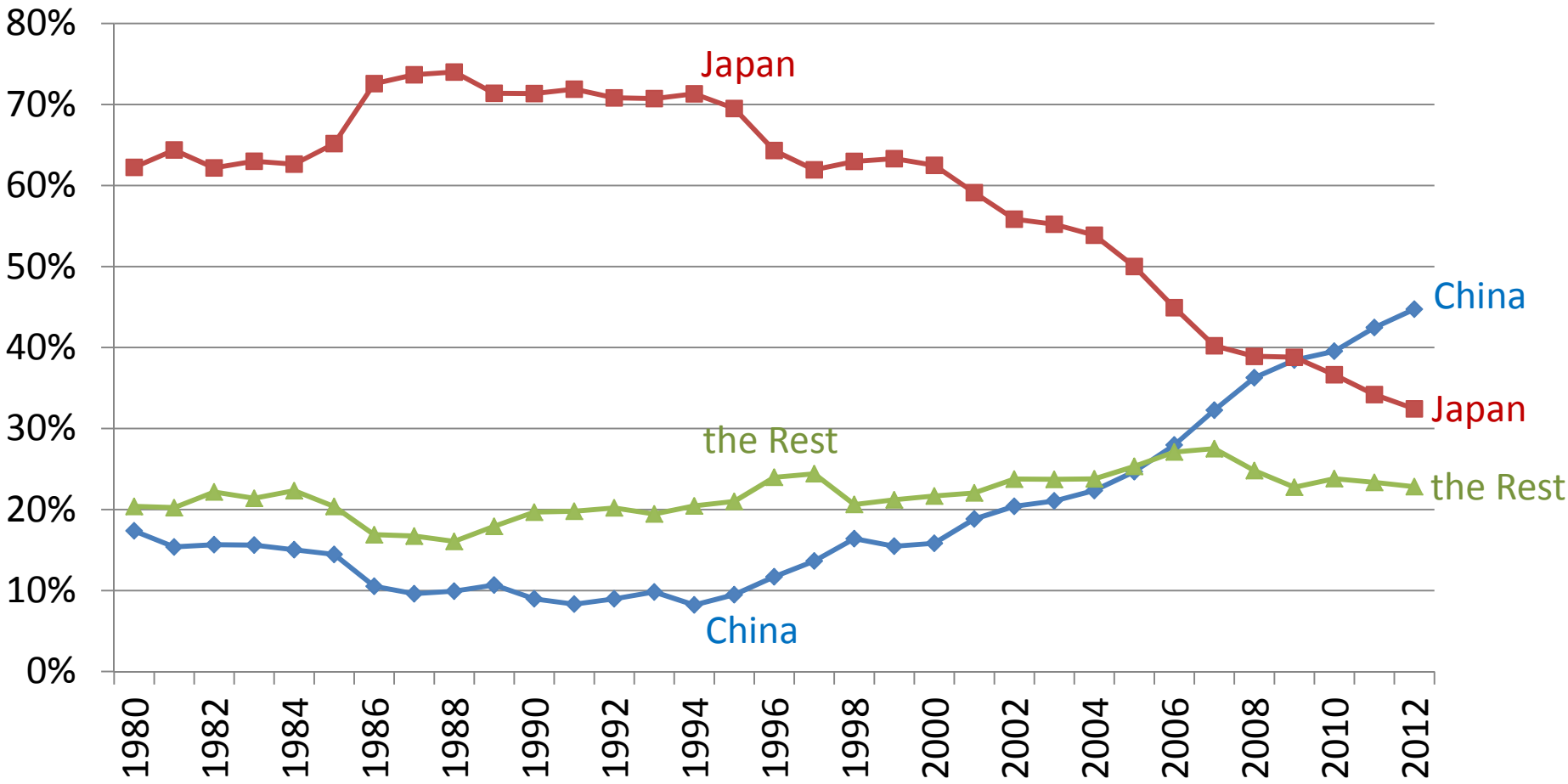
GDP shares in the world total: East Asia, EU, NAFTA



East Asia = ASEAN-10 plus China, South Korea, Japan, Taiwan and Hong Kong

Source: IMF World Economic Outlook database October 2013
By courtesy of Professor Nobuaki Hamaguchi

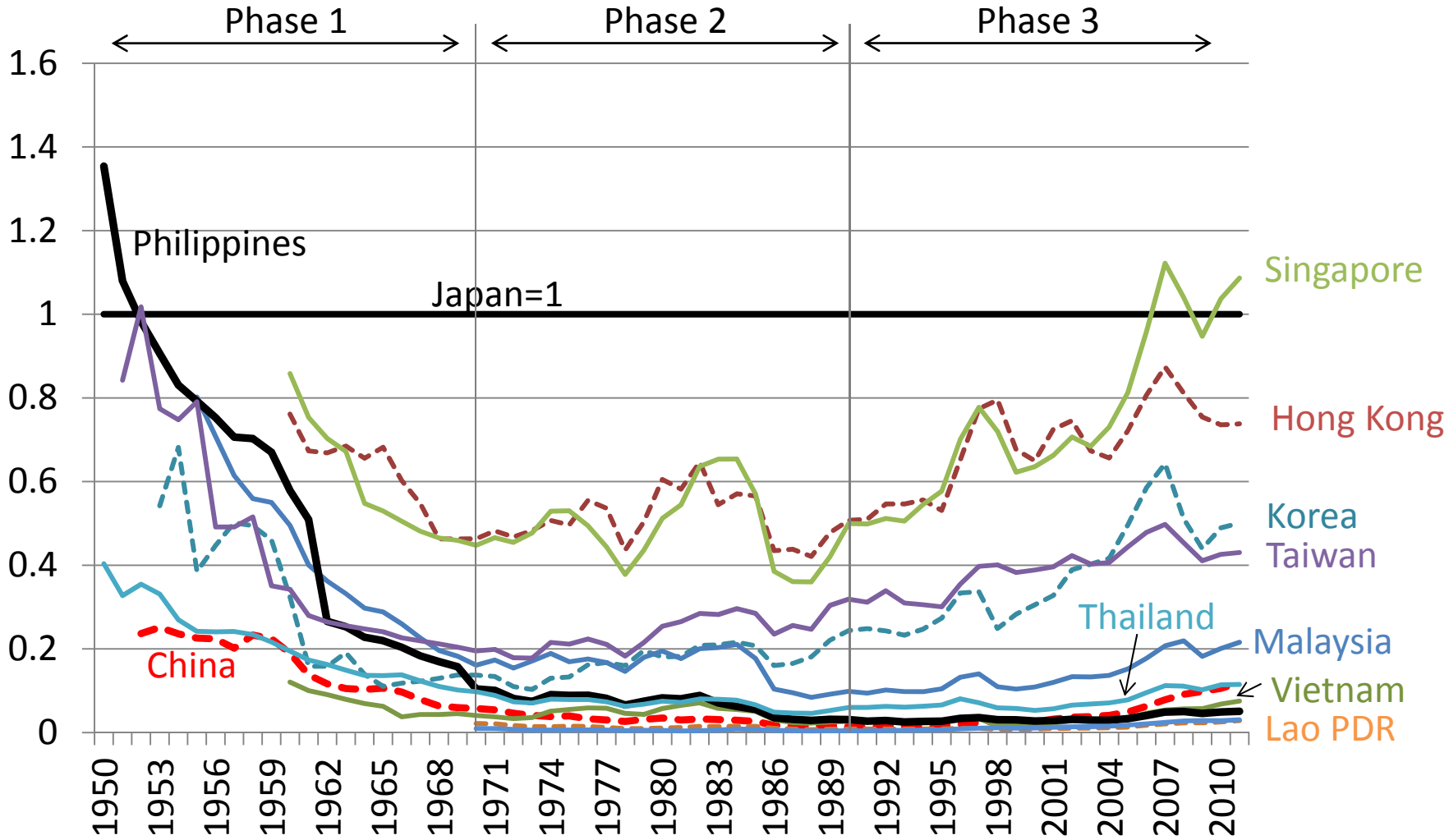
GDP shares within East Asia



Source: IMF World Economic Outlook database October 2013
By courtesy of Professor Nobuaki Hamaguchi

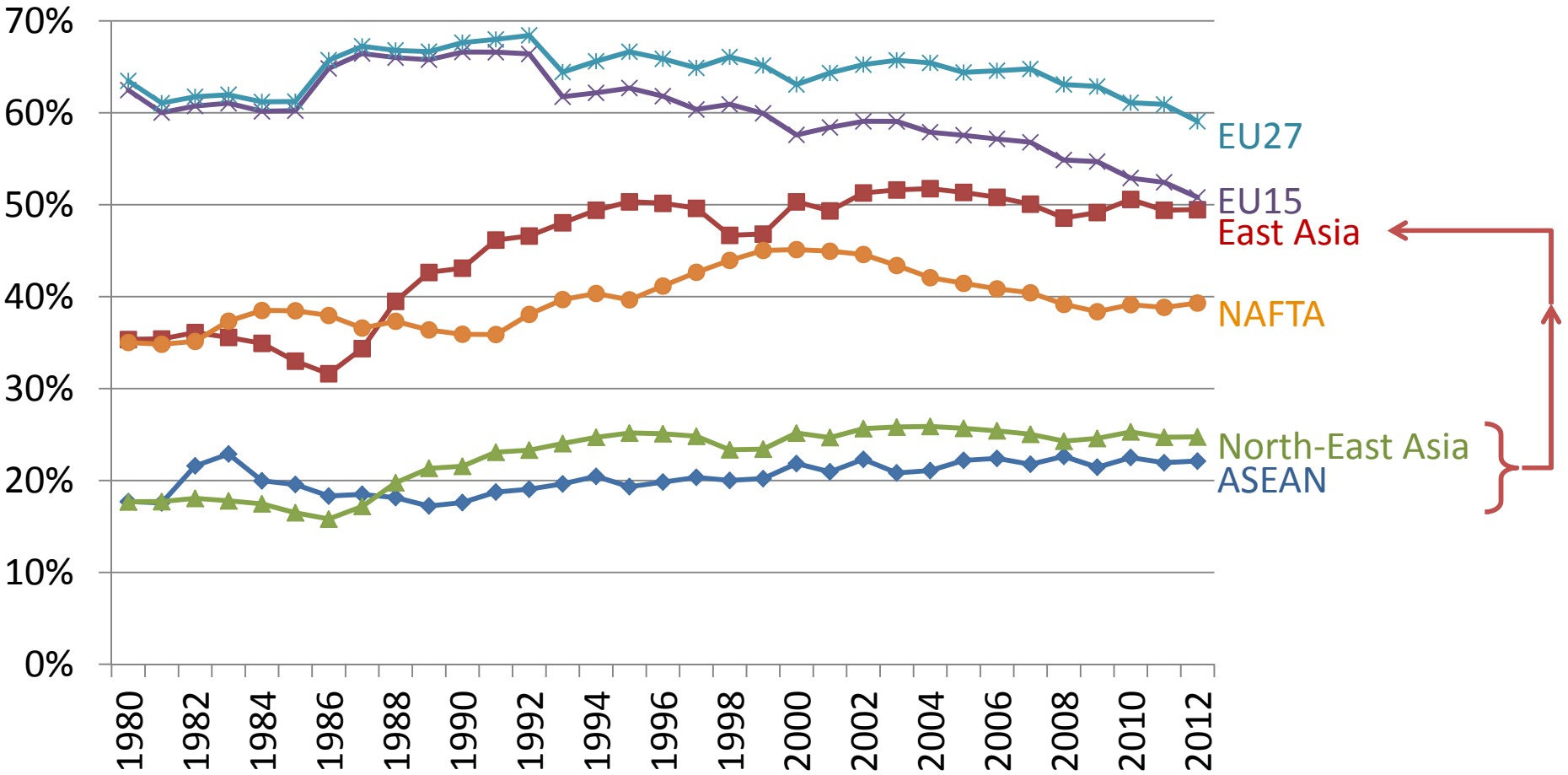
Income divergence / convergence in East Asia

GDP per capita at 2005 price US$, Japan=1



（Source）Penn World Table Version 8.0　By courtesy of Professor Nobuaki Hamaguchi

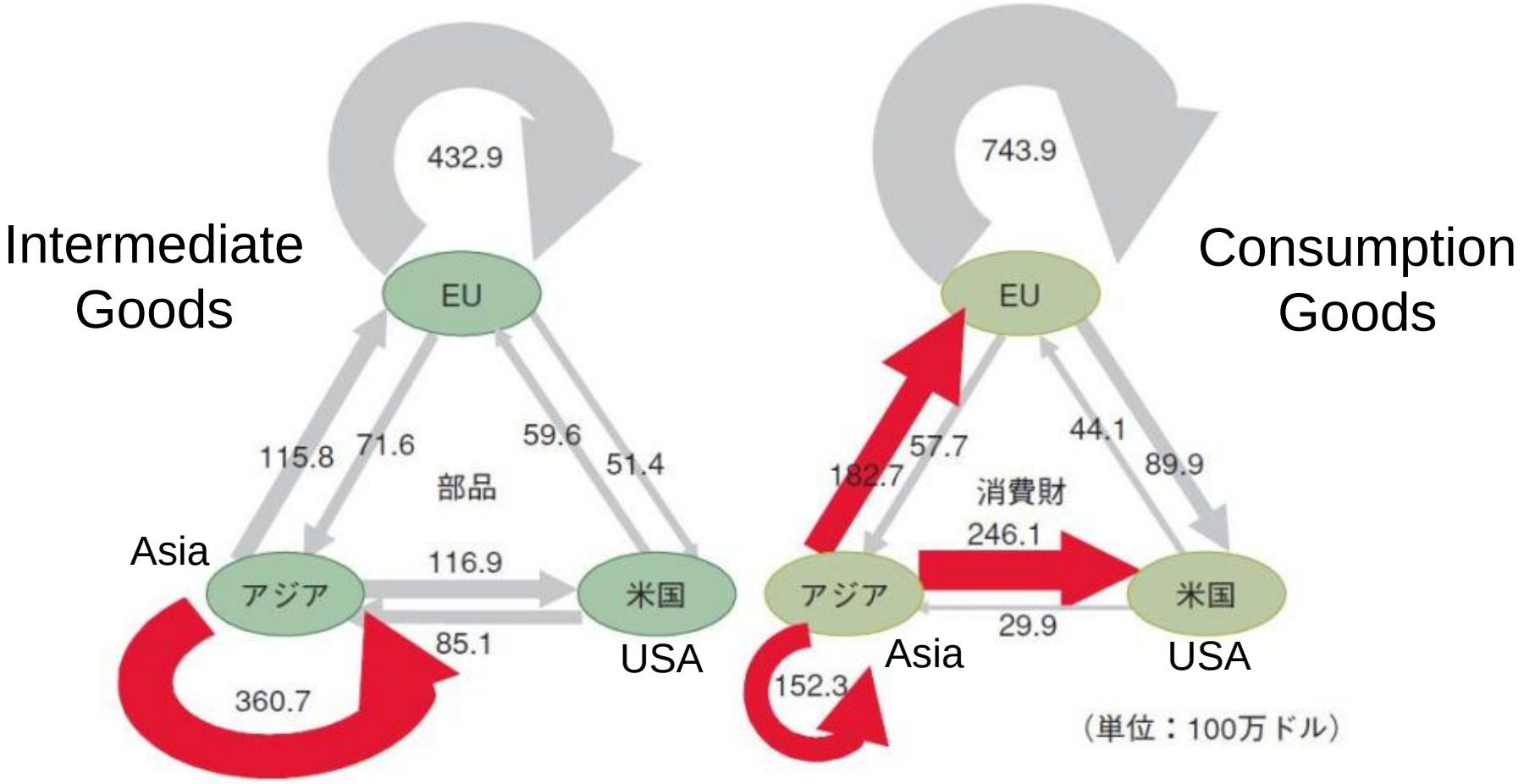
Share of intra-regional trade in each region



Source: RIETI-TID
By courtesy of Professor Nobuaki Hamaguchi

3. Is Asia still the World Factory?

International Trade Structure (2006)



