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# **Determinants and Regional Framework for Advancing Supply Chain Resilience in South East and East Asia**

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# Outline of the Presentation

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## 1. Overview of Asia's supply chain Determinants

- Nature of the Asian supply chains
- production processing and distribution
- Supply chain dependencies

## 2. Disasters and supply chain resilience

Immediate DR impacts

Medium term CC impacts

Success and lessons learned

## 3. Emerging challenges to Asian supply chain resilience

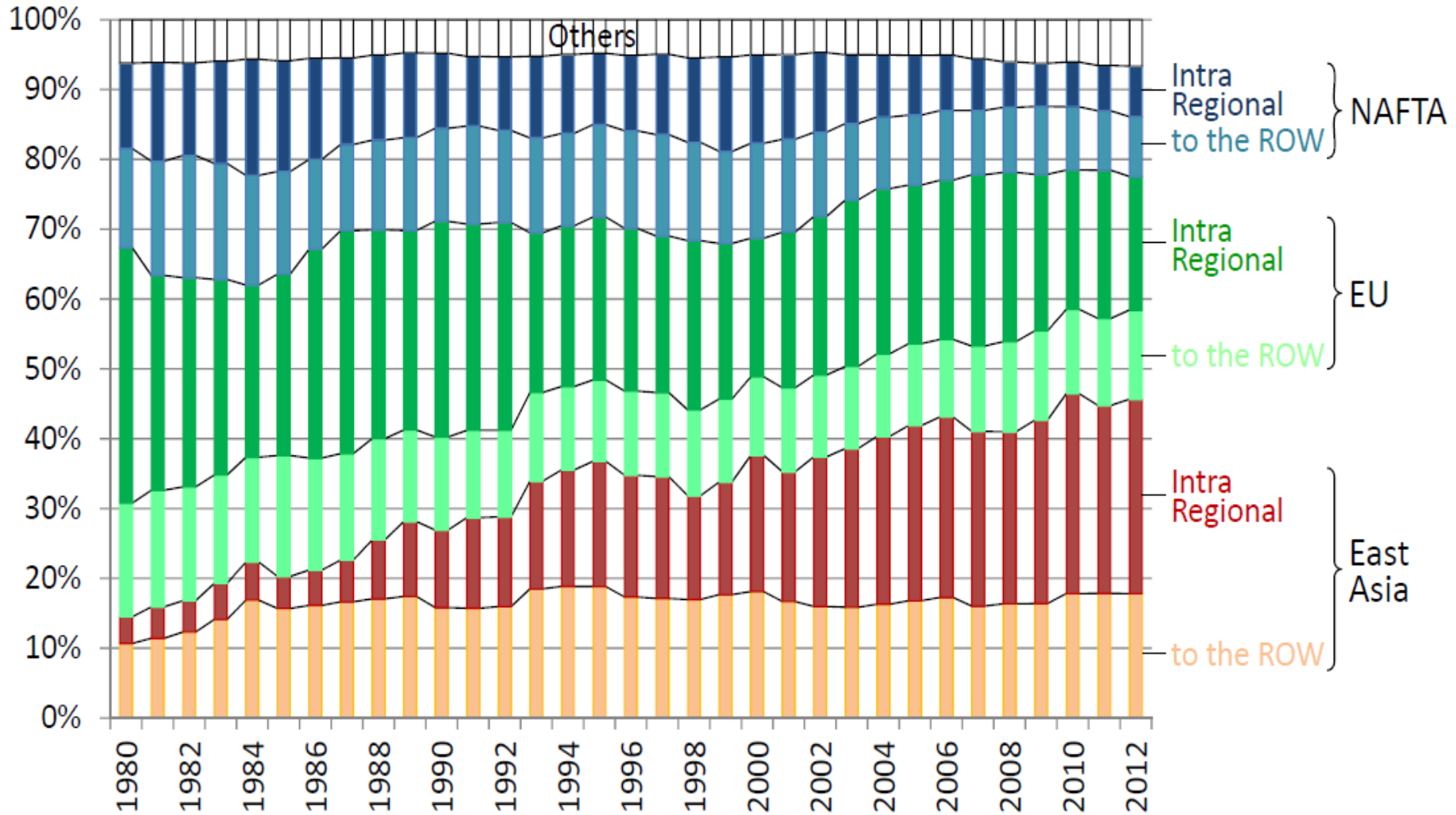
Business continuity planning by stakeholders

Pandemic Planning by government and industry

Regional platforms and financing architecture

# Global value chains have been developed expressively in SE and East Asia

World parts and components trade shares by region

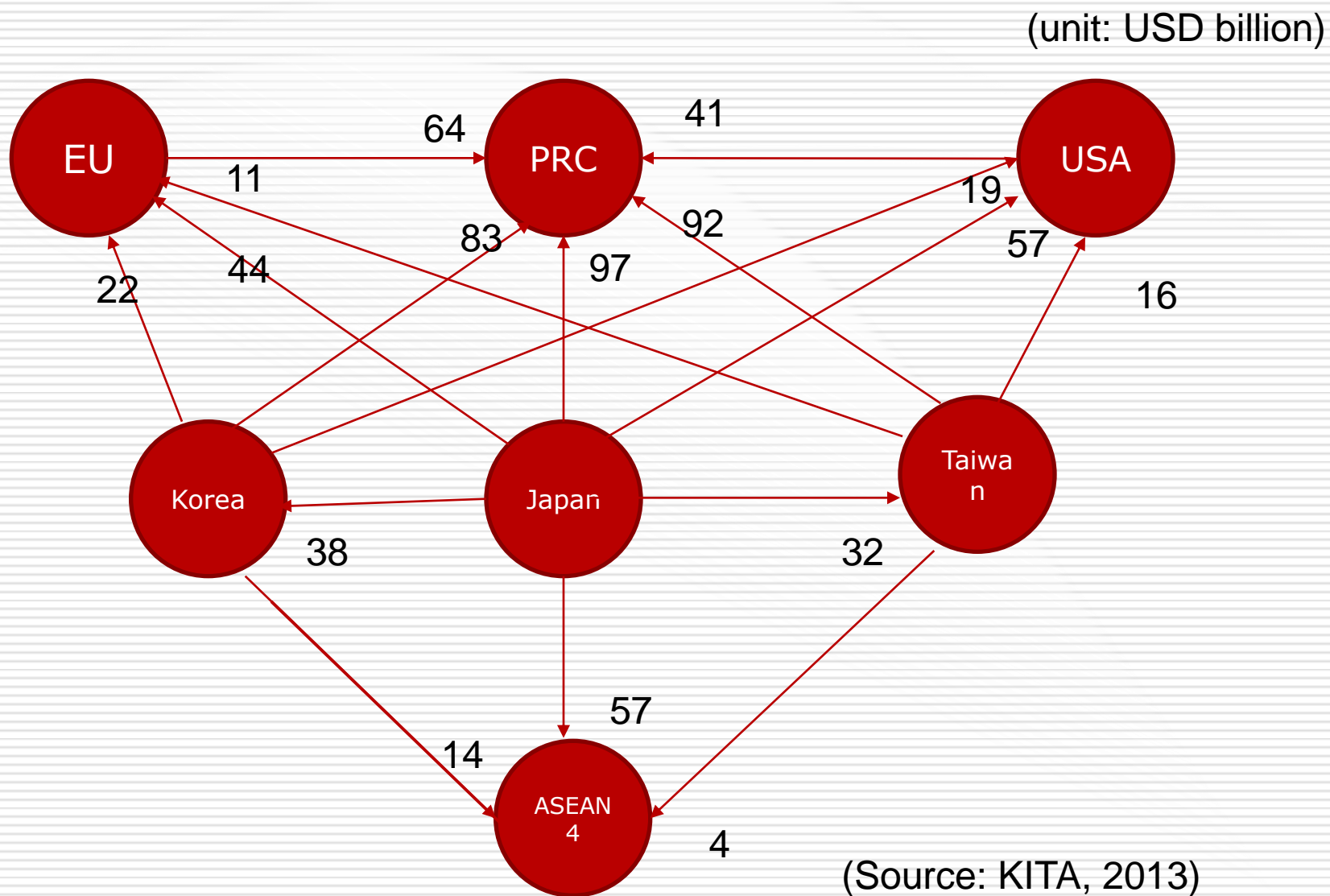


# Position of Asian Supply Chains in a Globalized Economy

		Export						
		Japan	Korea	China	Taiwan	ASEAN-4	USA	EU
I m p o r t	Japan	-	28,176	120,262	13,571	83,759	60,545	58,482
	Korea	64,296	-	71,574	13,647	31,174	40,403	37,732
	China	176,304	116,838	-	115,645	120,535	91,878	153,706
	Taiwan	36,154	14,830	29,642	-	13,986	26,027	19,968
	ASEAN 4	82,819	27,310	77,110	15,150	-	37,274	42,210
	USA	120,348	49,816	364,944	35,907	73,054	-	322,990
	EU	88,277	52,757	385,009	32,856	77,481	227,580	-

