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Global and Regional Shock Transmission

—New Evidence from Globally Integrated Input-Output Table—

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Objectives

▶ Shock Transmission Analysis:

- ▶ To analyze the effect of demand driven shock originating from the US economy
 - ➔ How and to what extent a negative shock to the US import demand is transmitted globally and regionally to the production and trade of intermediate goods.

▶ Global Input-Output (GIO Table):

- ▶ 27 endogenous countries & 61 exogenous countries.
- ▶ 35 industries.
- ▶ Annual data from 2005 through 2010.

US Import Decline from Endogenous Countries

1. Percentage Change over the Corresponding Period of the Previous Year

	China	Indonesia	Japan	Korea	Thailand	Australia	France	Germany	UK
2008M1	2.0	0.2	2.3	-7.4	1.1	27.6	12.3	0.7	9.1
2008M2	4.5	13.8	5.8	5.9	15.7	32.0	19.8	13.8	23.6
2008M3	-1.4	1.2	2.6	-4.5	3.1	-9.7	0.4	12.0	-1.2
2008M4	6.9	20.2	3.7	9.2	9.0	22.8	12.2	16.9	9.0
2008M5	8.6	10.3	1.0	-0.1	0.9	15.3	8.7	5.3	-1.8
2008M6	2.7	2.8	3.0	-2.2	7.0	60.1	11.5	16.5	5.2
2008M7	9.1	20.4	-6.8	6.2	6.8	24.1	3.0	13.3	11.9
2008M8	11.5	13.5	-5.7	2.1	1.9	13.2	1.5	-8.2	20.1
2008M9	12.1	6.6	-2.5	12.7	15.5	65.7	7.8	0.6	4.1
2008M10	7.3	17.1	-15.2	12.5	-0.5	13.6	-2.4	-3.9	-6.1
2008M11	-5.2	7.8	-18.0	-13.2	-7.0	17.7	-9.4	-13.7	-21.5
2008M12	-2.8	5.7	-17.1	-6.8	-9.7	-3.2	9.0	-11.6	-10.0
2009M1	-5.9	-6.6	-29.4	-7.6	-18.8	-13.5	-18.9	-25.3	-31.0
2009M2	-22.4	-12.6	-48.9	-25.1	-28.6	-20.1	-31.1	-29.5	-16.4
2009M3	-6.2	-14.9	-46.2	-20.4	-24.6	10.8	-14.8	-34.9	-22.7
2009M4	-16.1	-25.5	-45.8	-30.1	-31.9	-18.2	-27.3	-41.1	-24.2
2009M5	-18.6	-19.6	-45.3	-25.6	-29.0	-36.0	-29.1	-41.1	-32.7
2009M6	-15.0	-15.7	-36.7	-16.9	-28.2	-50.9	-23.8	-38.8	-26.8
2009M7	-18.9	-28.1	-33.2	-24.9	-21.8	-34.8	-22.8	-30.7	-26.2
2009M8	-20.1	-29.7	-25.3	-20.1	-16.2	-42.1	-29.4	-29.3	-26.4
2009M9	-16.6	-21.4	-23.5	-15.8	-23.4	-30.5	-25.8	-20.7	-9.9
2009M10	-14.2	-20.1	-21.0	-23.6	-10.7	-17.3	-26.2	-15.6	-11.6
2009M11	-3.6	-14.7	-4.5	-8.8	-3.7	-9.3	-8.7	-4.8	7.6
2009M12	4.7	-4.5	-3.1	3.2	9.7	-1.9	-12.9	-2.9	0.0
2010M1	0.9	-4.5	-1.6	-14.4	9.9	-20.7	1.9	-5.1	2.4
2010M2	23.2	18.4	38.9	8.6	15.9	13.6	5.5	2.3	10.0
2010M3	14.7	34.1	47.5	16.2	21.3	8.2	21.9	17.4	18.7
2010M4	18.2	37.3	31.6	27.0	37.6	-2.5	18.2	23.4	-1.4
2010M5	28.3	26.7	42.8	29.2	21.0	29.4	13.2	35.8	7.6
2010M6	38.3	35.1	33.5	34.7	30.0	26.2	5.2	30.8	20.8
2010M7	30.9	30.7	26.0	31.4	22.8	29.9	3.1	13.7	7.3
2010M8	38.4	34.9	29.2	43.8	22.0	17.8	21.5	33.5	6.6
2010M9	26.7	39.5	17.4	27.7	20.9	-0.4	27.4	17.7	-9.0
2010M10	19.1	6.8	23.8	29.4	10.3	-3.1	8.2	11.6	-5.5
2010M11	28.0	53.0	14.0	44.3	18.2	12.8	12.7	12.5	-6.1
2010M12	16.6	26.7	19.3	22.4	4.5	-8.4	20.6	6.1	12.8