Source: 2008 White Paper on International Economy and Trade

Trade between the US and East Asia

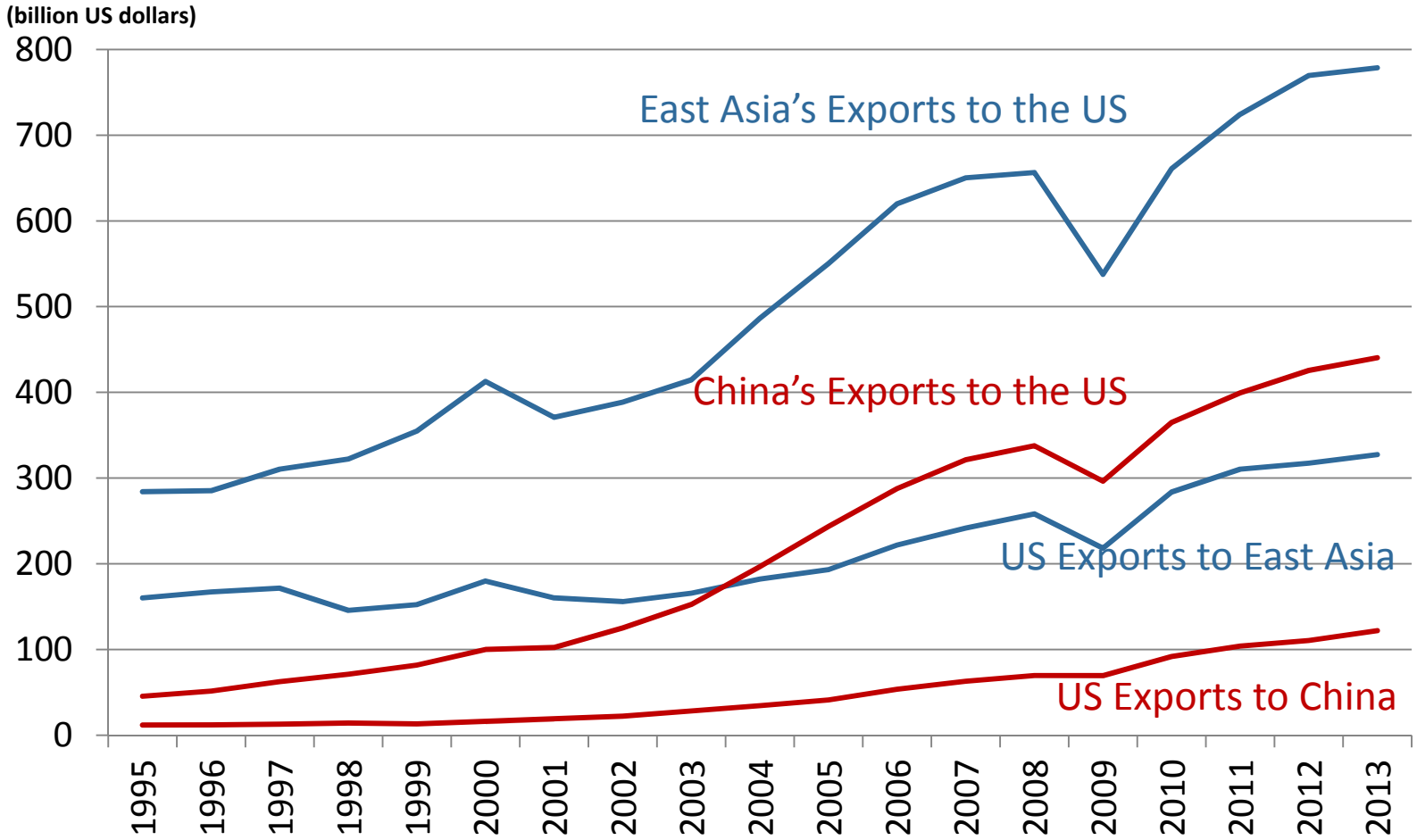


Figure 1. The Value of US Exports to China and East Asia and China's and East Asia's Exports to the US.
Source: US Census Bureau.
Note: East Asia includes China, Japan, Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan, and Thailand.
(Figure made by Dr. Willem Thorbecke at RIETI)

US Trade Deficit

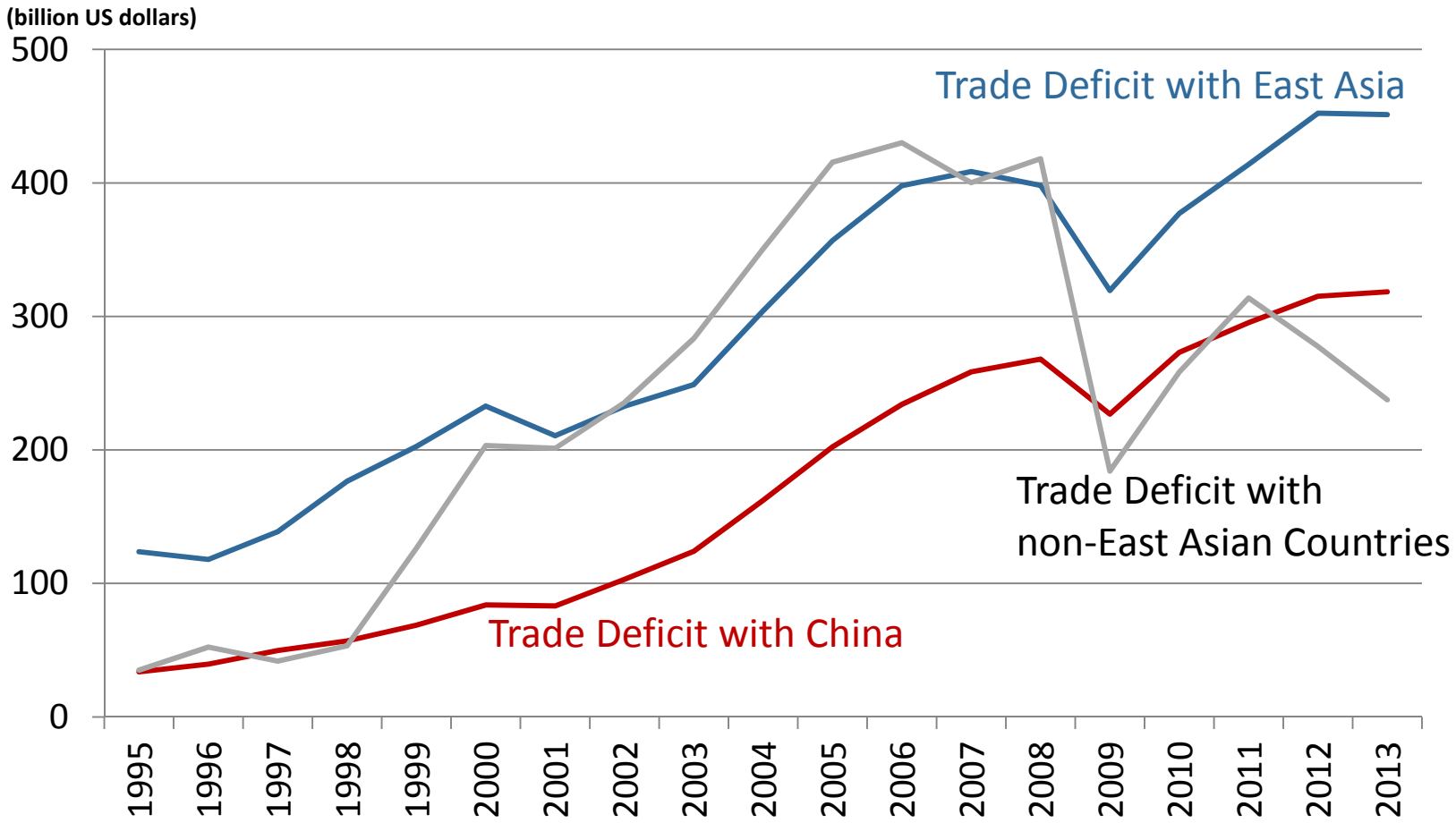
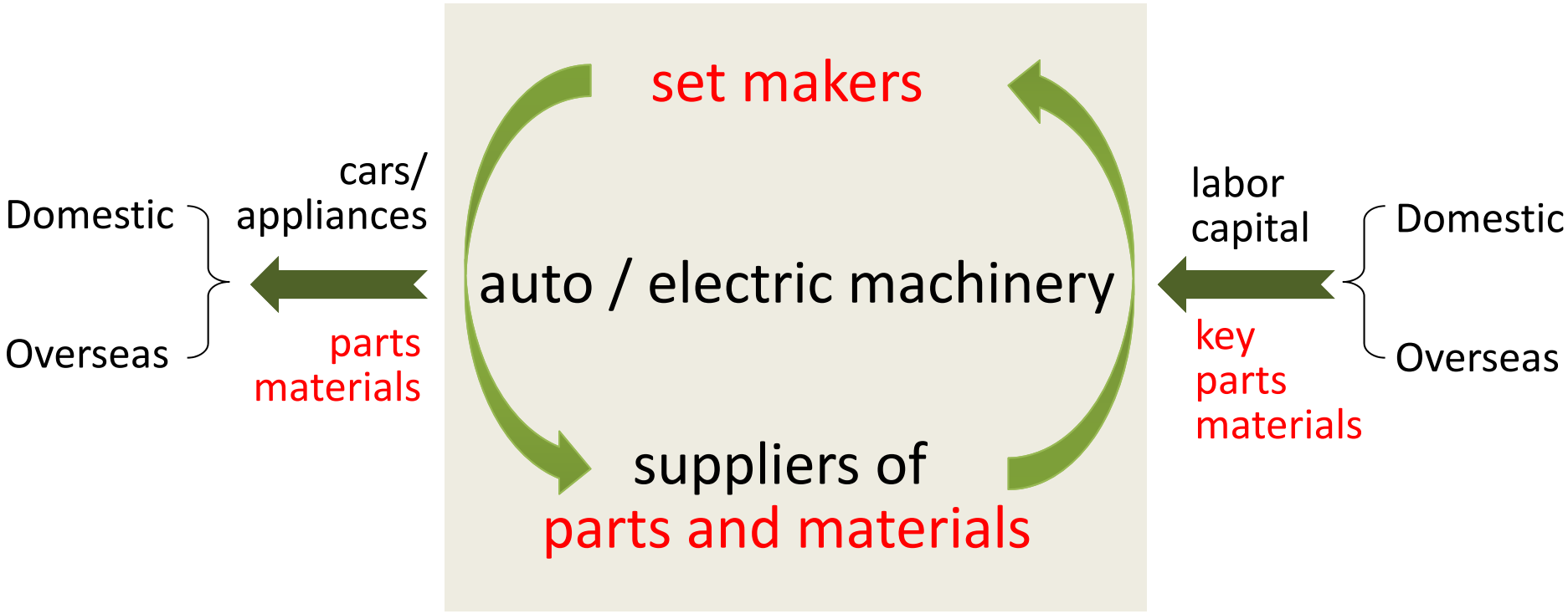


Figure 2. US Trade Deficit with China, East Asia, and non-East Asian Countries.
Source: US Census Bureau.
Note: East Asia includes China, Japan, Indonesia, Malaysia, the Philippines, Singapore, South Korea, Taiwan, and Thailand.
(Figure made by Dr. Willem Thorbecke at RIETI)

East Asia today: the World Factory based on supply chain networks centered around dozens of major cities and industrial agglomerations