Source: Keizai Koho Centre, 2013

# Integrated Economies - Parts and Materials Trade of Major Economies



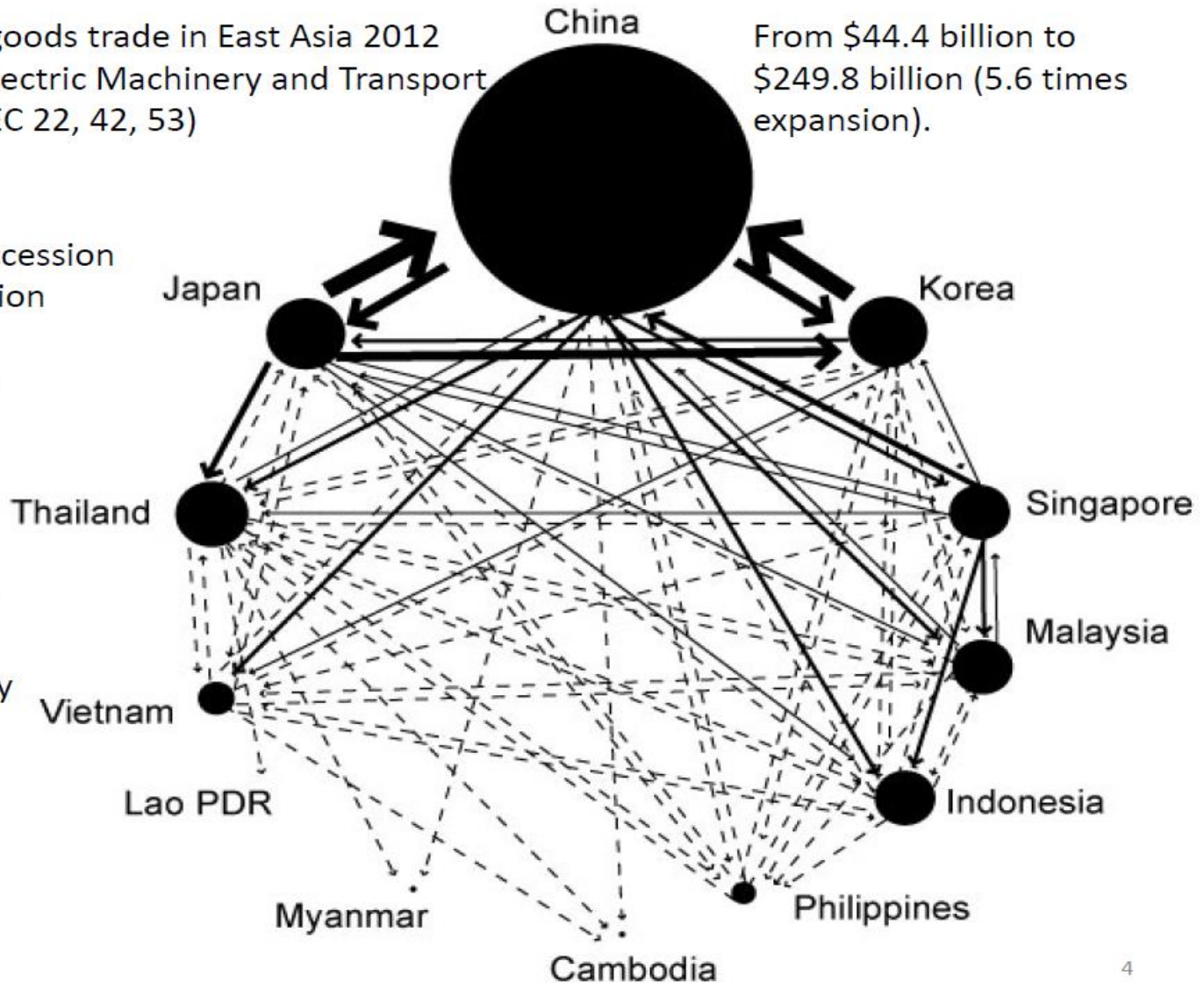
# Intermediate Goods trade in SE&EA

Intermediate goods trade in East Asia 2012  
General and Electric Machinery and Transport  
Equipment (BEC 22, 42, 53)

From \$44.4 billion to  
\$249.8 billion (5.6 times  
expansion).

China's WTO accession  
ASEAN integration  
Exchange rate  
Transportation  
ICT  
.....

Greater volume  
Higher density  
More complexity  
And  
More inclusion

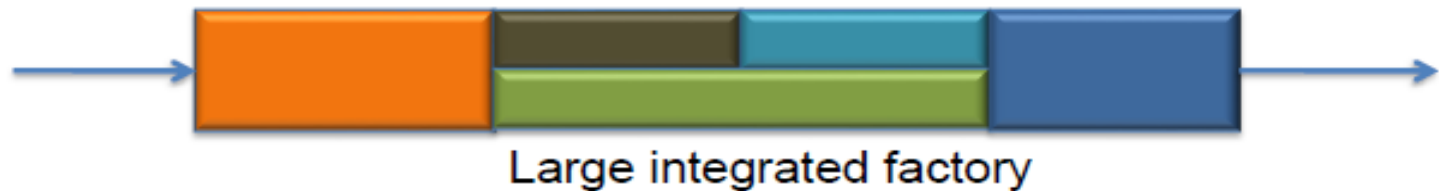


# **Current status of ASEAN Manufacturing value chain (trade trends) with Japan**

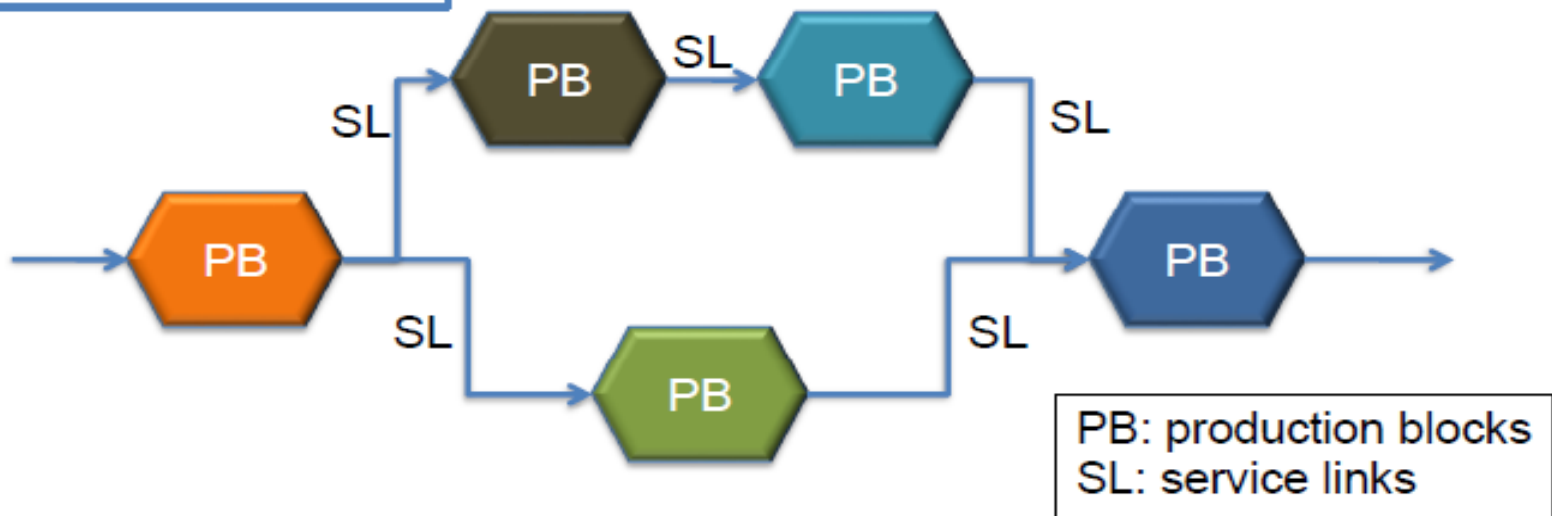
		Export		Import	
		Rank	Proportion %	Rank	Proportion %
Indonesia					
	Machinery	2	12.1	2	18.6
	Electronics	3	11.2	3	11.4
	Automobile	3	14.6	1	40.1
Malaysia					
	Machinery	6	5.1	3	11.4
	Electronics	5	7.5	3	13.4
	Automobile	7	5.6	1	41.7
Philippines					
	Machinery	2	18.1	1	30
	Electronics	3	12.3	2	11.7
	Automobile	3	14.5	2	26.1
Thailand					
	Machinery	3	8.8	1	25.9
	Electronics	1	14.5	1	23.3
	Automobile	6	3.8	1	60.5