2. Annual Average Change

	08M1~ 08M12	09M1~ 09M12	10M1~ 10M12
China	4.6	-12.7	23.6
Indonesia	10.0	-17.8	28.2
Japan	-3.9	-30.2	26.9
Korea	1.2	-18.0	25.0
Thailand	3.7	-18.9	19.5
Australia	23.3	-22.0	8.6
France	6.2	-22.6	13.3
Germany	3.5	-26.2	16.7
UK	3.5	-18.4	5.4

This [export decline in 2009](#) is used for an analysis of the [shock transmission](#).

Source: IMF, Direction of Trade Statistics, CD-ROM.

US Import Decline of Finished Goods

(by Industry, 2008-2009, Million US\$) (Source: UN Comtrade)

	World	Japan	China	Korea	Taiwan	Malaysia	Thailand	France	Germany	UK
2009 Manufacturing Industries, Total	-137,449	-28,711	-17,684	-3,078	-2,094	-5,707	-1,803	-4,421	-12,041	-4,657
Y03 Food, beverages and tobacco	-4,791	9	-611	5	-37	-75	23	-743	-54	-146
Y04 Textiles, leather and footwear	-15,883	-26	-3,568	-269	-485	-202	-637	-174	-51	-71
Y05 Wood product	-336	-1	-231	-1	-4	0	0	-1	-1	-1
Y06 Paper products, printing and publishing	-1,048	-84	-303	-31	0	-5	-8	-18	-49	-156
Y07 Coke, refined petroleum and nuclear fuel	42	-4	0	0	0	0	0	1	4	0
Y08 Chemicals and pharmaceuticals	1,466	367	-79	-2	-19	-5	-7	-1,254	895	-525
Y09 Rubber and plastics products	-1,957	-152	-668	-28	-140	-30	-6	-28	-75	-68
Y10 Other non-metallic mineral products	-645	-8	-324	16	-3	-6	-20	-38	-28	-24
Y11 Basic metals	0	0	0	0	0	0	0	0	0	0
Y12 Fabricated metal products	-1,200	124	-745	14	-154	-2	-33	27	-76	-13
Y13 Machinery and equipment, nec	-21,743	-5,823	-1,679	-205	-531	-98	-115	-710	-4,003	-1,049
Y14 Office, accounting and computing machinery	-5,724	-587	128	-148	-157	-4,076	-397	6	-93	-143
Y15 Electrical machinery and apparatus, nec	-4,773	-410	-720	28	-174	-12	-66	-56	-430	-124
Y16 Radio, television and communication equipment	-6,408	-1,753	100	-258	-236	-881	-176	-39	-104	-128
Y17 Medical, precision and optical instruments	-7,086	-1,265	-952	-211	321	-157	-84	-65	-1,000	-184
Y18 Motor vehicles	-50,001	-18,069	-274	-1,807	-44	1	-3	-152	-7,340	-1,869
Y19 Other transport equipment	-5,388	-864	-539	-115	-121	-18	1	-1,002	527	-71
Y20 Other Manufacturing	-11,975	-165	-7,218	-68	-308	-141	-276	-175	-164	-86