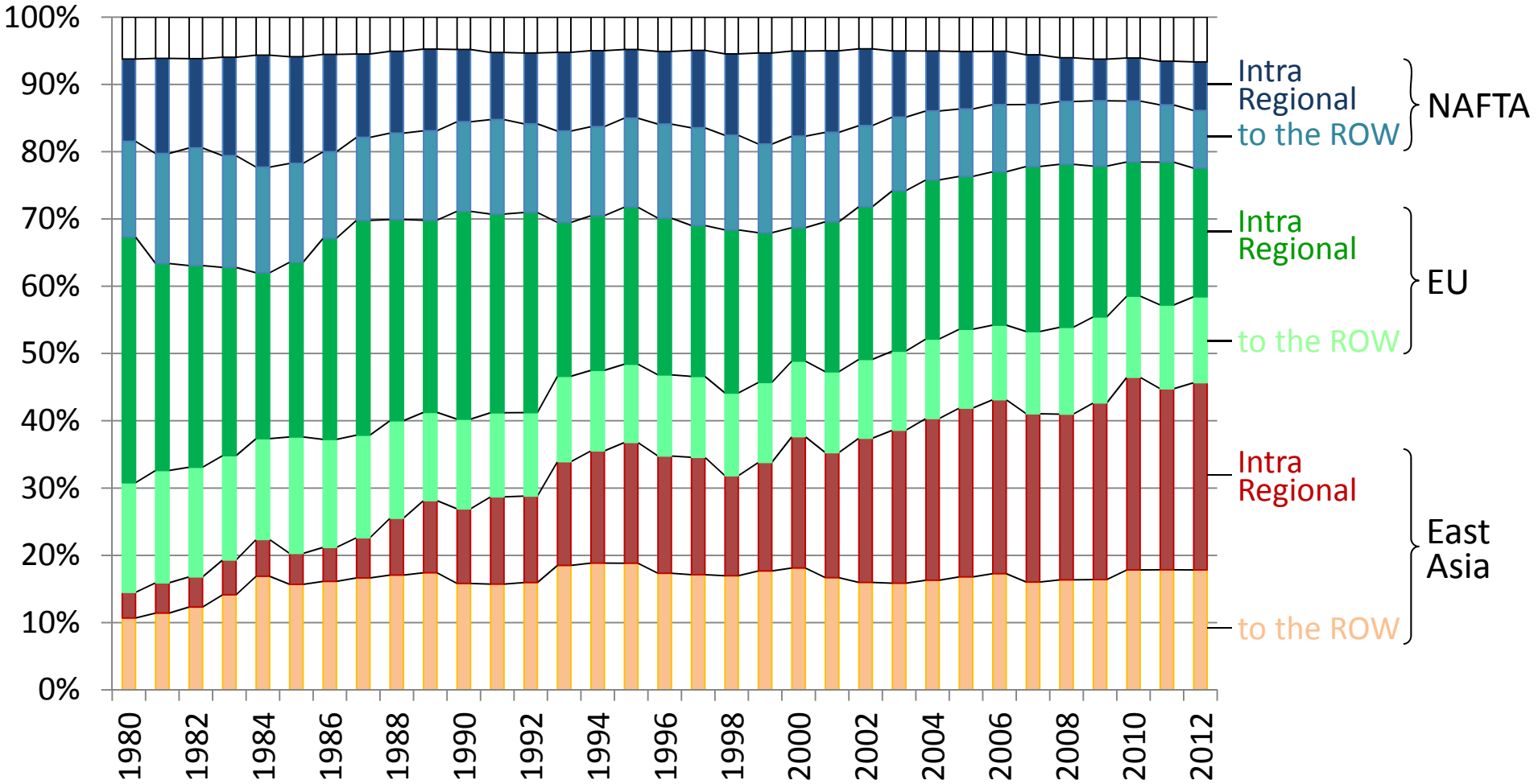
Agglomeration through snowball effects

Example: auto/electric machinery industry



Key factors for agglomeration: scale economies and low transport-cost

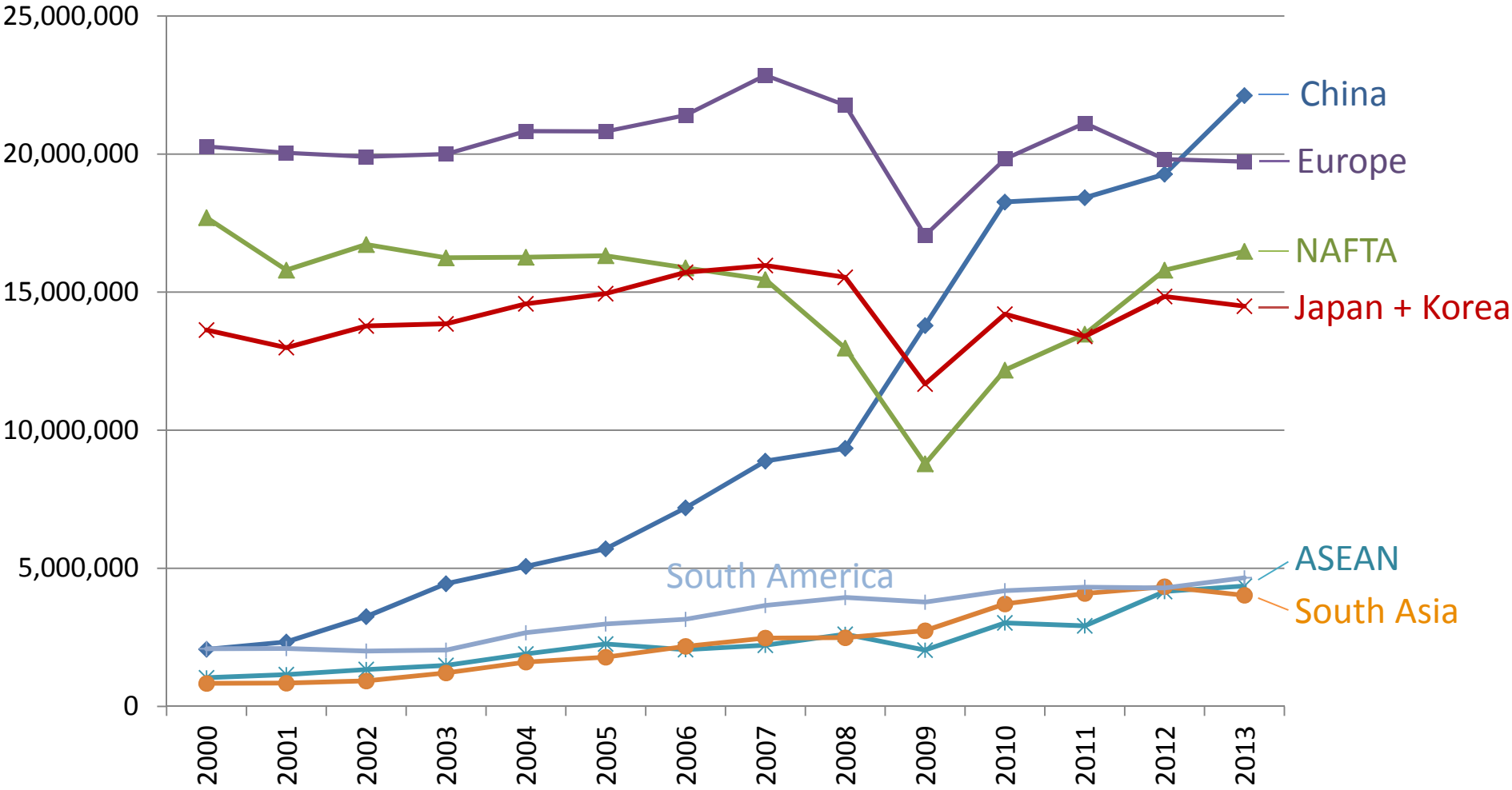
World parts and components trade shares by region



Source: RIETI-TID ROW: Rest of the World By courtesy of Prof. Nobuaki Hamaguchi

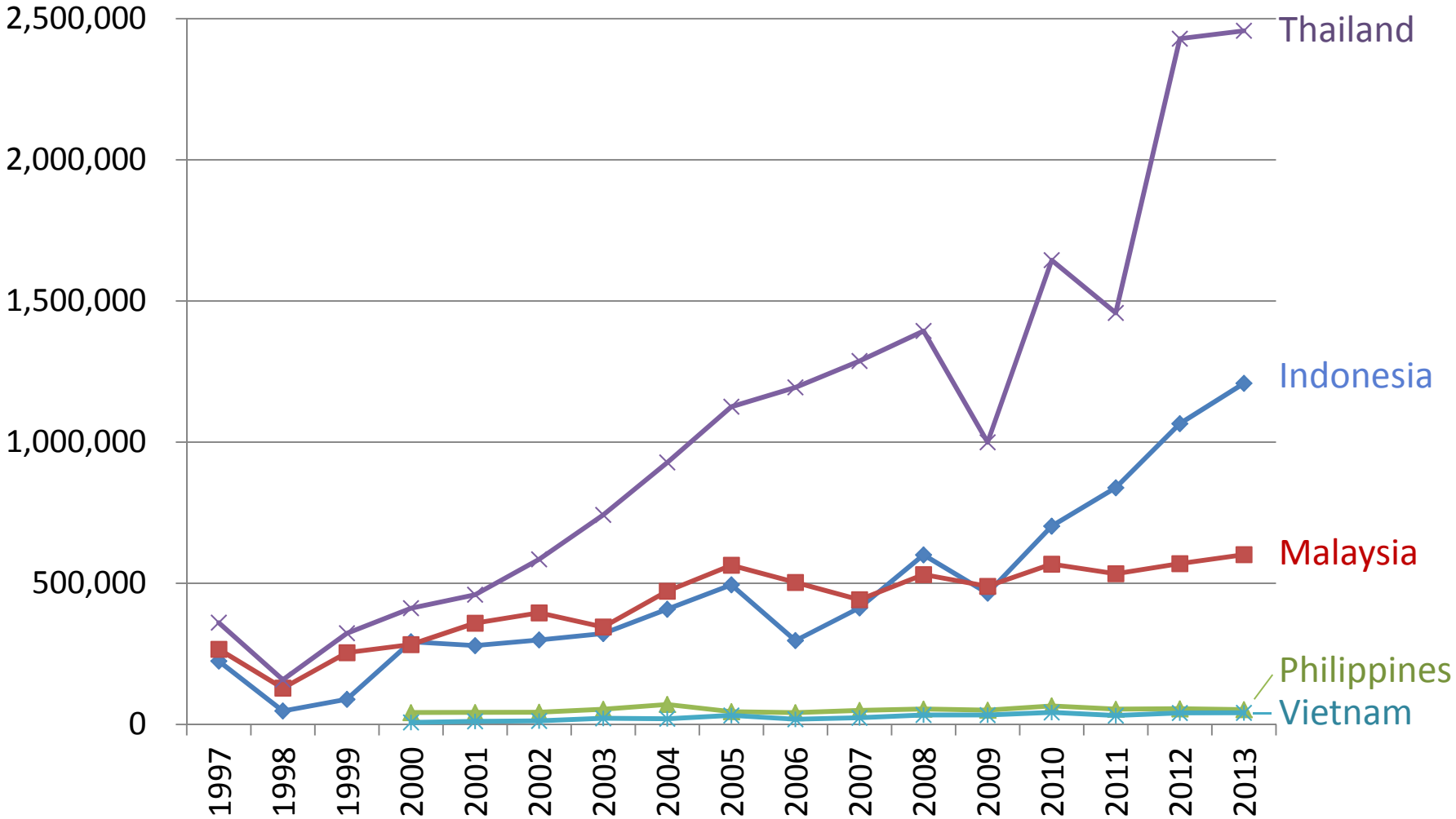
4. Auto Industry: global supply chain and its vulnerability

Automobile production by area (All types)



Source: OICA

Automobile production in ASEAN



Source: OICA

Automobile industry (together with supporting industries)
production of a car ← assembling 20,000~30,000 parts

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scale economies in production

low transport costs

each key part produced at only one (or a few) locations
in Japan (or East Asia)

multilayered complex supply chain networks
from procurement of parts to delivery of finished products

minimizing inventory stocks through just-in-time procurement policy

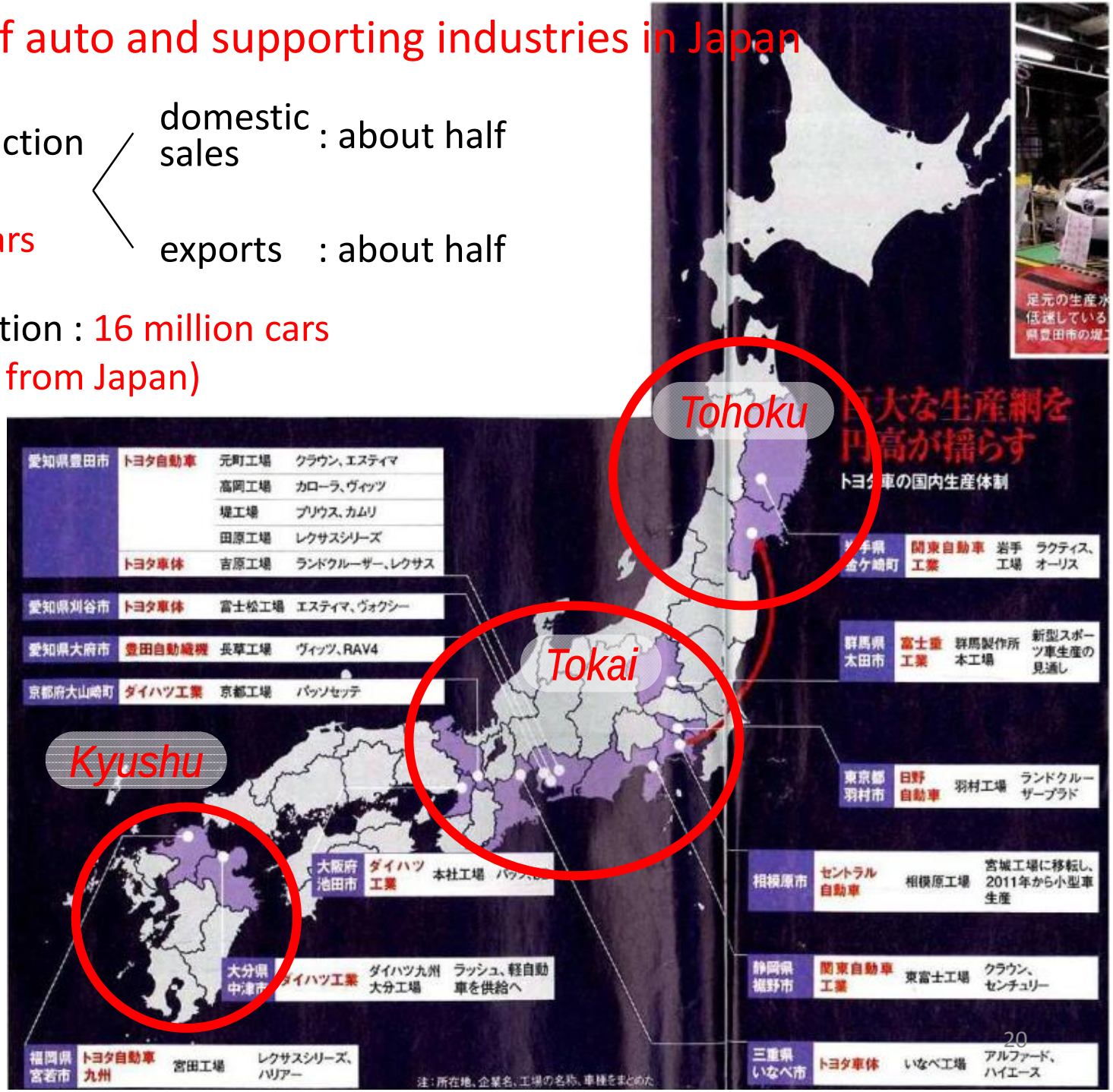
Quite efficient under normal conditions
but
Quite vulnerable to major disasters

Agglomeration of auto and supporting industries in Japan

Domestic production per year
10 million cars

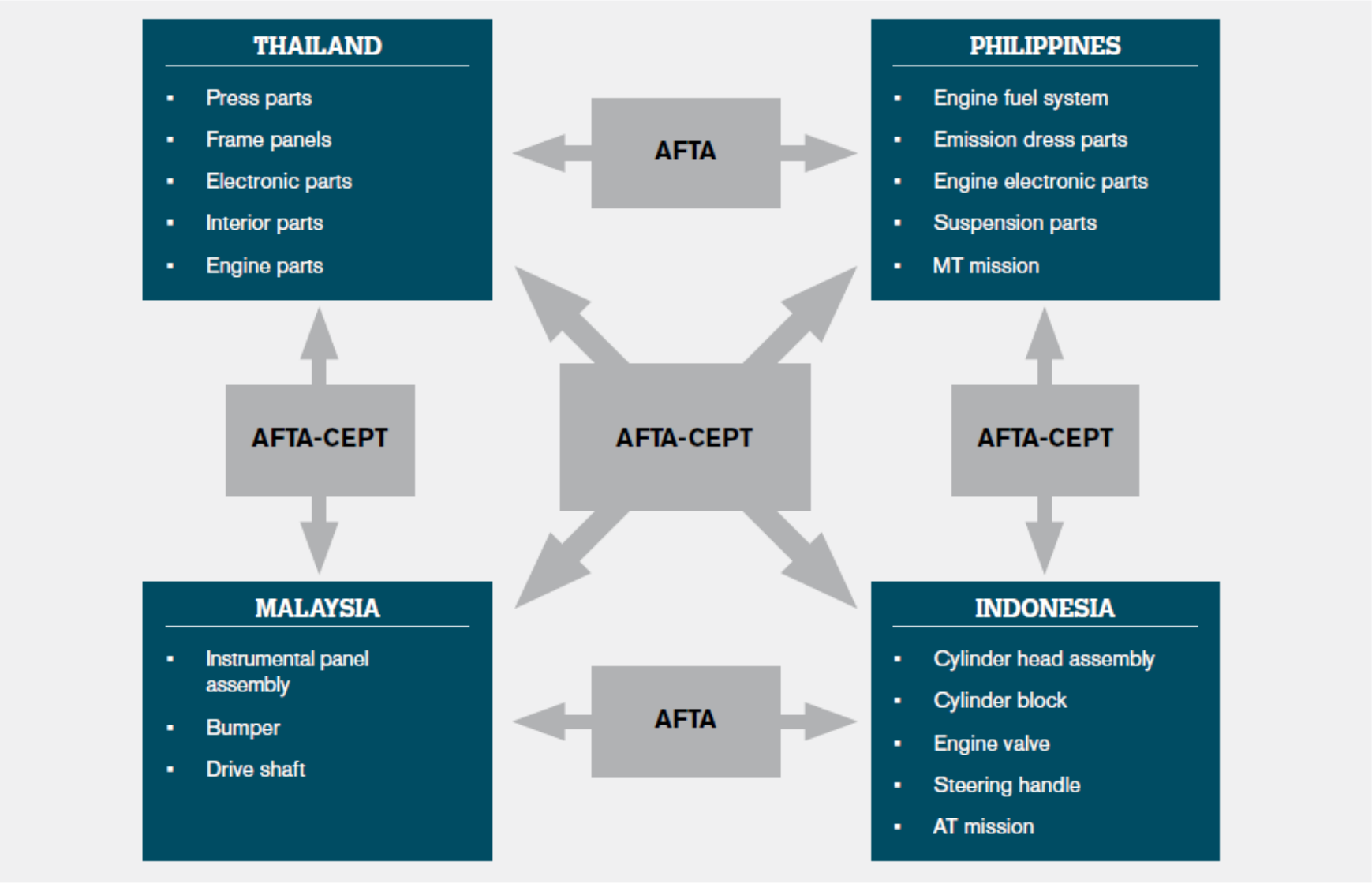
- domestic sales : about half
- exports : about half

Oversea production : 16 million cars
(using key parts from Japan)