# Evolution of Supply Chain = Production Fragmentation

Before fragmentation



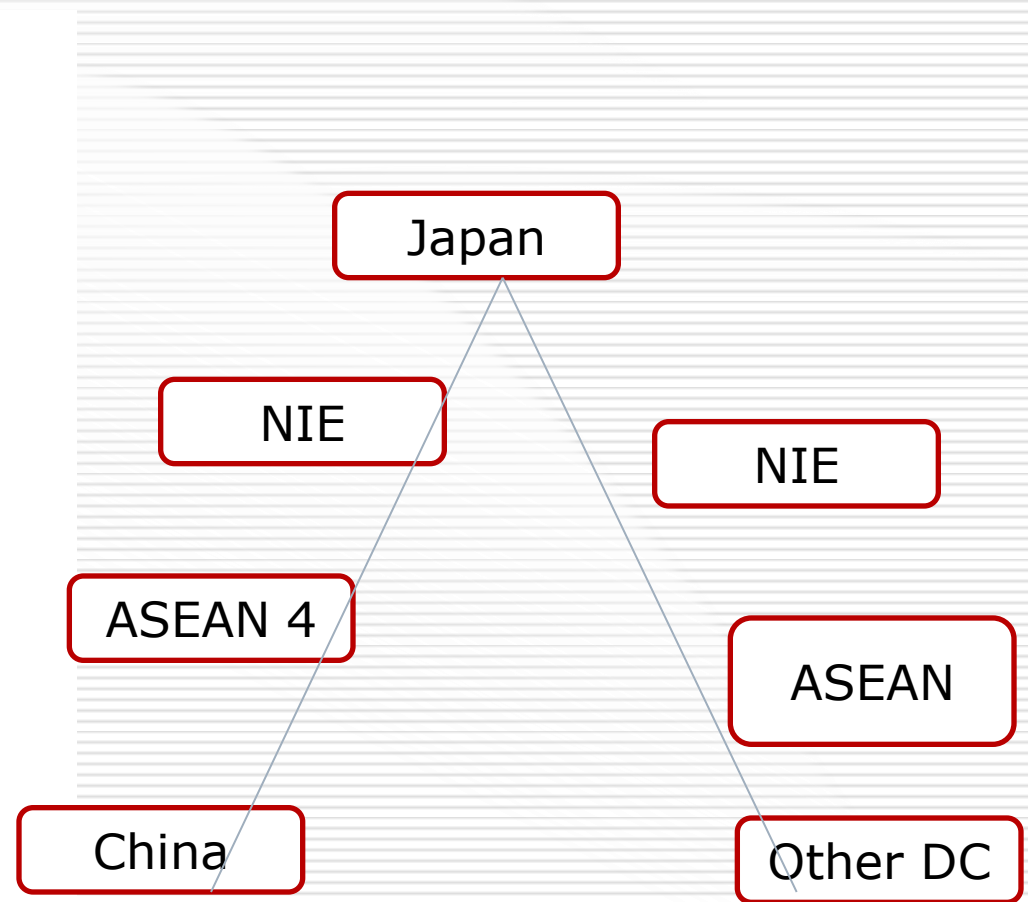
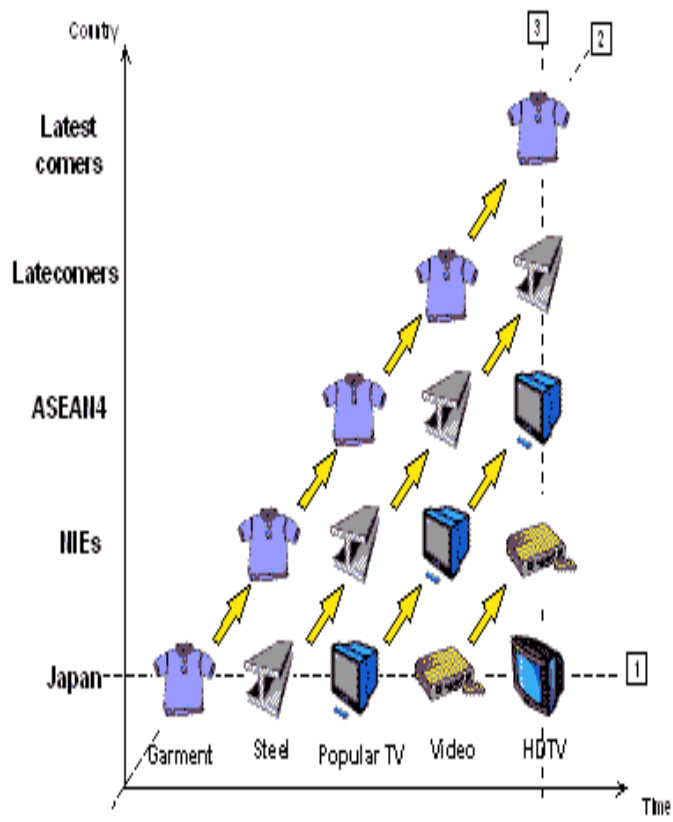
After fragmentation





# Flying Geese Pattern of Supply Chain Evolution in Asia

Structural Transformation in East Asia



Non durable consumer goods -> durable consumer goods -> Capital goods]

# Industrial Policies that supported Evolution of Regional/Global Supply Chains

	Policy	Period	Management	Capital	Capital goods	Technology	Parts
Japan	Large enterprise	1945-60	Domestic	Domestic	Domestic	Domestic +Foreign	Domestic
	Eco-Town	1990-	Domestic	Domestic	Domestic	Domestic	Domestic
Taiwan	SME	1960-1970	Domestic	Domestic	Domestic	Domestic	Domestic
	Export processing zone	1965-70	Foreign	Foreign	Foreign	Foreign	Foreign
Korea	EPZ	1972-80	Domestic	Domestic	Domestic	Foreign	Foreign
	Ecoindustrial Parks	2000	Domestic	Domestic	Domestic	Foreign	Foreign
China	Economic Development Zone	1984-	Foreign	Foreign	Foreign	Foreign	Foreign
	Eco-industrial Park	1995	Domestic	Domestic	Domestic	Foreign	Foreign
Malaysia	Free Trade Zone	1986-	Foreign	Foreign	Foreign	Foreign	Foreign
Thailand	Industrial parks	1976	Foreign	Foreign	Foreign	Foreign	Foreign

# Policy of Structural Dualism within Global Supply Chain— case of Japan, Korea, Taiwan

- Outfocused -> Infant industry (intensive, textile, electronics, automobile) -> Export Promotion -> Outward technology flow, Capita flow -> knowledge flow
- Inner dependent -> Disadvantaged industry (agriculture, transport, construction) -> Inward FDI Restriction -> Slow pace of technology development

# Role of Public-Policies in ASEAN 4

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## 1. Promotion of International competition/Market

- 100% foreign ownership
- Reduced local content ratio

## 2. Market intervention

- Preferential treatment
- Financing

## 3. Preconditions

- Macro economic stability
- Good infrastructure

Effect

- Increased  
export

- Increased  
employment
- Technology  
Transfer
- Increase  
energy use
- Increased  
pollution

Increased  
inequality

# Openness and Supply Chain Development

	Openness	Economic Progress		
		Annual growth of percapita GNP (1970-1995)	Growth of exports (%) 1970-1995	People living in less than a day (81-95)
<b>China</b>	25.4	6.9	12.5	29.4
<b>Indonesia</b>	52.6	4.7	10.6	14.5
<b>Korea</b>	62.5	10.0	11.6	-
<b>Malaysia</b>	154.2	4.0	13.6	5.6
<b>Phillippines</b>	61.5	0.6	5.3	27.5
<b>Thailand</b>	75.8	5.2	16.7	0.1
<b>India</b>	18.8	2.4	6.5	39.5