Questions

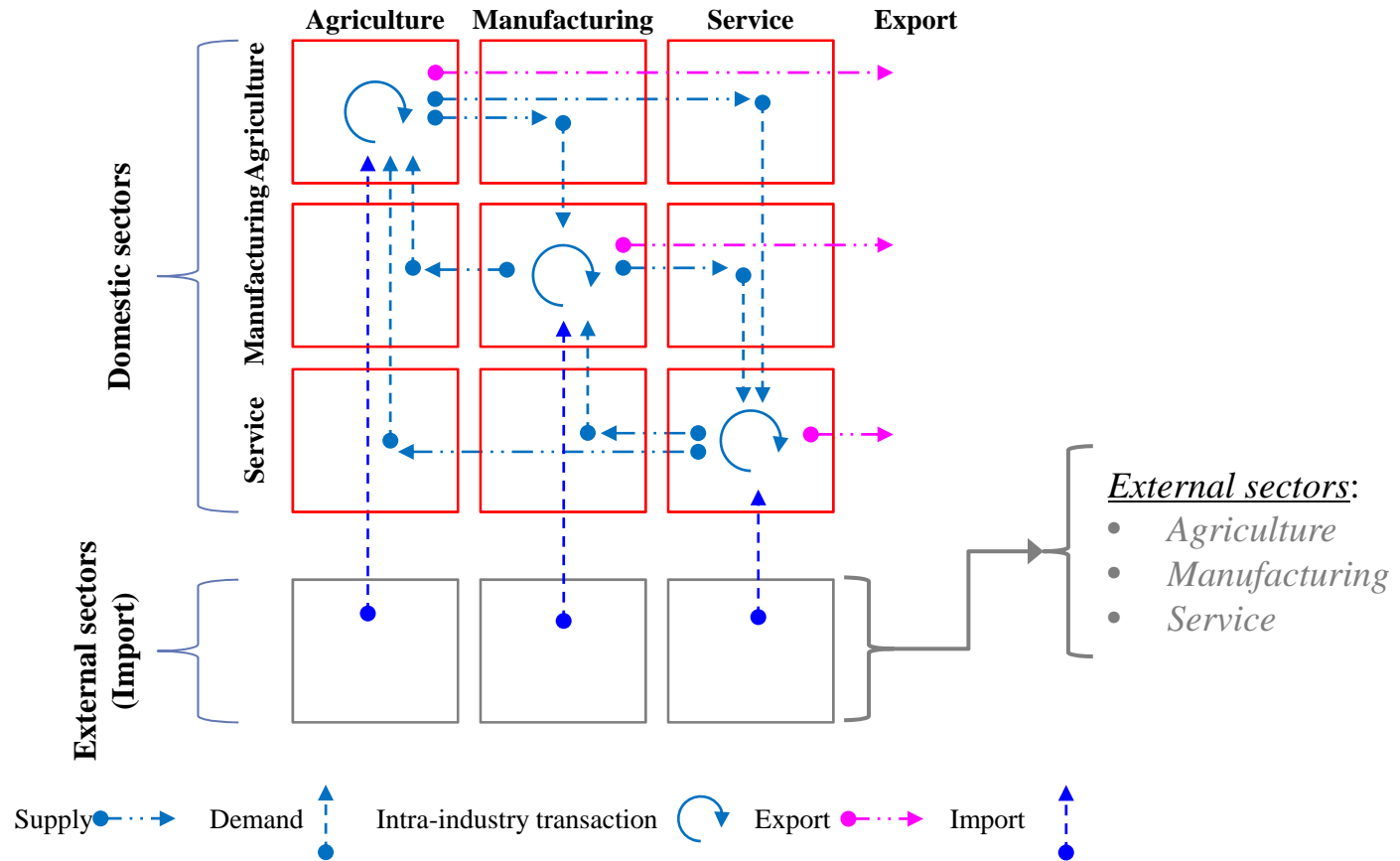
- ▶ Transmission of US shock:
 - ▶ How and to what extent a **negative shock** to the US import demand is **transmitted** globally and regionally to the **production** and **trade** of intermediate goods?
- ▶ Sharp decline of Japanese exports:
 - ▶ Why were **Japan's trade and production** most hit by the global financial crisis?
- ▶ Implications for regional integration
 - ▶ Can we analyze the issue of **regional integration** by using the GIO analysis?