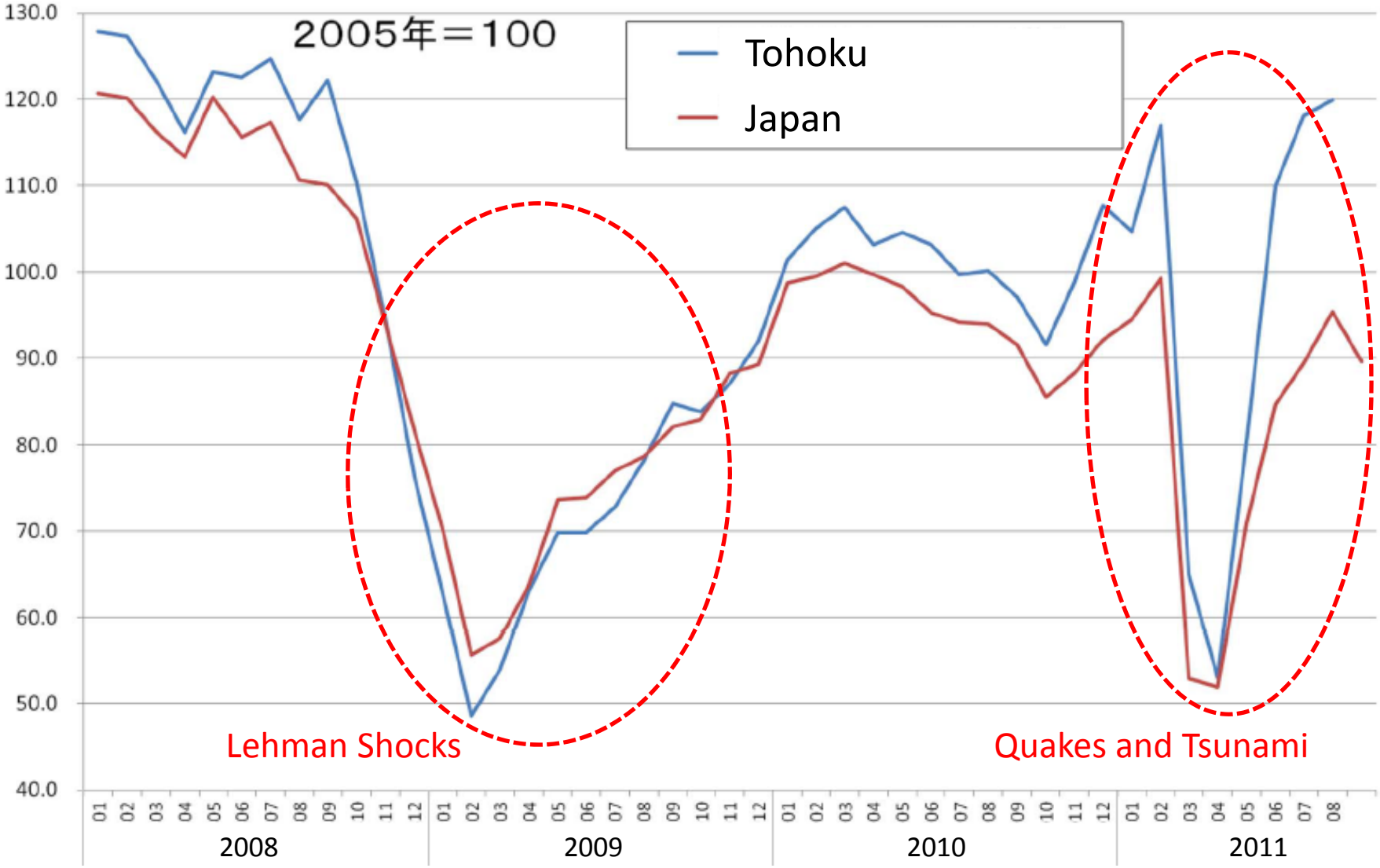
日経ビジネス
2010・10・18号

Supply chain of automobile parts in ASEAN countries



Source: IDE-JETRO and WTO 2011, Trade Patterns and Global Value Chains in East Asia: From Trade in Goods to Trade in Tasks

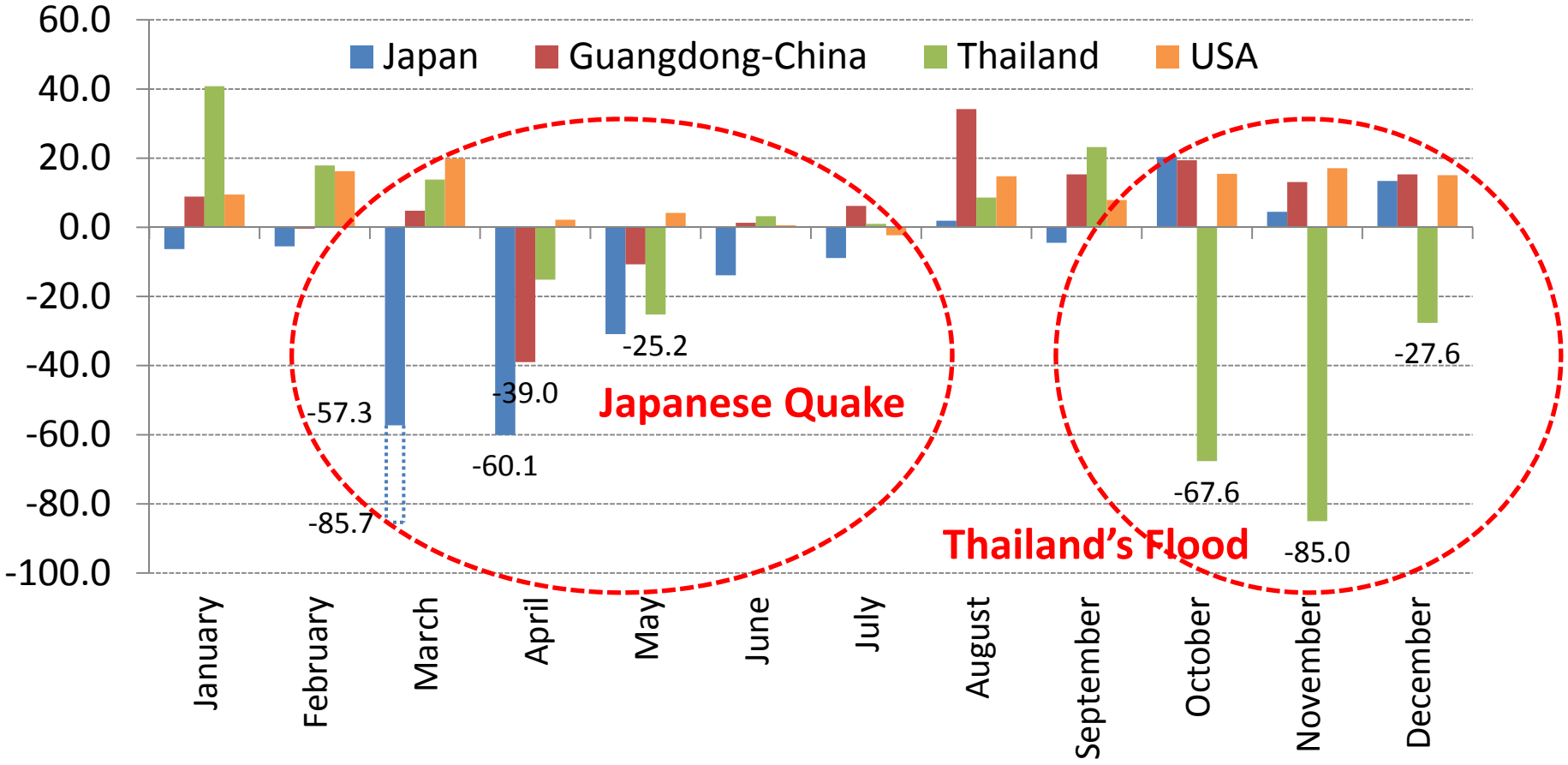
Index of Automobile production in Tohoku and in Japan (synchronized impacts)



Source: R. Wakasugi, RIETI Symposium on Great East Japan Earthquakes, 2011.11.07

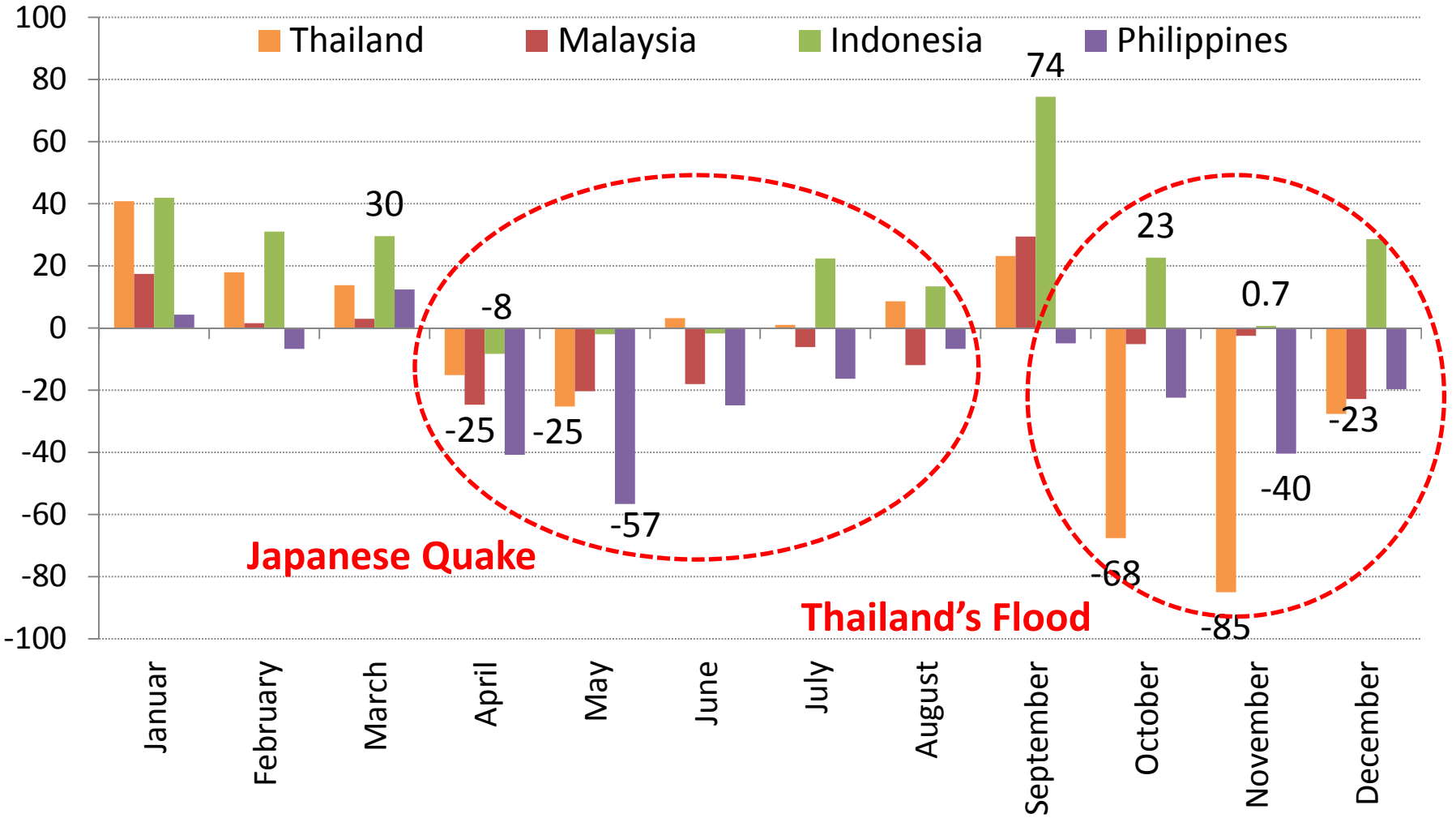
The Global Impact of the Japanese Quake and Thailand's Flood

2011, Japan, Guangdong (China), Thailand, and the US
Automobile production (y-o-y % change)



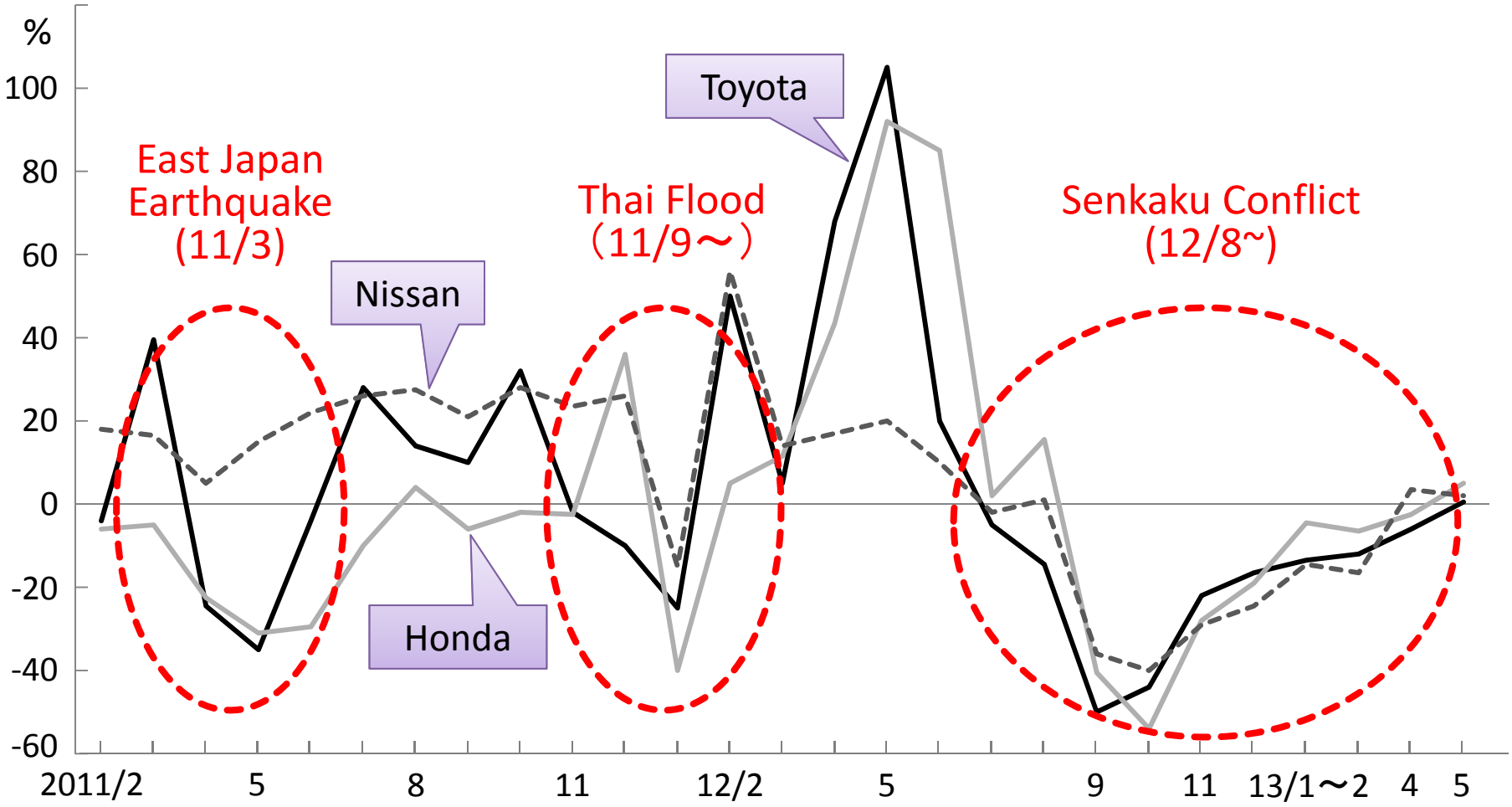
Source: JAMA, Statistic Bureau of Guangdong Province, TAIA, Federal Reserve Board
By courtesy of Professor Nobuaki Hamaguchi

2011, ASEAN automobile production (y-o-y % change)



Source: TAIA, AAM, GAIKINDO, AAP By courtesy of Professor Nobuaki Hamaguchi

Impact of natural disasters and international conflicts on automobile sales in China



Source: The Nikkei, 10 October 2012 and 5 June 2013 (two diagrams combined by the author)

No place in the world would be risk-free!