# Technology Achievement of Asia – Better than the world

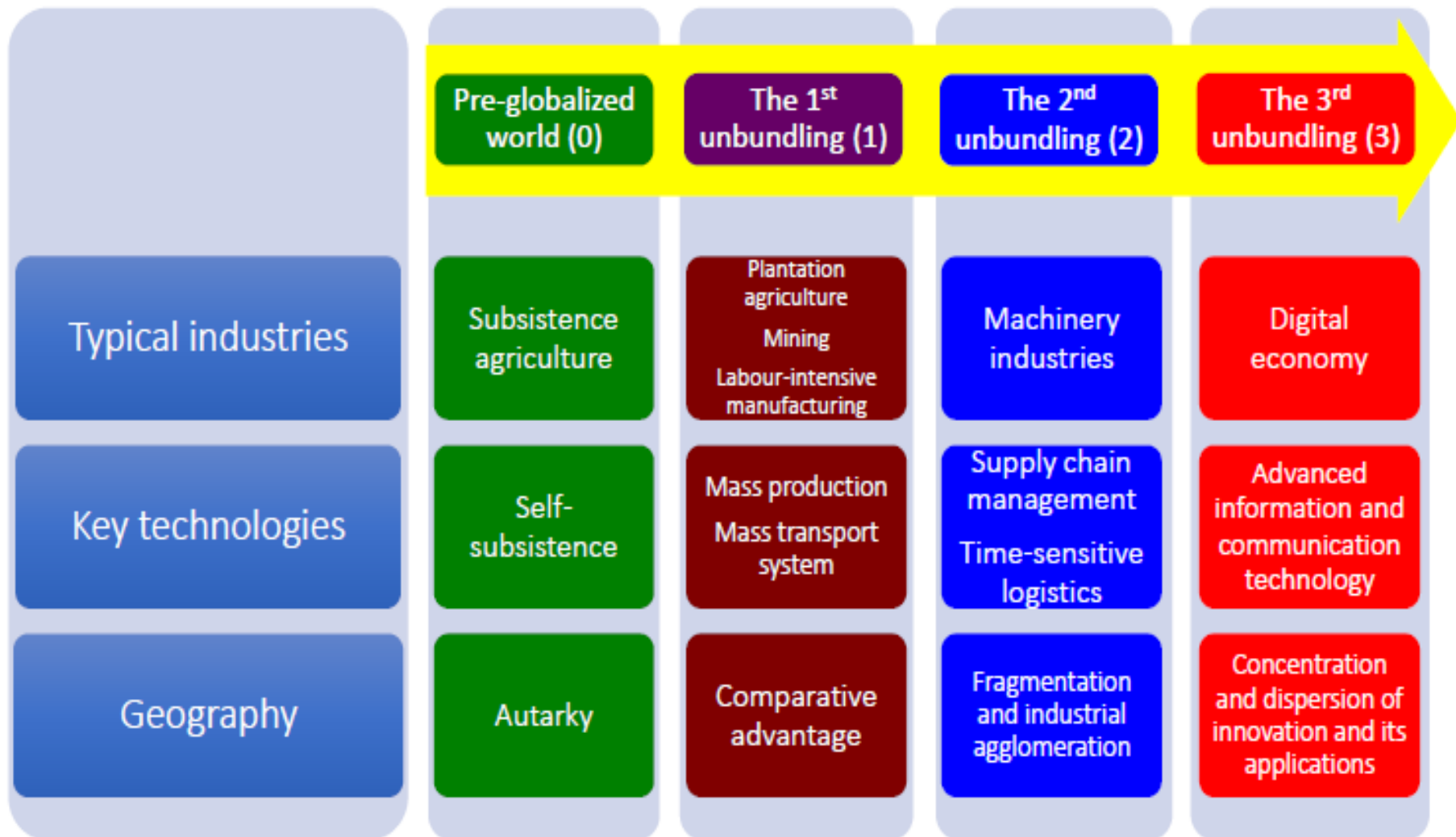
Country	Rank of Achievement	Technology Policy
China	42	33
Japan	5	11
India	67	51
NIE	13	14
ASEAN5	55	57
CLMV	77	47
Other developed	12	14
Other developing	53	54
world	43	42

# Procurement Policies and Practices of Japanese subsidiaries in Asia

(in FY 1989)

Sector	NIE			ASEAN		
	Local	Japan	Other	Local	Japan	Other
General Machinery	45.5	51.7	2.8	49.2	45.6	5.2
Electrical Machinery	46.4	45.3	8.4	32.5	40.3	27.2
Transport Machinery	61.2	38.0	0.9	39.0	47.3	13.7
Precision Machinery	31.0	57.6	11.5	7.9	85.0	7.1