YNU-Global Input-Output (GIO) Table

Comparison of YNU-GIO, WIOD and AIIO

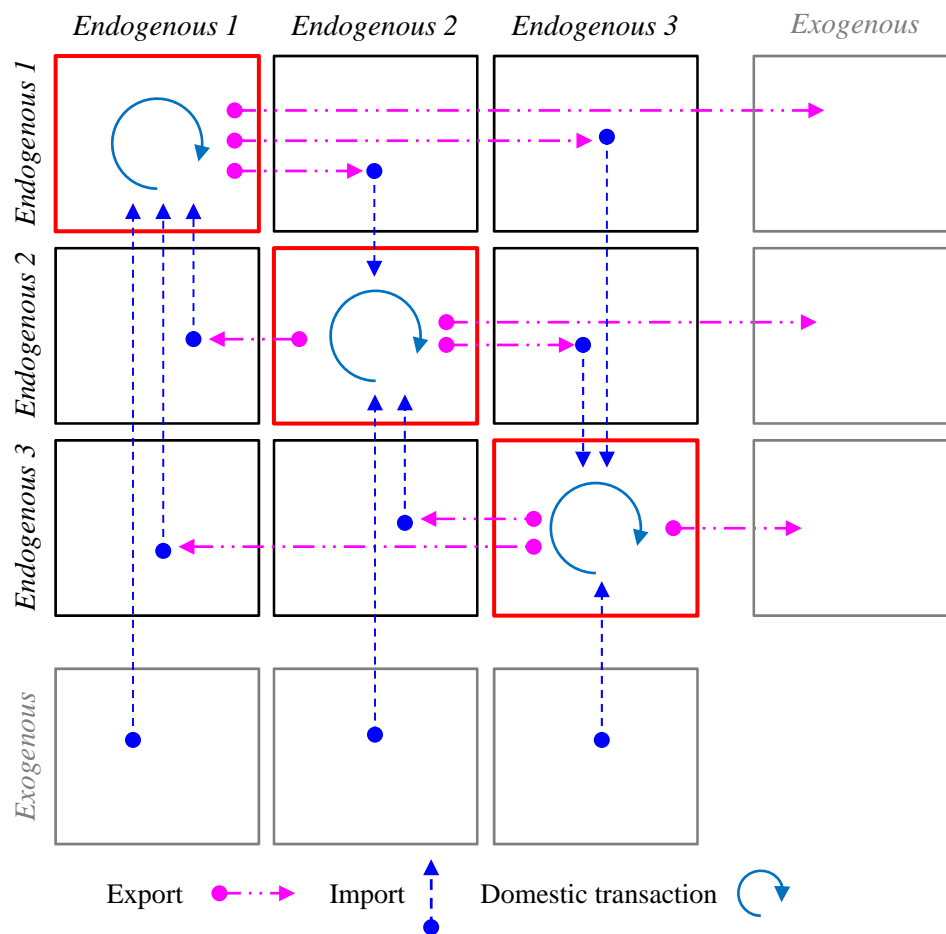
	YNU-GIO	WIOD	Asian IIO Table (IDE-JETRO)
Number of Endogenous countries	27 countries	40 countries	10 countries
<i>Asia</i>	9 countries JPN, CHN, KOR, TWN, MAL , THL , IDN, VTM , IND	6 countries JPN, CHN, KOR, TWN, IDN, IND	9 countries JPN, CHN, KOR, TWN, MAL, THL, IDN, SGP, PHL
<i>North America</i>	3 countries USA, CAN, MEX	3 countries USA, CAN, MEX	1 country USA
<i>Europe</i>	12 countries FRA, GER, UK, EU9	27 countries EU27	
<i>Others</i>	3 countries AUS, BRA, SAF	4 countries AUS, BRA, RUS, TUR	
Exogenous countries	61 countries HK , PHL , SGP , Asia31 , Eur16, OPEC12 and ROW	???	3 countries HK, EU27 (?), and ROW
Period (Availability)	2005 - 2010	1995 - 2009	1985, 1990, 1995 and 2000 (Latest table)