Possible large-scale disruption of supply chains from any major disaster:

Natural disasters

Quake
Tsunami
Flood
Typhoon / Hurricane
…

Social disasters

Air / Water pollution
Epidemics
Financial / Monetary shocks
Terrorism
Political conflicts
Military conflicts / War
Global warming
…

Secondary disasters

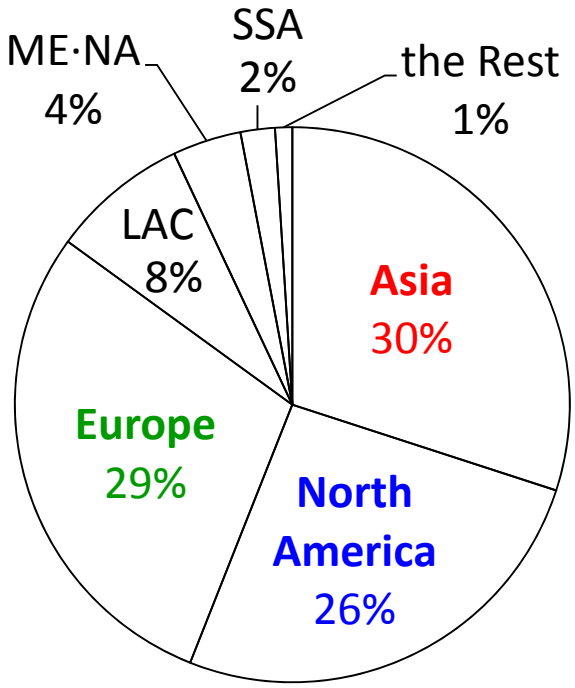
Transport disruptions, Nuclear Power plant accident, Demand/Supply disruptions …

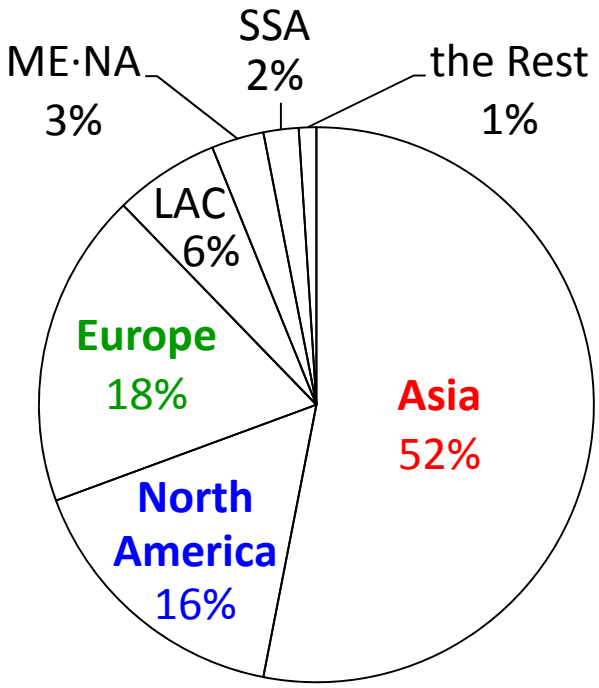
International cooperation for mainstreaming the global resilience of supply chains

5. The Asian Century?: Prospects and Tasks

The Scenario of the Asian Century (ADB, *ASIA 2050*)

2012		**2050**
Global Population: 7.1 billion	→	9.2 billion
Asian Population : 3.9 billion (55%)	→	4.8 billion (52%)
Global GDP: $70 trillion (market FX rate)	4.2% / year →	$335 trillion
Asian GDP : $21 trillion (30%)	5.8% / year →	$174 trillion (52%)





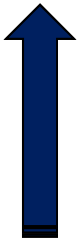
In order to realize the expected Asian Century

Asia as the World Factory today

based on the extensive supply chains utilizing huge wage-disparity

a World Center of

Advanced Production networks + High Quality Markets + Innovation networks



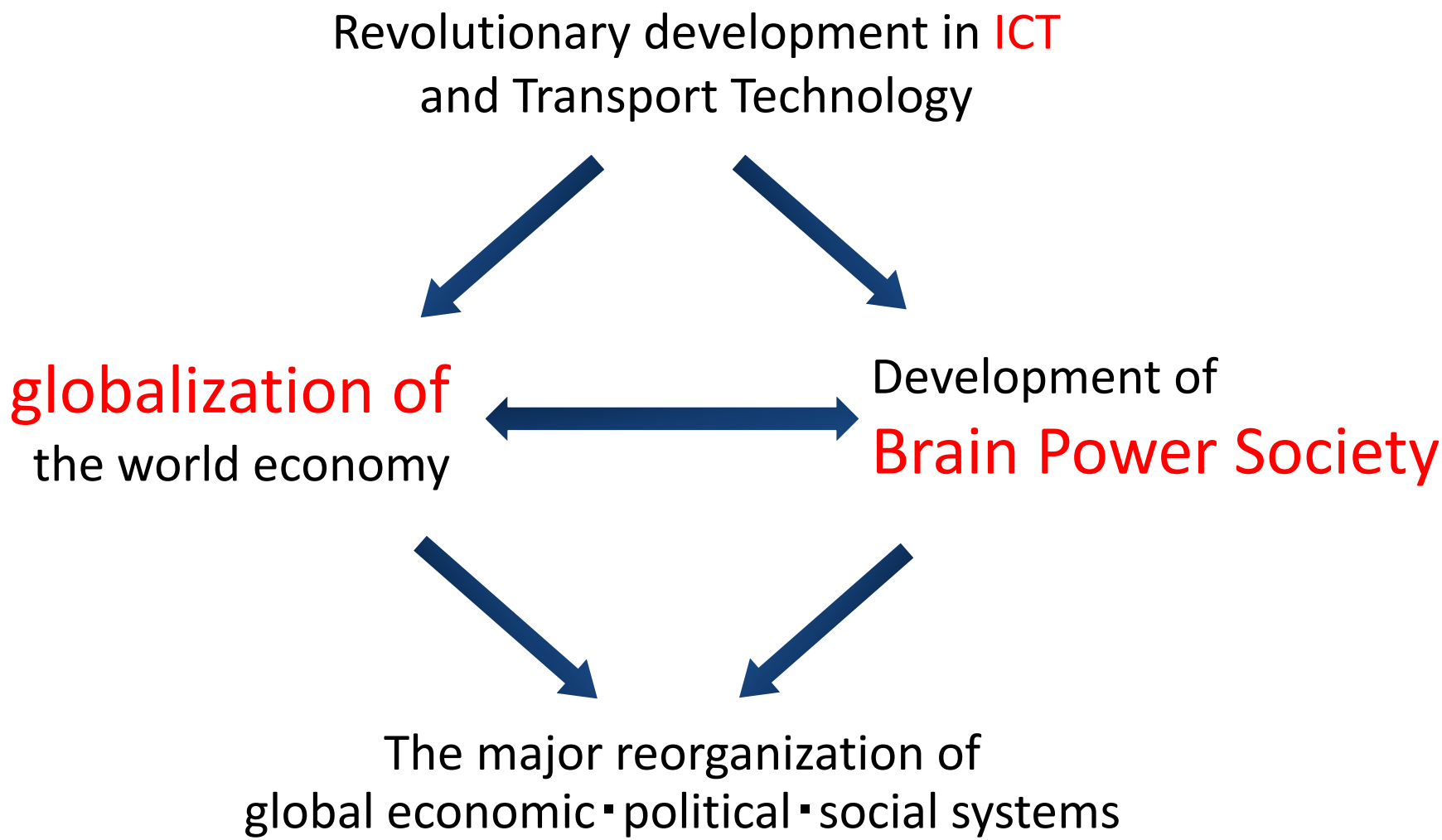
International Cooperation

I. Rebuilding more resilient and inclusive Supply-Chain-Networks, and

II. Strengthening the Brain-Power-Network for the future Asia

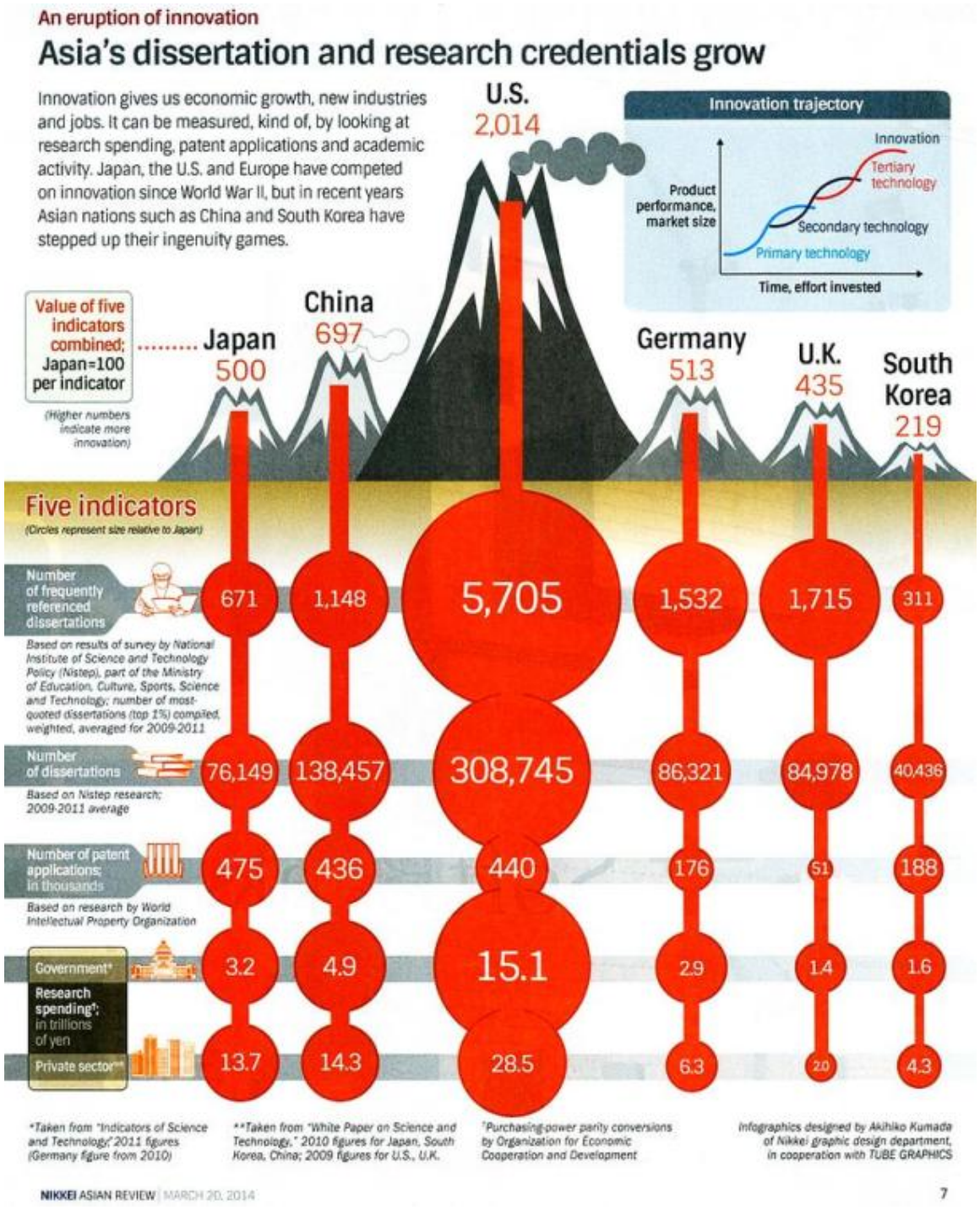
6. Developing the brain-power-network in Asia

Development of the Brain Power Society since the late 20th century



NIKKEI ASIAN REVIEW
March 20, 2014

Eruption of Innovation



Number of papers most cited (top 1%)

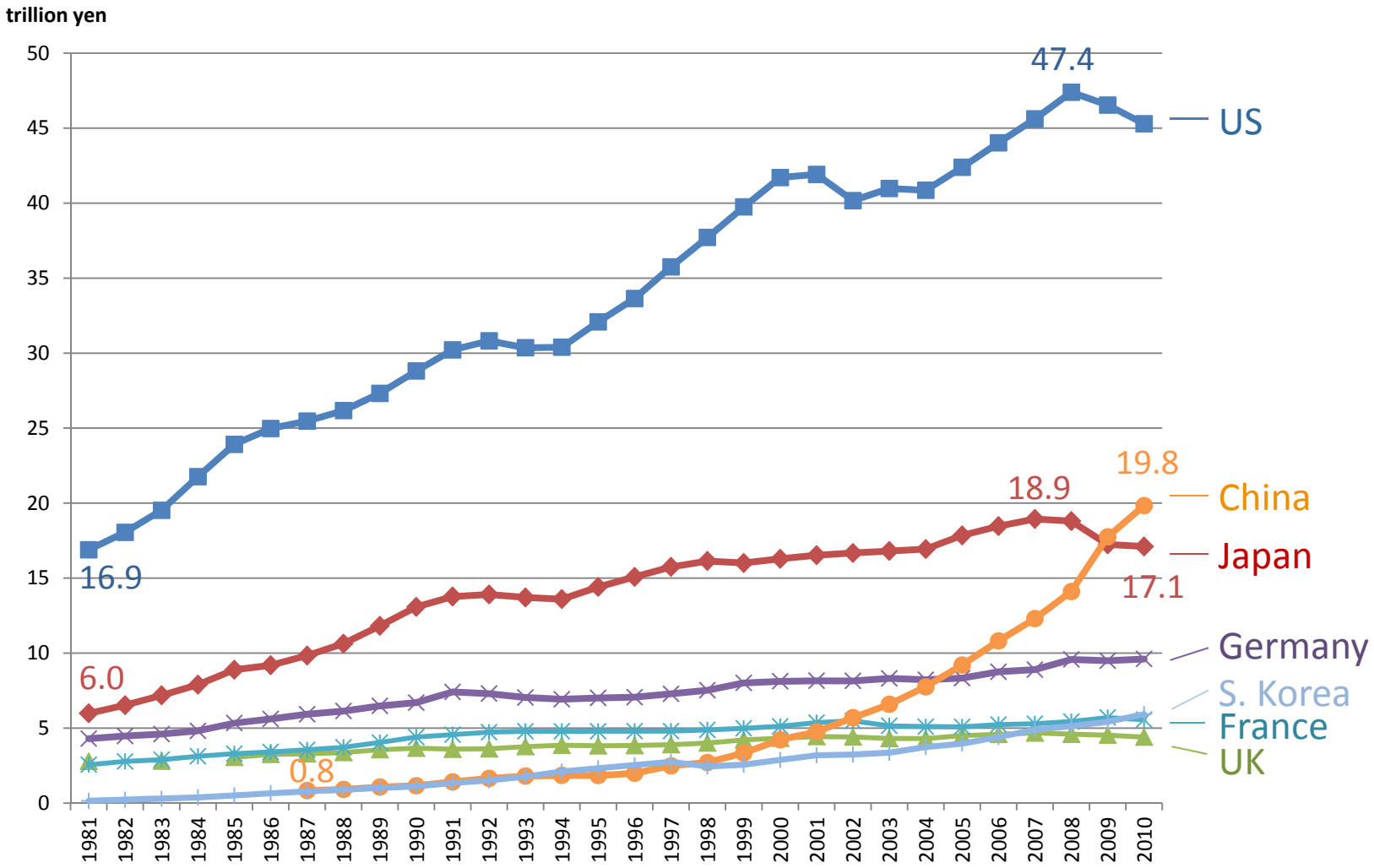
Number of papers

Number of patent applications

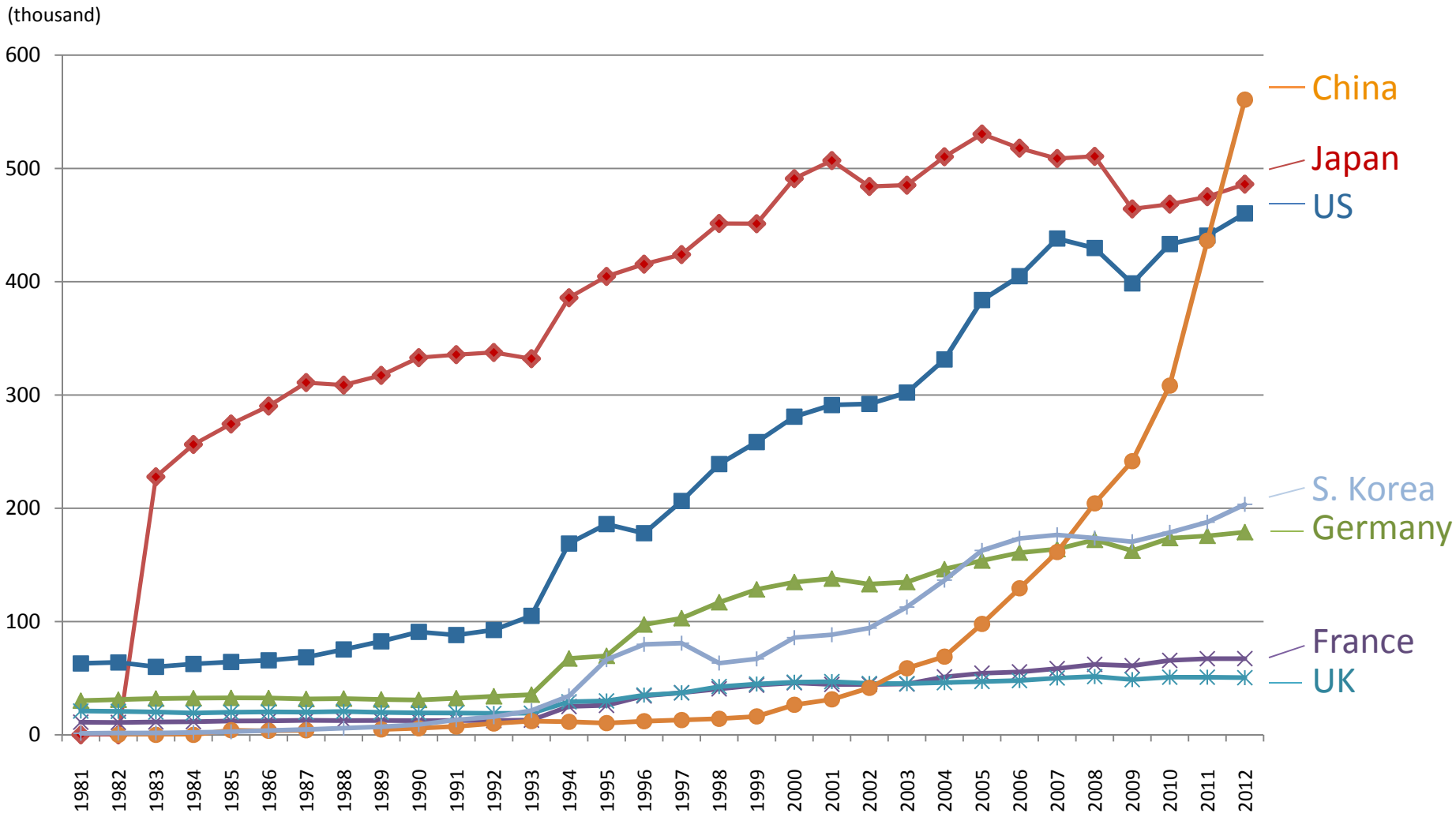
Government R&D expenditure

Private Sector R&D

R&D expenditure by country (OECD PPP)