# Supply chain and unbundling

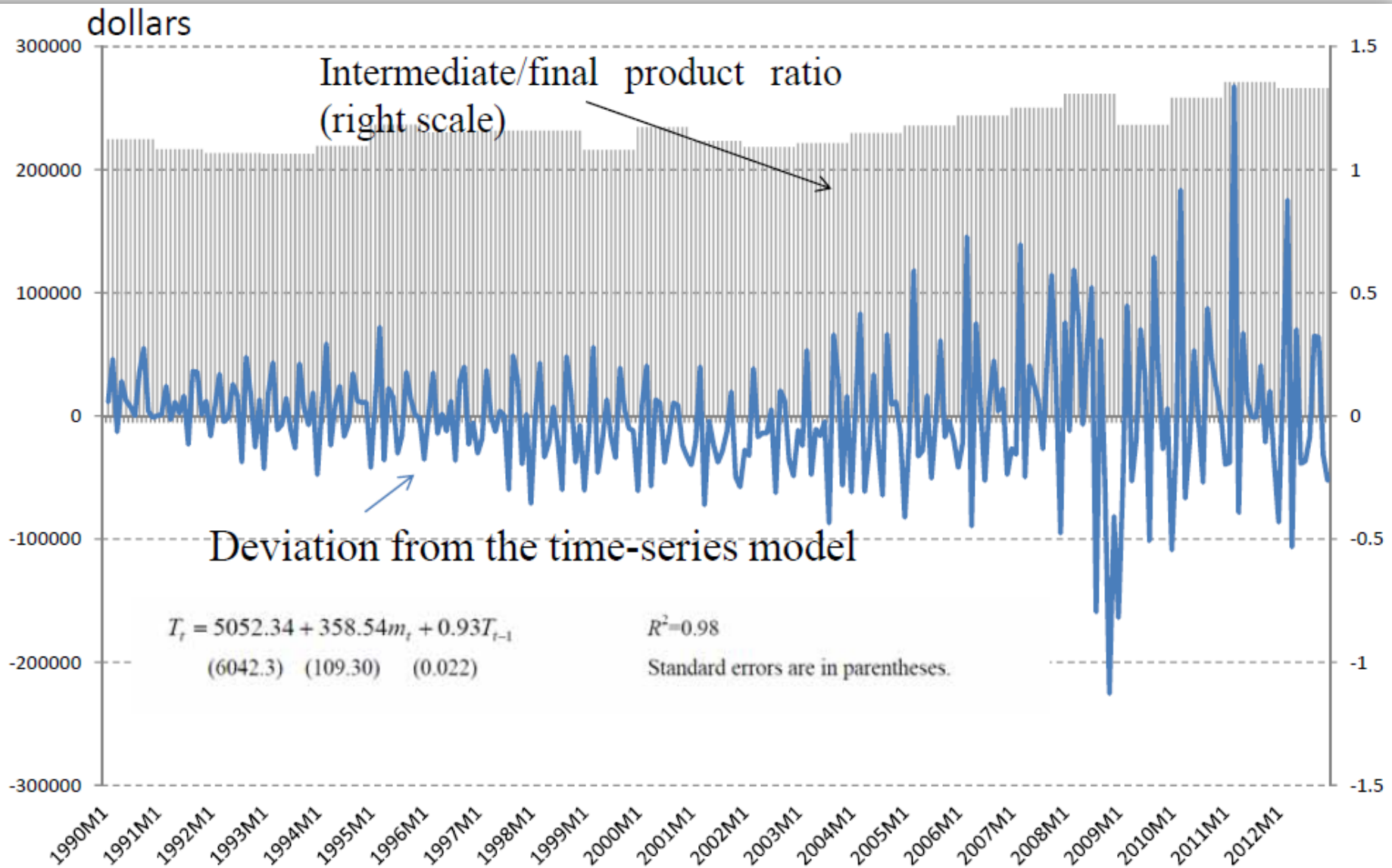




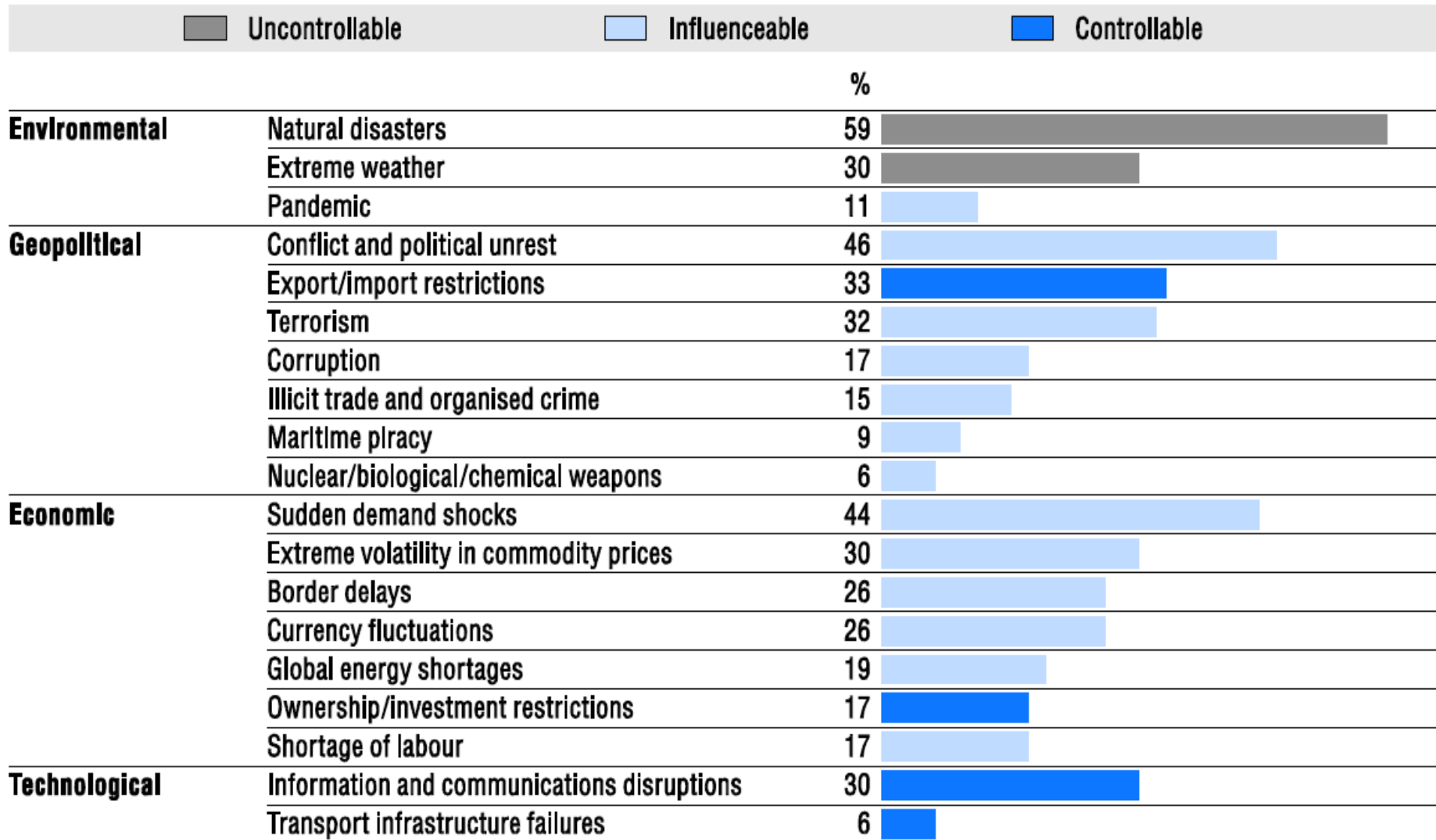
# Points to Ponder

- Supply Chain evolution of East Asia is characterized by the sequential take up of industrial restructuring, division of labor and productivity enhancement. There are comparative advantage of FG model that is characterized by openness to trade and investment which resulted in enhanced social benefits.
- A path dependency is observed in emulating the FDI strategies, industrial policies and infrastructure programs.
- Replication of FG model – with new lead geese(s) has the potential to evolution of new supply chains.

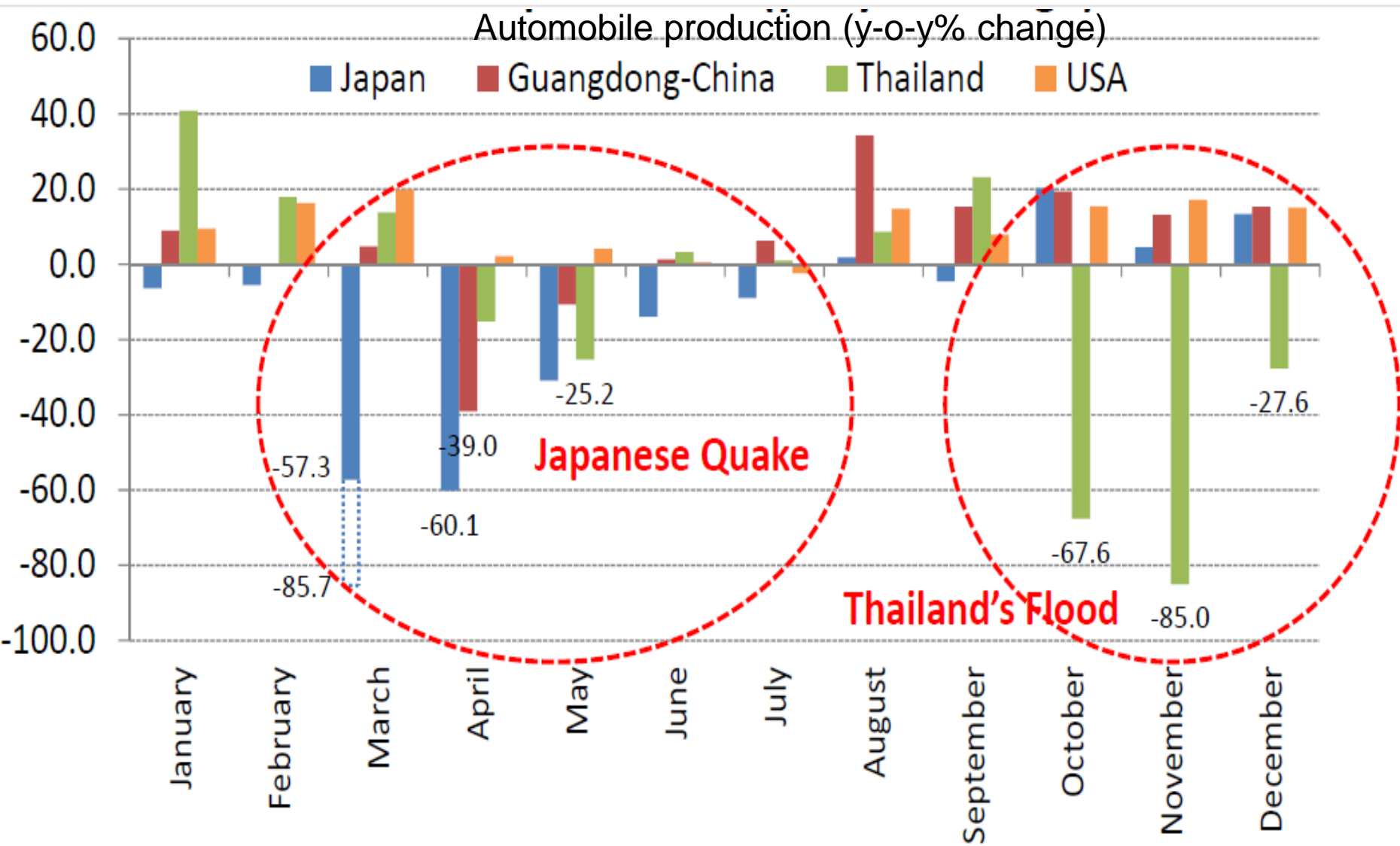
# Global supply chain is naturally volatile



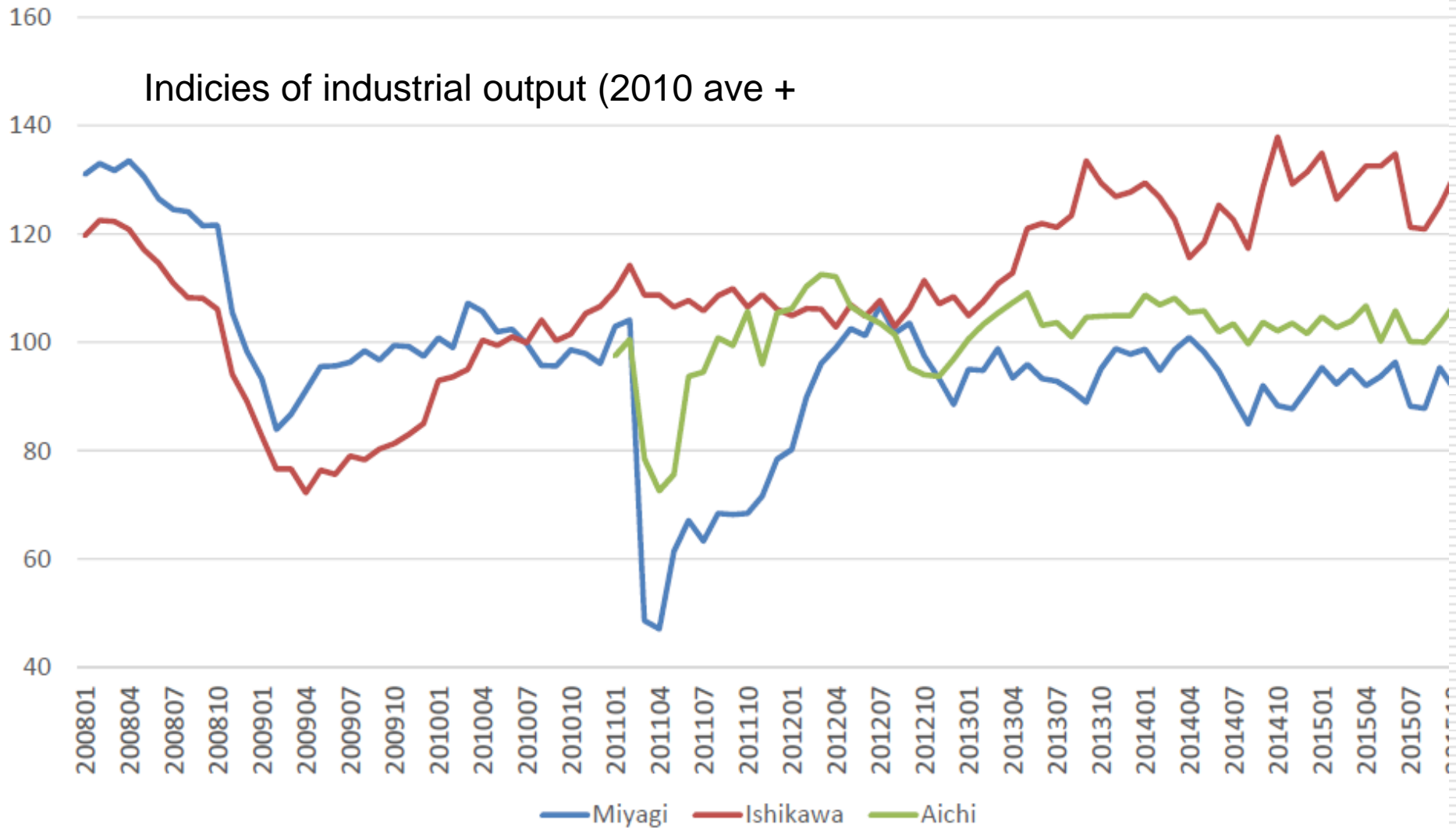
# Drivers of global value chain risks and resilience