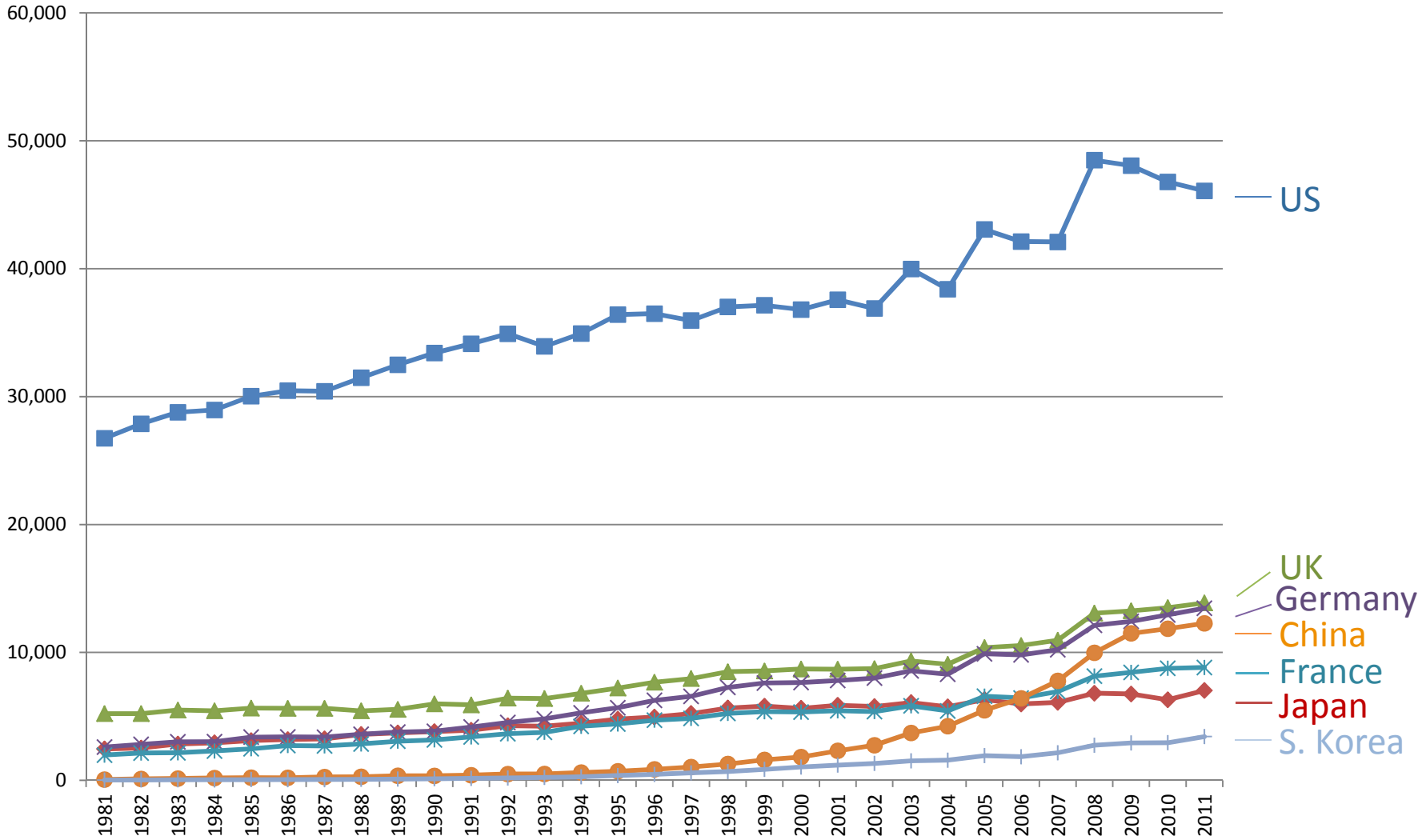


Number of patent applications by nationality



Data source: National Institute of Science and Technology Policy
Diagram made by Dr. Isamu Yamauchi at RIETI

Number of papers cited frequently (top 10%)



Data source: National Institute of Science and Technology Policy
Diagram made by Dr. Isamu Yamauchi at RIETI

Importance of International Cooperation through diversity and culture in the Brain Power Society

The fundamental resources in the Brain Power Society

- Individual Brain Power

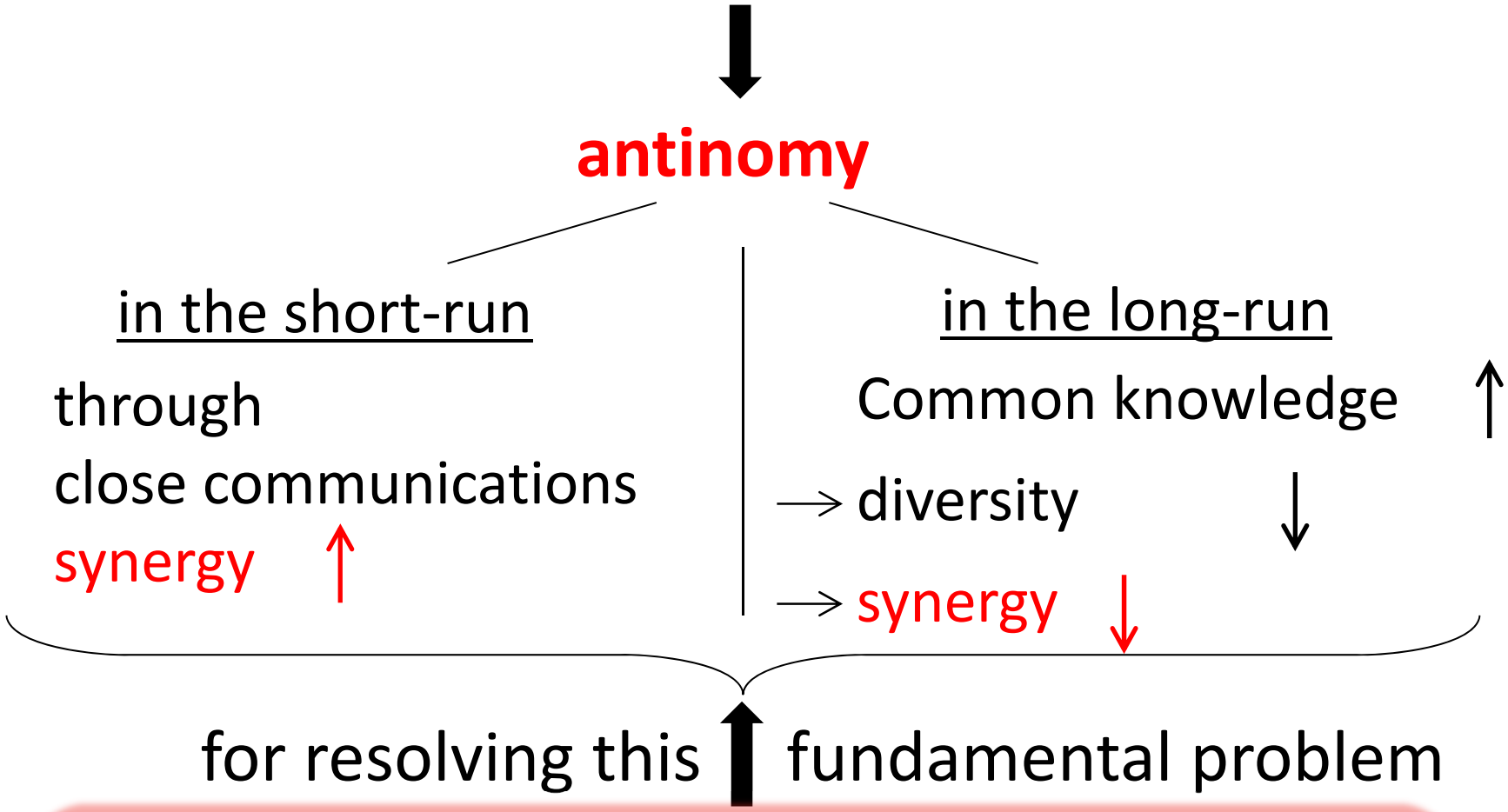
- Diversity in people・brains in the society

  ⟶ Synergy through heterogeneous people・brains

- Diversity in cultures among different regions

  ⟶ Synergy through heterogeneous cultures

close cooperation of
heterogeneous K-workers
(e.g. “nominication” in Japan)



antinomy

in the short-run

through
close communications
synergy ↑

in the long-run

Common knowledge ↑
→ diversity ↓
→ synergy ↓

for resolving this fundamental problem

Promote active interactions among diverse regions and countries

Diversity and creativity: National Institute for Materials Science (NIMS)

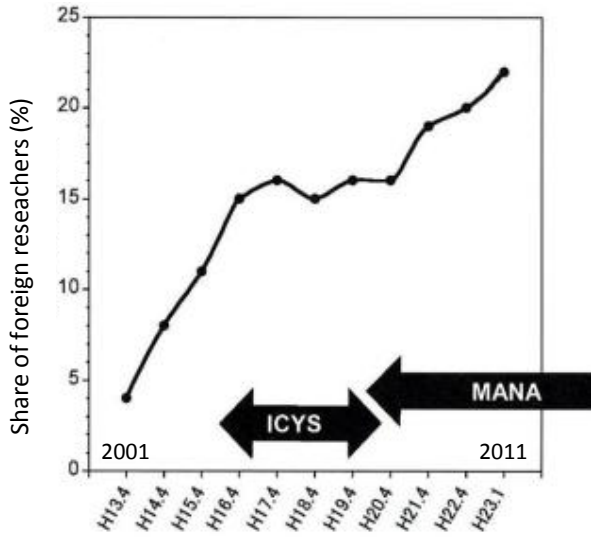
Table 1. The number of foreign researchers in public research institutes in Tsukuba (2011, March)

研究機関	外国人研究者数
（独）物質・材料研究機構(NIMS)	585
（独）産業技術総合研究所	493
（共）高エネルギー加速器研究機構	305
（独）国立環境研究所	130
（独）農業・食品産業技術総合研究機構	64
（独）国際農林水産業研究センター	51
（独）農業生物資源研究所	28
（独）農業環境技術研究所	18
（独）土木研究所	12
気象庁　気象研究所	10
（独）森林総合研究所	6
（独）建築研究所	3
国土交通省　国土技術政策総合研究所	1
国土交通省　国土地理院	1

Table 2. World ranking in terms of citations in materials science

	ICYS/MANA 開始前の１１年間の計 (Jan. 1994 to Dec. 2004)		直近５年間の計 (Jan. 2007 to Jan. 2011)	
	Institute	Citation	Institute	Citation
1	Max Planck Society	25739	Chin. Acad. Sci.	45576
2	Tohoku Univ.	23891	Max Planck Soc.	16318
3	MIT	18568	MIT	11514
4	UC Santa Barbara	17338	NIMS	11266
5	Penn. State Univ.	15503	Natl. Univ. Singapore	11209
6	Chin. Acad. Sci.	15101	Tsing Hua Univ.	10436
7	Univ. Cambridge	14977	Tohoku Univ.	10291
8	Kyoto Univ.	13301	Georgia Tech.	9463
9	Osaka Univ.	12575	Ind. Inst. Tech.	9459
10	Russ. Acad. Sci.	12556	Univ. Manchester	9197
.....				
.....				
.....				
18	NIMS	10474		

Figure 1: share of foreign researchers at NIMS



プログラム名：MANA, 国際ナノアーキテクトニクス研究拠点；
ICYS, 若手国際研究拠点

- Among high-ranking papers at NIMS in terms of citations, the number of papers written by author(s) including foreign researcher(s)

  among top-10 papers: 8

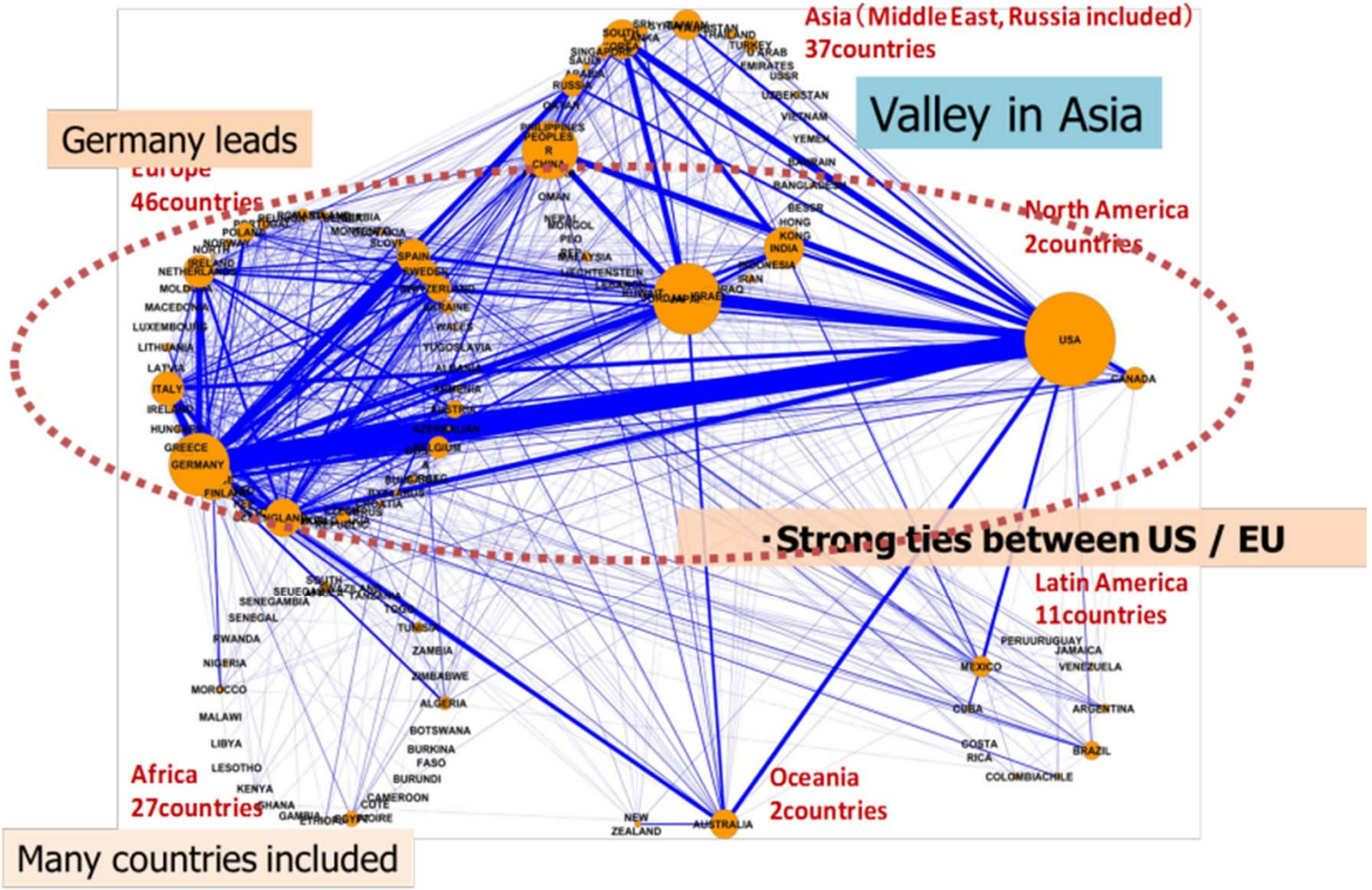
  among top-31 papers: 24

SOURCE: Ariga and Urao, “Productivity enhancement of a research institute through the contribution of foreign researchers,” Science & Technology Trends No.127, 2012, 1•2, Ministry of Education and Science

The Map of international research cooperation in Solar Cells

the number of papers and international coauthorship (published between 1945 and 2009)

Source : I. Sakata, H. Sasaki, H. Nakamura and Y. Kajikawa "Maps of international research collaboration in clean energy" Journal of Energy and Power Engineering 7 (2013)



Ranking in the number of papers

1st: US, 2nd: Japan, 3rd: Germany, 4th: China, 5th: India, 6th: France, 7th: England, 8th: South Korea, 9th: Spain, 10th: Italy
(but, weak research cooperation in Asia)

7. The Growth Strategy for Implementing the “Third Arrow”

Making the economy grow while the population decreases

≈ Enhancing the TFP of economy

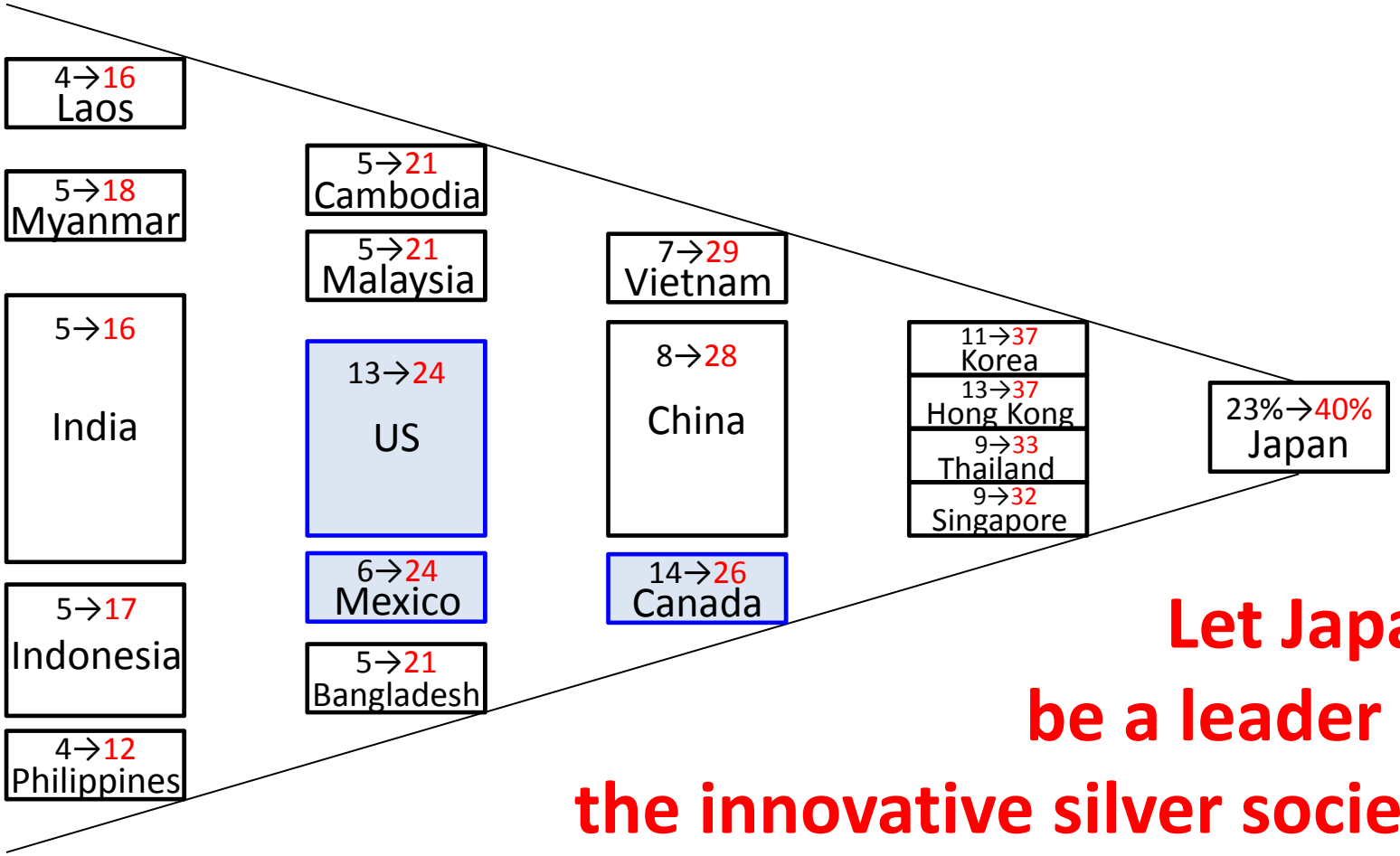
But, how? : **Innovation everywhere involving everyone!**

Advancing the bold new strategy reflecting new values such as:

I. “Silver” is beautiful
II. “Small and creative” is beautiful
III. “Open and connected” is beautiful

Flying Geese of Aging Society in Asia-Pacific

the population share (%) of aged people over 65: year 2010 → year 2060



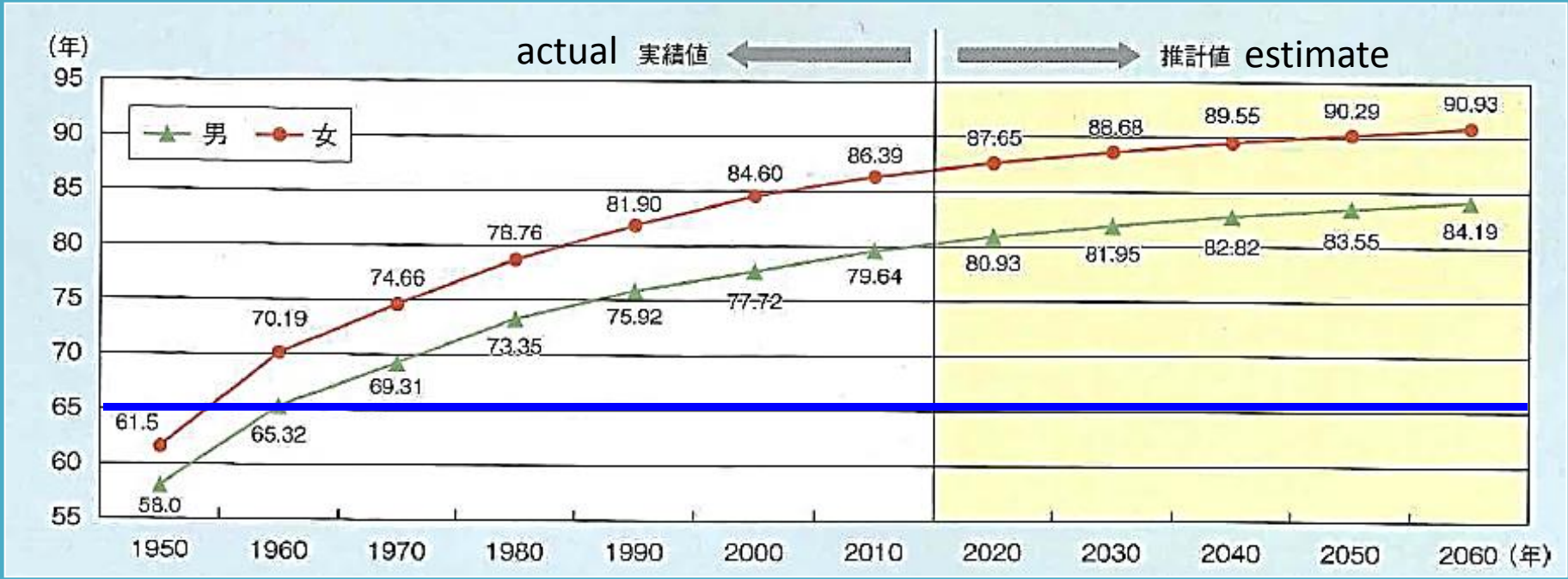
Let Japan be a leader of the innovative silver society

Source: UN World Population Prospects, The 2012 Revision

Source for Japanese data: National Census of Japan, National Institute of Population and Social Security Research, "Population Projections for Japan (2012 revision)"

Who are the aged? Why fix the dividing line at 65?

The average life expectancy in Japan



Data source: Ministry of Health, Labour and Welfare Diagram: Cabinet Office, Government Of Japan "Report on Aging Society, 2014"

Ultimate Goal: Create a new society where everyone can happily work/enjoy in good health until the end.

The Silver is beautiful:

Senior Citizen

↑

Creating the best matching

↓

Younger generations

Big customers for new products / industries

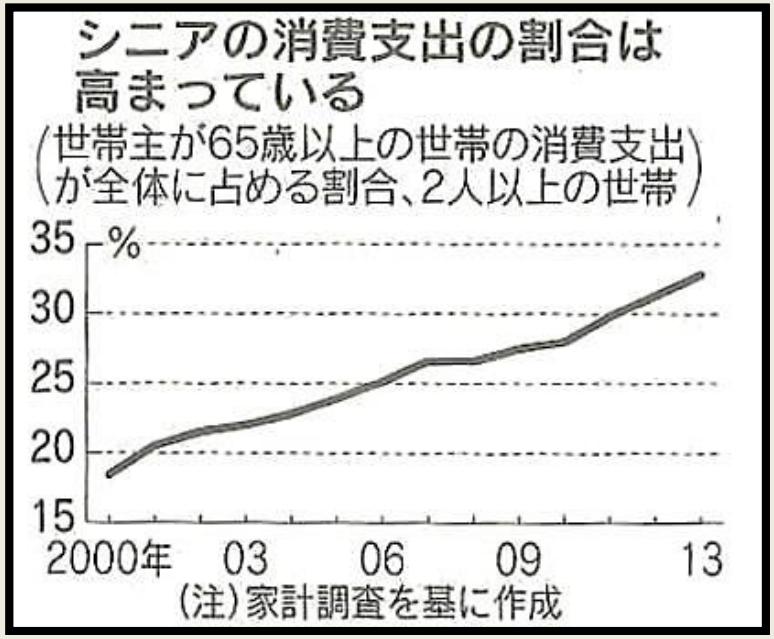
- housing · goods · services · entertainments tailored for the aged
- medical / nursing services
- medical / nursing equipments
- friendly and helpful robots
- lifetime education
- all kind of resorts / retirement villages
-
-

Big resources

- human resources for
  workers / managers, skills / knowledge, innovation / creation / ventures
- financial resources

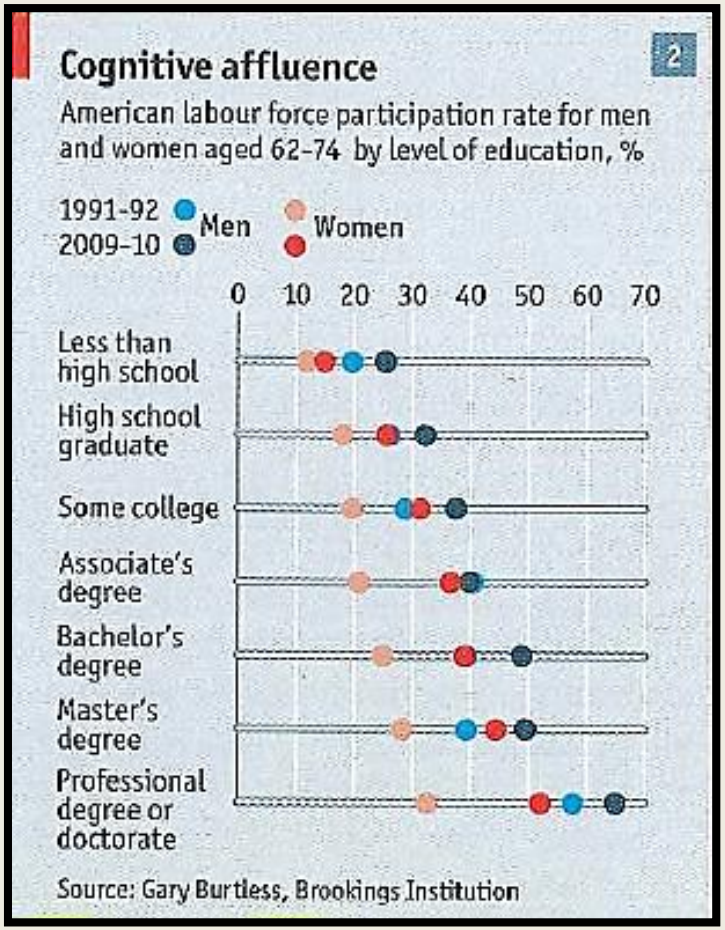
→ **Creating the most innovative silver society through international cooperation**