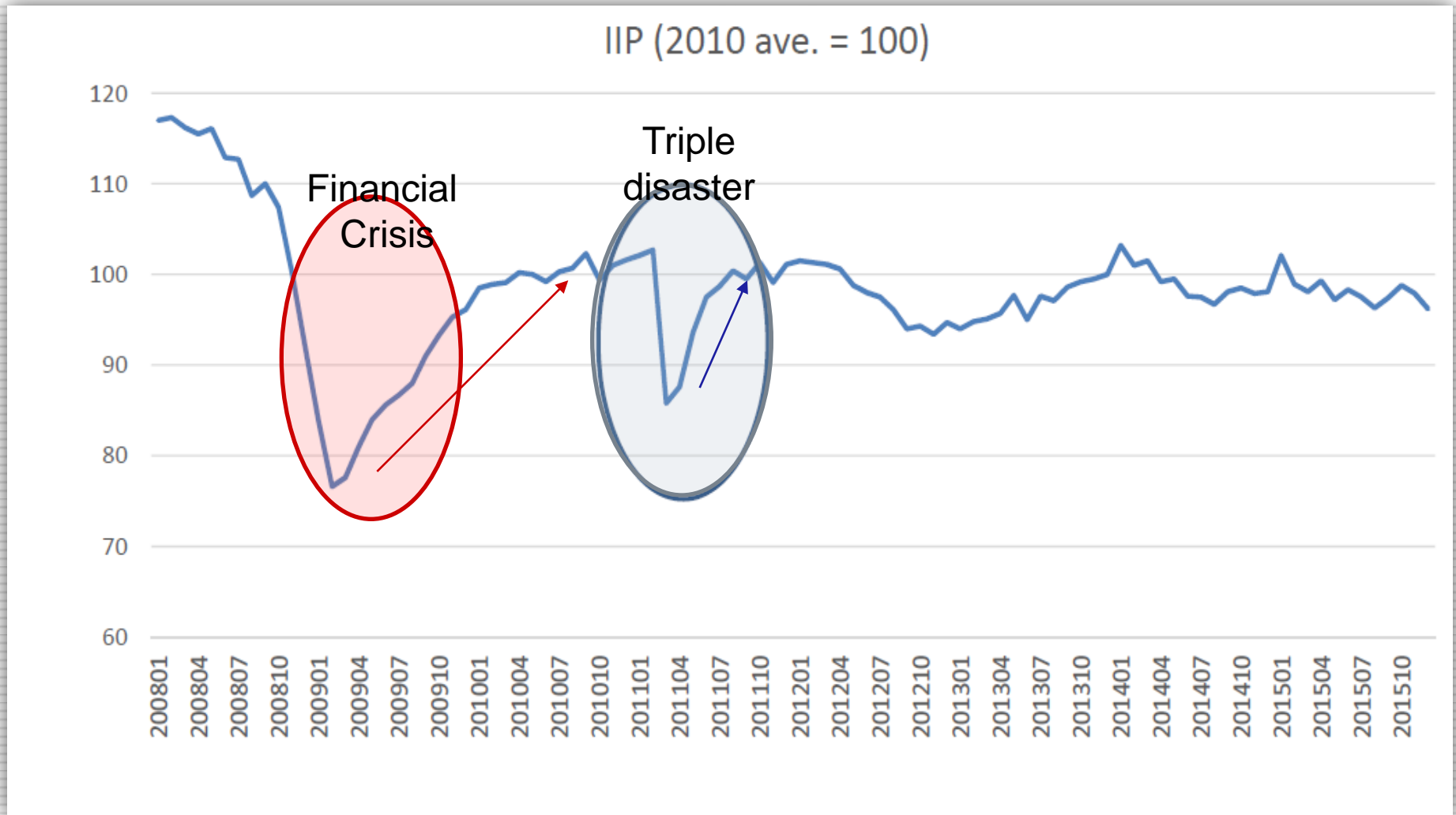
# But disasters can create deep shocks



# The impact of shocks vary by location



# What is impact of financial and economic shocks on Global value Chains?



Indices of industrial output in JPN recovered quickly after the disaster, but took longer time, after Lehman shocks

# Do economic shocks impair global value chains?

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- ❑ The theory indicates, global financial crisis can adversely affect supply chains, but this negative results is not robust in Viet Nam and Thailand. (IMF, 2010; Park and Kawai, 2011; Ando and Kimura, 2012).
- ❑ Evidence supports the view that the adverse exchange rate volatility have had impact on global value chains (Santos Silva and Tenryo, 2010; Hamanaka, 2012).
- ❑ Economic shocks such as financial crisis and exchange rate mechanisms can be associated with short-term unemployment for certain tier of workers. (Amiti and Wei, 2009; Crino, 2013)
- ❑ The theoretical and empirical literature has so far paid little attention to the impact of economic shocks on resilience of global supply chains.

# Immediate Impacts of Disasters on Supply Chain

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(Case of GEJE)

- 337 companies bankrupt in six months
- Only 46 companies located in tsunami affected area and most of the companies located in other parts.
- Main reason for bankrupt is “indirect loss’ or damage due to supply chain disruption

Impact to disaster hit area



{  
Lose company and competitiveness  
Difficult to secure employment  
Decrease tax revenue  
}

Potential impact to not disaster hit area  
outside the supply chain

Source: ([www.tdb.co.jp](http://www.tdb.co.jp))



# Medium term impacts of disasters and supply chain disruptions

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## Impact on Demand

Contraction of (for eg Japan's) import market  
(US\$ 728 b)

Impact on ASEAN's exports to Japan  
(US\$ 84 b)

## Impact on Supply

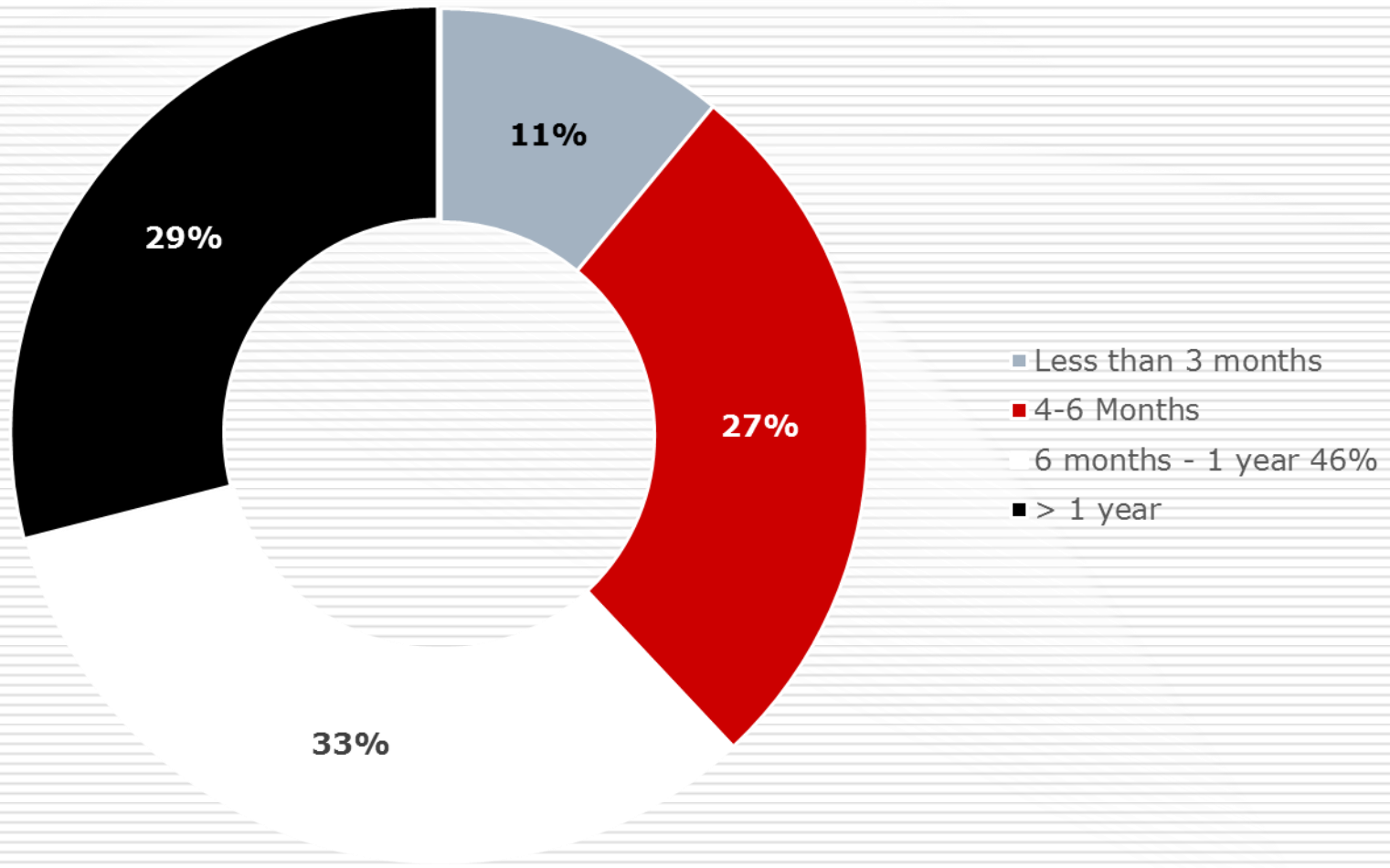
Impact on Japan's export markets  
(US\$ 427b)

Operational disruption in EAS  
Countries due to Japan's parts shortage  
(US\$ 225b)

Southeast and East Asia economic downturn

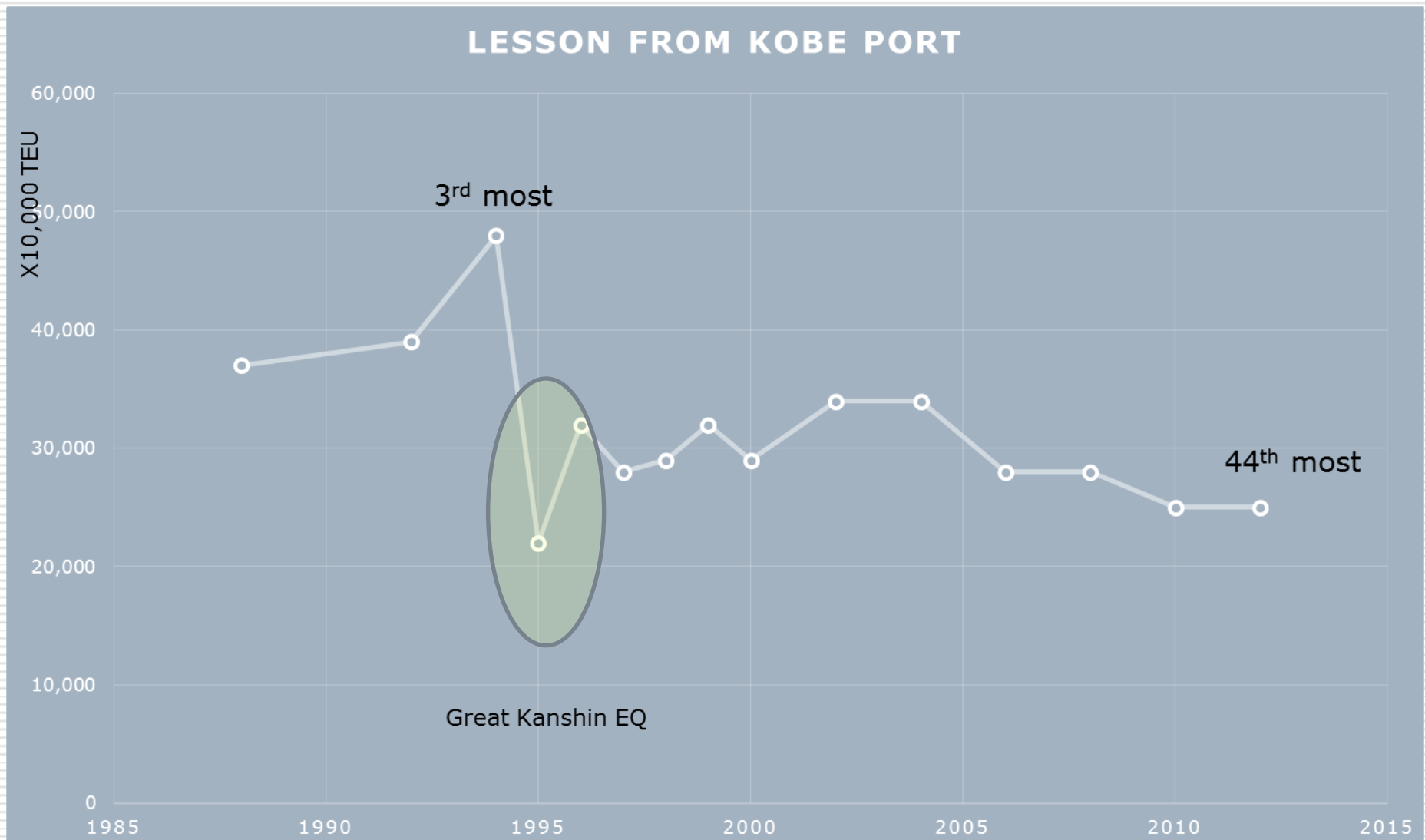
Impact on global economy

# Immediate Impact of Disasters - Production Recovery Time to Normal Level from Thailand Floods



Source: Business Survey – 2011, Bank of Thailand

# Recovery and Industrial Competitiveness



The Kobe port lost competitive ground from its leading global logistics positions after the EQ

# Business Risks and Resilience

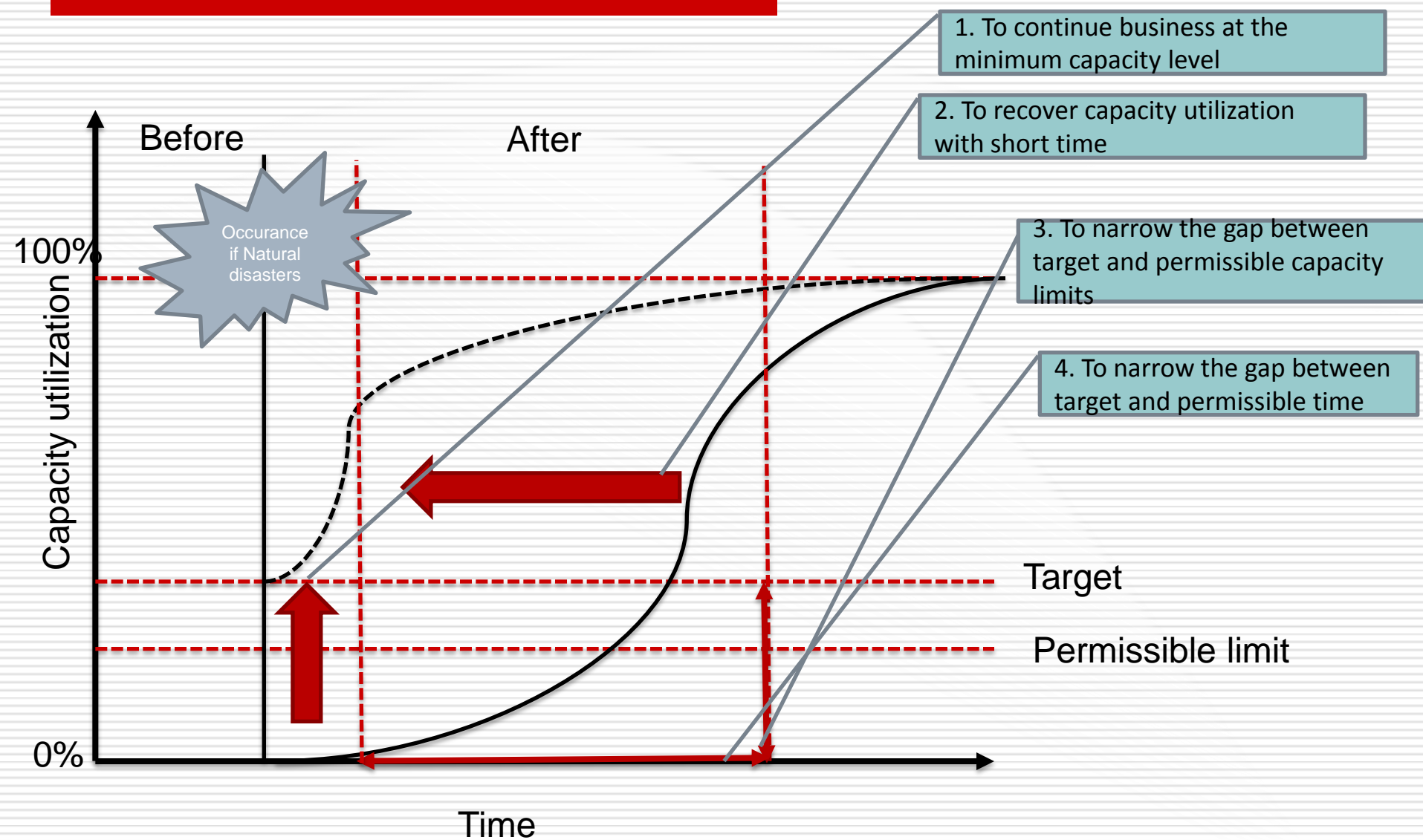
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- During economic shocks and natural disasters, the business must overcome many challenges
  - Restore or rebuild the own operations, facilities and restore the production level as soon as possible.
  - Regain the customers which have been lost during the ceased operation
  - In many cases, the previous customers will not come back. Target new customer, discount selling price will be necessary, which prevent firms from returning to profit earning situation