Increasing share of consumption expenditure by senior households



Source: Nikkei Shimbun, May12, 2014

American labor force participation rate: aged 62-74



Source: The Economist, April 26, 2014

Irodori Project in Action (with All Smiles): Kamikatsu, Tokushima

Products of Irodori Project: Tsumamono for Japanese Dishes

Irodori (Color) Project in Kamikatsu Village, Tokushima

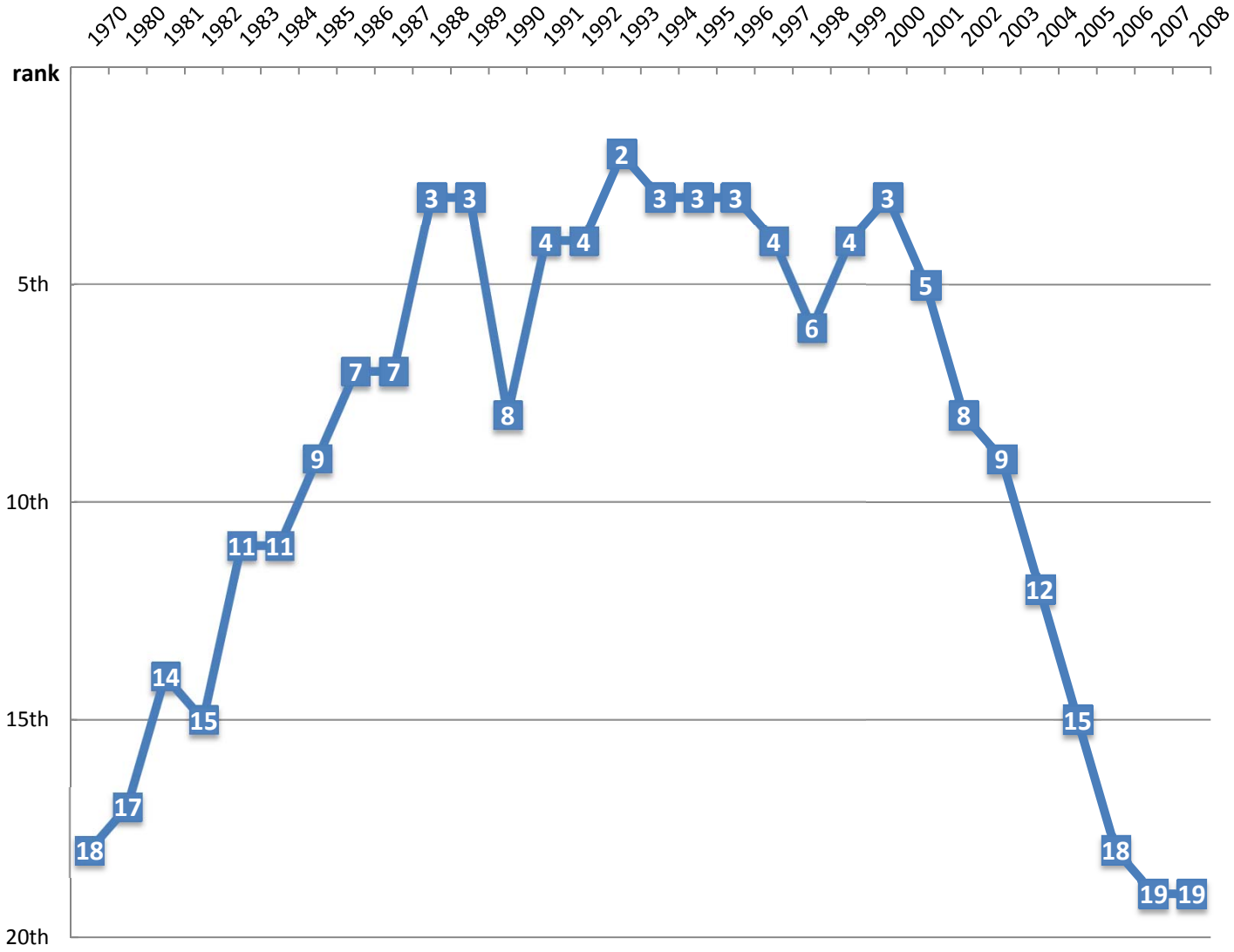
- Initiated in 1986 by Mr. Yokoishi (then 24 years old) of JA and four senior ladies
- Now 150 members (all farmers)
  average age: 67 (mostly females), the oldest: 94
- Average revenue per member: 1.7 million yen

Kamikatsu village today

- Irodori project + four similar projects (the third-sector)
- population: 2092 (U-turn + I-turn: 6.3%)
- aged people over 65: 47% (the highest in Tokushima)
- only two persons are bedridden
- per capita medical expenditure (National Health Insurance): 260 thousand yen (vs. 460 thousand yen at the village with the second highest ratio of elderly)

“Small and Creative” is beautiful.

Ranking of Japanese per capita GDP in OECD



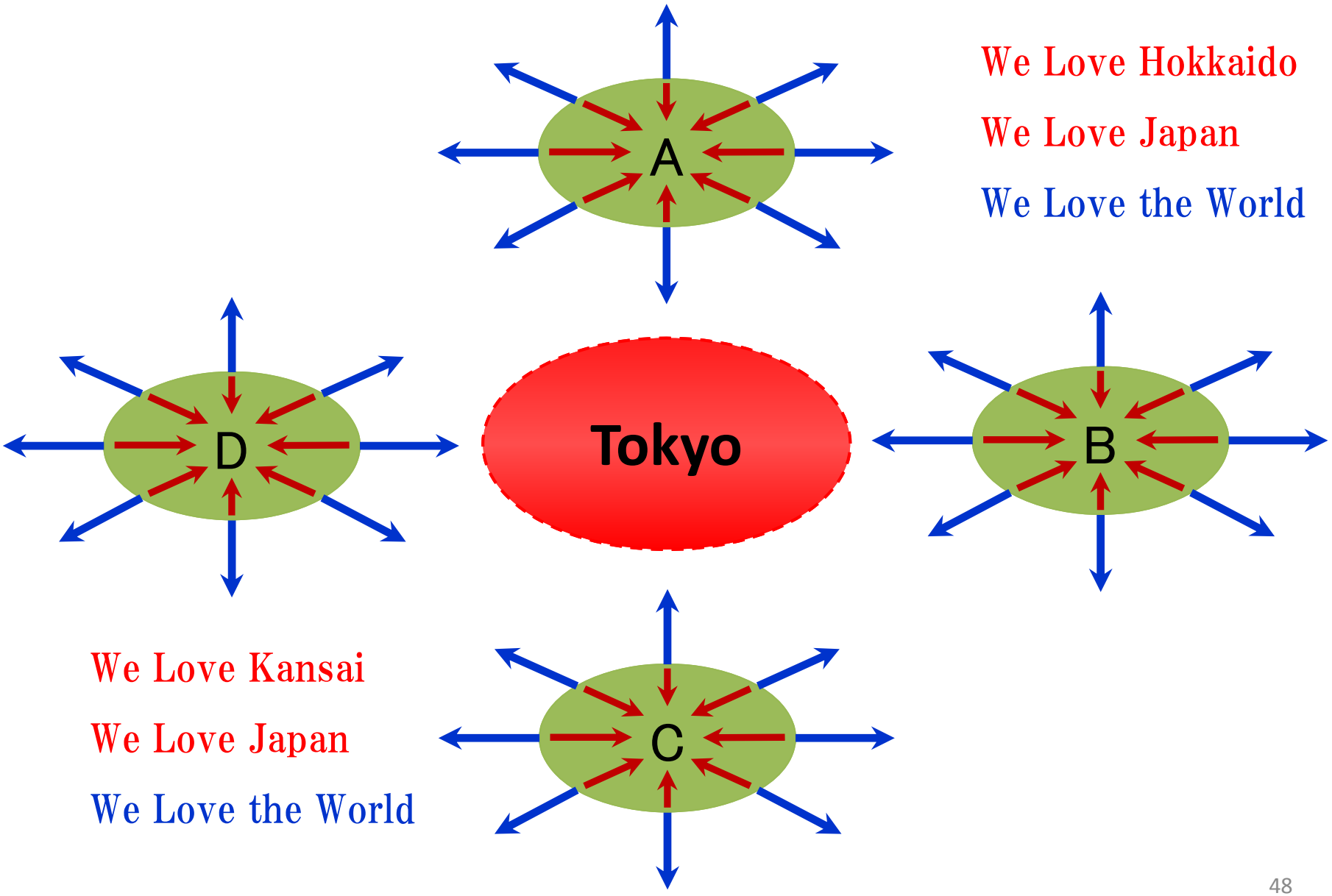
rank	Country	2008
1	Luxemburg	117,967
2	Norway	94,763
3	Switzerland	64,885
4	Denmark	62,054
5	Ireland	59,944
6	Netherlands	53,094
7	Iceland	52,568
8	Sweden	51,954
9	Finland	50,931
10	Austria	49,527
11	Australia	48,049
12	United States	47,186
13	Belgium	47,151
14	Canada	44,950
15	France	44,550
16	Germany	44,519
17	United Kingdom	43,237
18	Italy	38,455
19	**Japan**	**38,371**
20	Spain	34,971

Source : OECD Factbook 2010: Economic, Environmental and Social Statistics, and http://www.esri.cao.go.jp/jp/sna/h20-kaku/percapita.pdf

The top 10 countries in the OECD in terms of per capita GDP (2008)

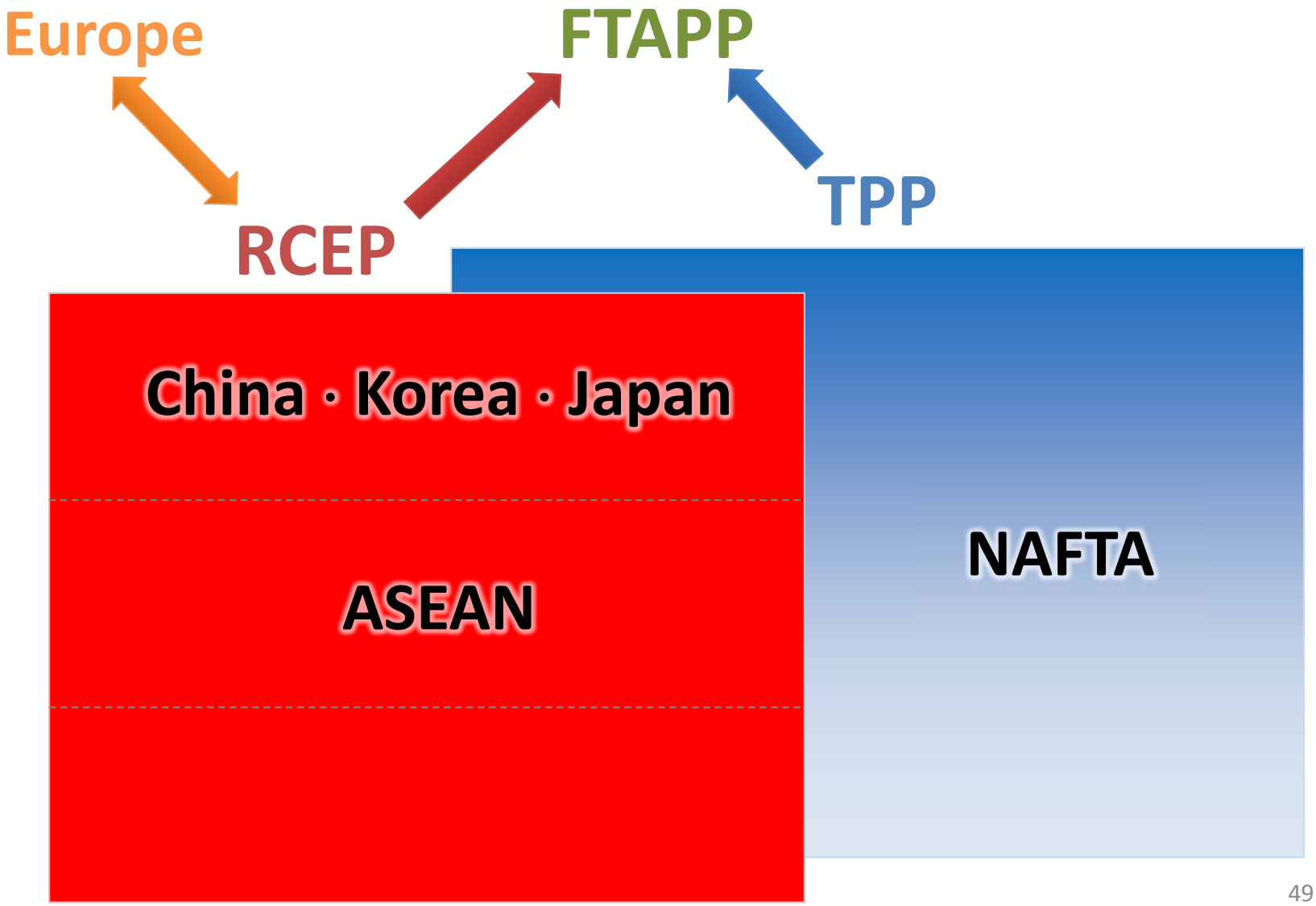
1. All small countries located in the northern part of Europe
2. The total population of the 10 countries: 63 million (about ½ of Japan)
   The average population: 6.3 million (vs. 5.5 million in Hokkaido)
   → **To achieve economic growth in a Brain Power Society, population size is not essential.**
3. Most countries are already in the advanced "silver society". (the share of people over 65 in 2010: Sweden 18%, Denmark 17%, Switzerland 17%, Finland 17%,…)
4. Each is an independent country, having its own language and culture, with a unique set of economic · social · educational policies.
5. Each spends a high proportion of GDP on education (Denmark 7.8%, Sweden 6.7%, Norway 6.7%, Finland 5.9%, vs. Japan 3.4%, in 2007)
6. Each is highly globalized with high GDP ratios of exports, out-FDI and in-FDI, and with a high proportion of immigrants
7. Most multi-national firms are concentrated on knowledge-intensive activities (e.g. HQ-management, R&D, design) with high profit-ratios, while all workers in each country get relatively high wages, (cf: Grossman and Ross-Hansberg, 2008, AER 98)
8. The ten countries together form a Brain Power Society, rich in diversity

Let Japan be a union of semi-independent shining regions

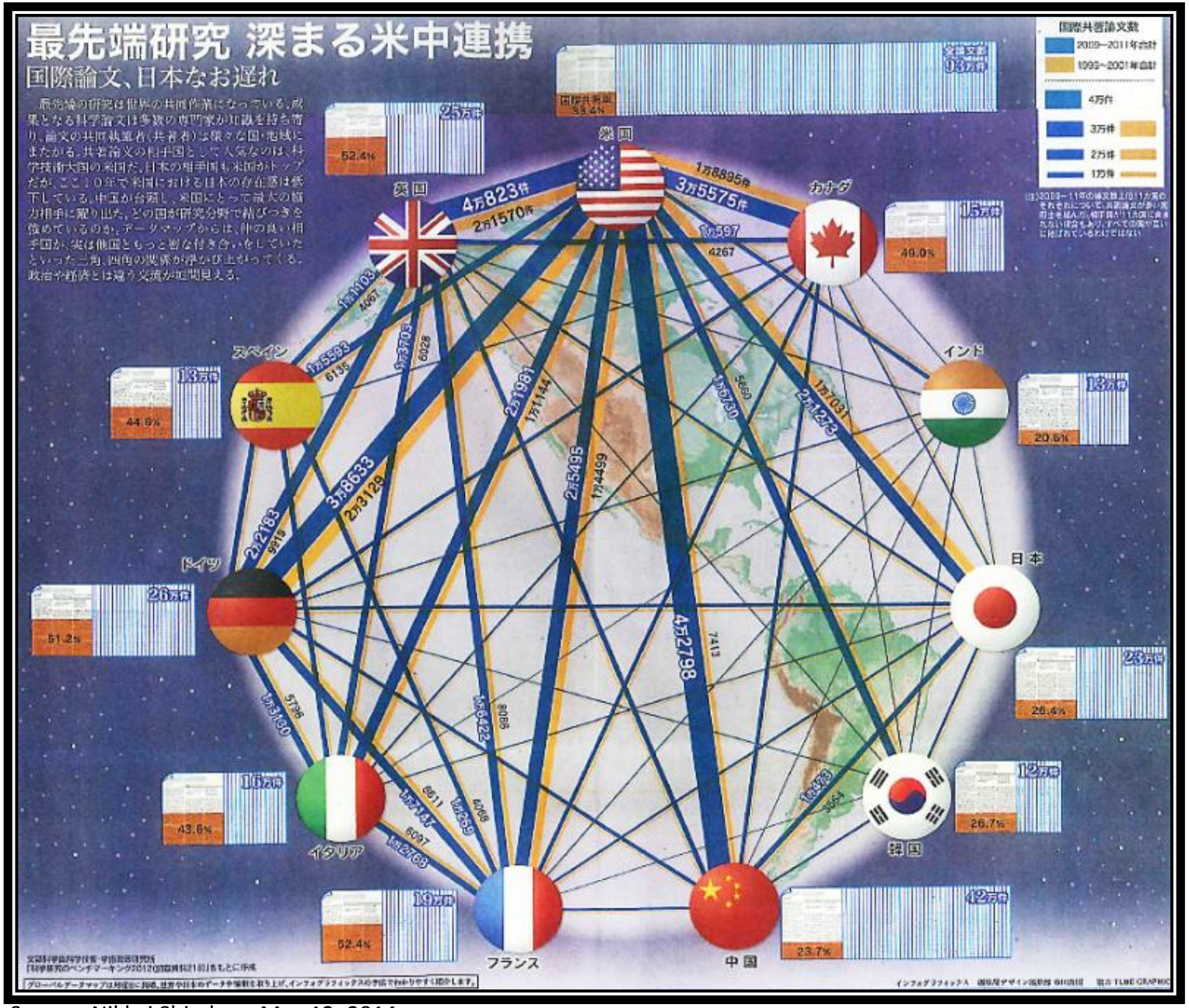


“Open and connected” is beautiful

Promoting the Regional Integration of Asia-Pacific



Connect or Perish: International coauthorship



Source: Nikkei Shimbun, May 12, 2014