# What could be done for higher Resilience?

- Business continuity plan
- Investment in higher level of protection of workplace
- Creation of redundancy (multiple sourcing, duplication of production locations etc)

# Emerging Challenges :Disasters and Business Continuity Plans for Supply Chain Resilience



# Resilience and BCP issues

Enterprise Resilience		Issues
Risk Reduction		Prevention of shocks and disasters
		Emergency response, support
		Secondary support plans
		Compliance
Business Continuity (recovery and restoration)	Hardware	Upkeep of assets
		Fungibility of critical operations
		Security of information systems
	Software	Principles of BCP and crisis management plan
		Business impact analysis
		Understanding time series analysis of BCP
		Target restoration time
		Awareness and training programs
		Communication to stakeholders in time of crisis
		Disclosure of information on business community
		Financial stability – risk finance, insurance

# **Building Blocks of supply chain disaster Resilience**

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## **(i) Policy**

- Regulatory Frameworks
- Industrial guidelines
- Anchoring incentives

## **(ii) Investment**

- Access to financing
- Structuring incentives and other market mechanisms

## **(iii) Capacity Development**

- Promoting research and awareness
- Outreach on technical knowledge



# Regional Context for Advancing Supply Chain Disaster Resilience

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- Why is regional cooperation and coordination is needed?
- Are not supply chain risks, climate change and disasters are local events?
- Global supply chains shifts disaster damages from local to regional level
- Mega disasters and climate change affect other countries through supply chain: eg, GEJE and Thai floods
- To receive relief and assistance effectively: Need a regional protocol
- To strengthen supply chain risk management system against disasters through knowledge sharing and peer review

# Risk Financing for Supply Chain Resilience

National level

Type of Risk	Loss of assets -businesses	Loss of crops	Public assets, relief and reconstruction expenditure - governments
<b>Post-disaster (ex post)</b>	Emergency loans; money lenders; public assistance	Sale of productive assets, food aid	Diversions, assistance from bilateral, loans from IFI
<b>Pre-disaster (ex ante)</b>			
<b>Non-market</b>	Kinship arrangements	Voluntary mutual arrangements	Budget items
<b>Inter-temporal</b>	Micro-savings	Food storage	Catastrophe funds, contingent credit
<b>Market based risk transfer</b>	Property and life insurance	Crop and livestock insurance	Insurance or catastrophe bonds

# Current Regional Cooperation Framework for Disaster Risk management

## ASEAN Cooperation for Disaster Risk Reduction

### Other regional framework

APEC

ADPC

UNSDR  
WB-  
ASEAN

UNESCAP

### ASEAN

Brunei  
Cambodia  
Indonesia  
Laos  
Malaysia  
Myanmar  
Philippines  
Singapore  
Thailand  
Vietnam

### AADMER

Disaster risk identification, assessment and monitoring

Disaster risk prevention and mitigation

Disaster risk Preparedness

Emergency Responses

Technical cooperation and Scientific Research

Rehabilitation

### ACDM

### AHA Center

Risk Assessment, Early Warning and Monitoring

Partnerships

Prevention and Mitigation

Resource Mobilization

Preparedness and Response

Outreach and mainstreaming

Recovery

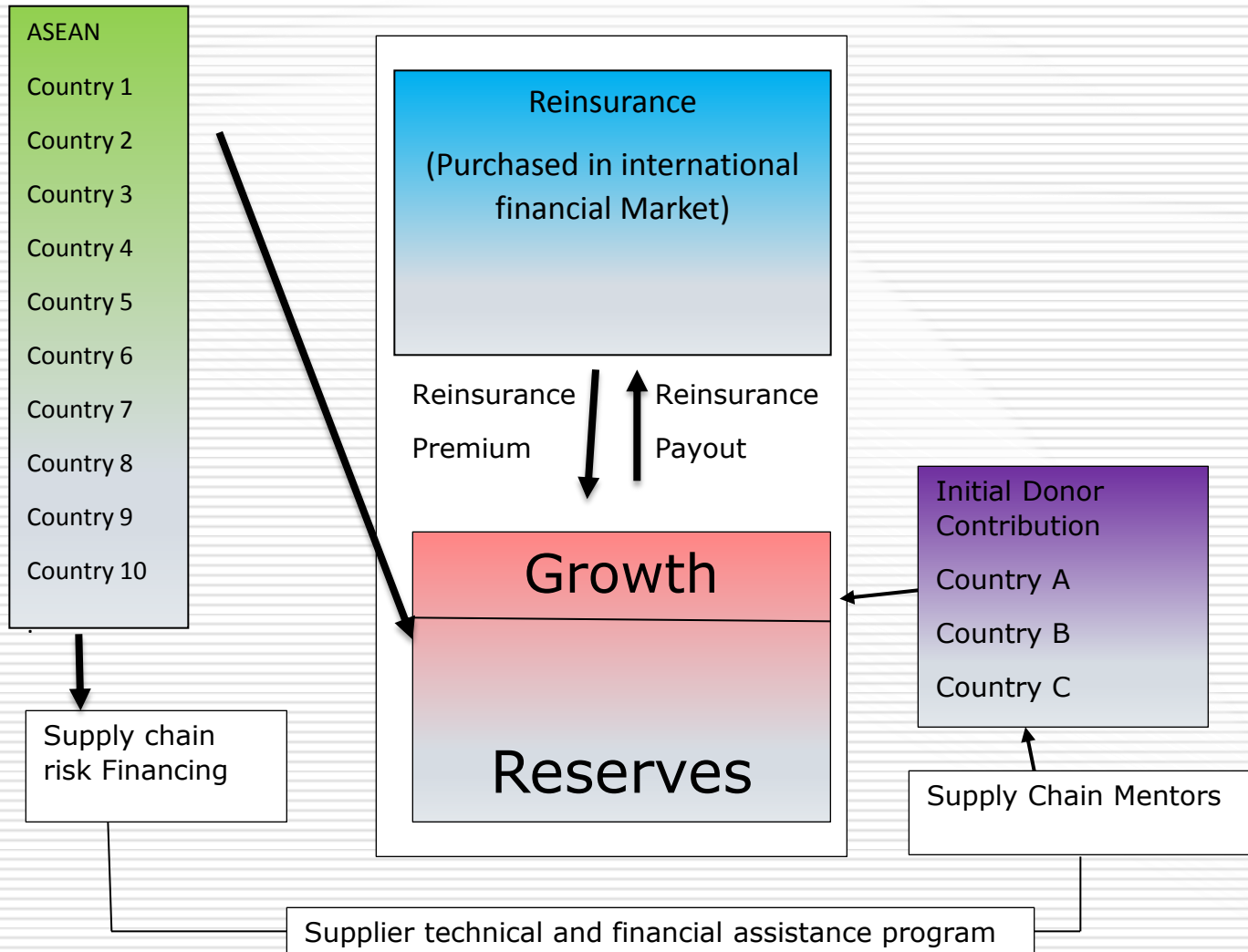
Information management and Communication Technology

Institutionalization

Training and knowledge management

**Bilateral Assistance (eg Japan –ASEAN) and Actions:**  
Regional monitoring guidelines, satellite based monitoring systems, Database management systems, Regional training

# Risk Financing at Regional Level



# Conclusions and Policy Implications

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- The increasing frequency of natural disasters and climate change with economic damages along the supply chain makes it imperative to recognize the risks from these disasters.
- Compared to evolving international good practices in supply chain management practices, current *ex post* approaches to disaster management in the region has been limited to rehabilitation/recovery with limited involvement of market forces such as *ex ante* risk financing.
- It is necessary to raise the currently still low awareness of business continuity plans and the commonality of the disaster (and climate change threats) in the region.
- Building up wide range of capacities at regional level in short time need expanding ongoing regional cooperation efforts to include evaluation of supply chain risks and review of applicable risk finance models.
- Knowledge support to disaster risk reduction along supply chain need to be consolidated and enhanced to include them as a part of regional level policy/capacity/economic development platform.