Single Country Three Sector IO table

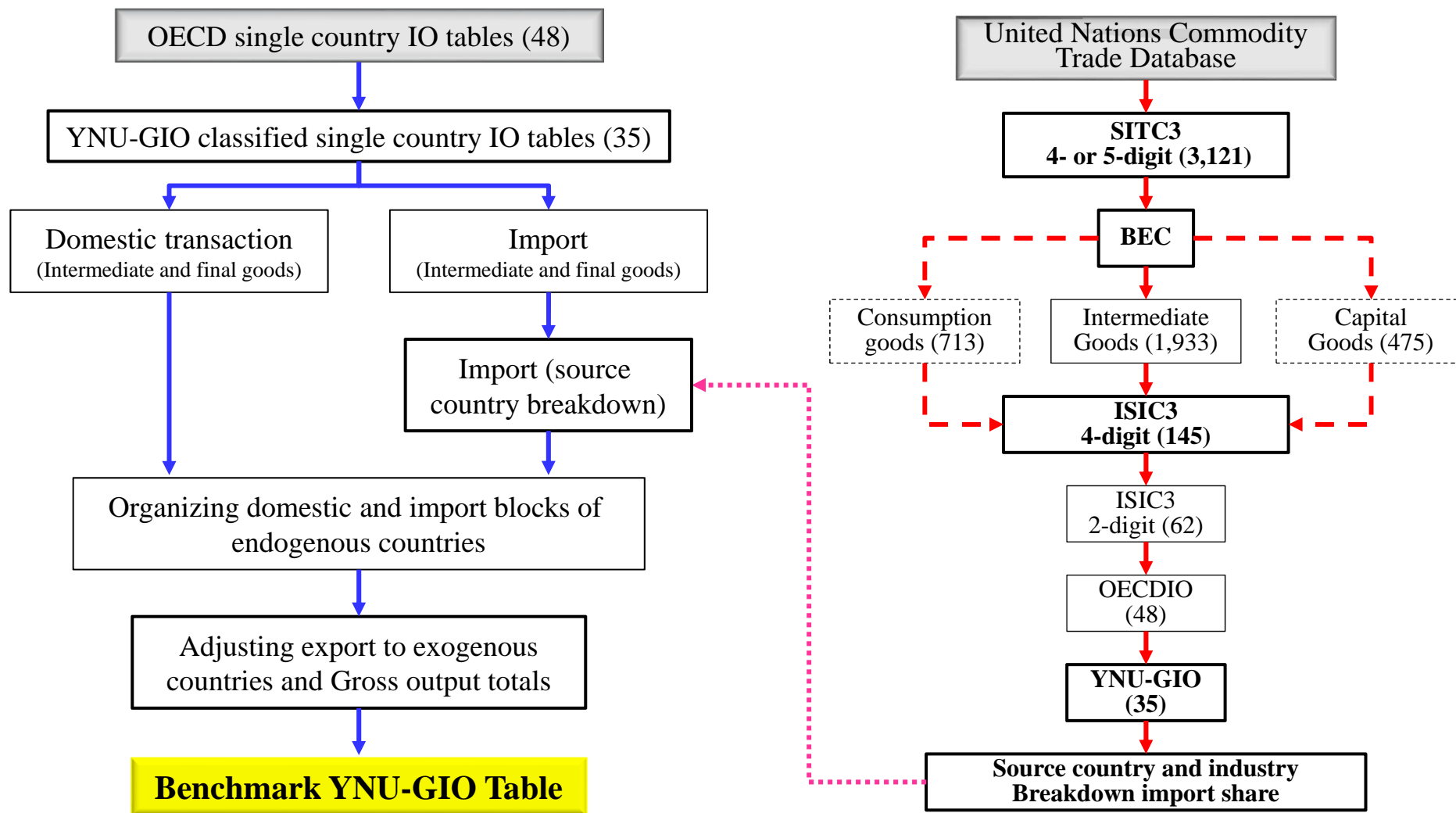


Note: Single country OECD IO table has maximum 48 sectors

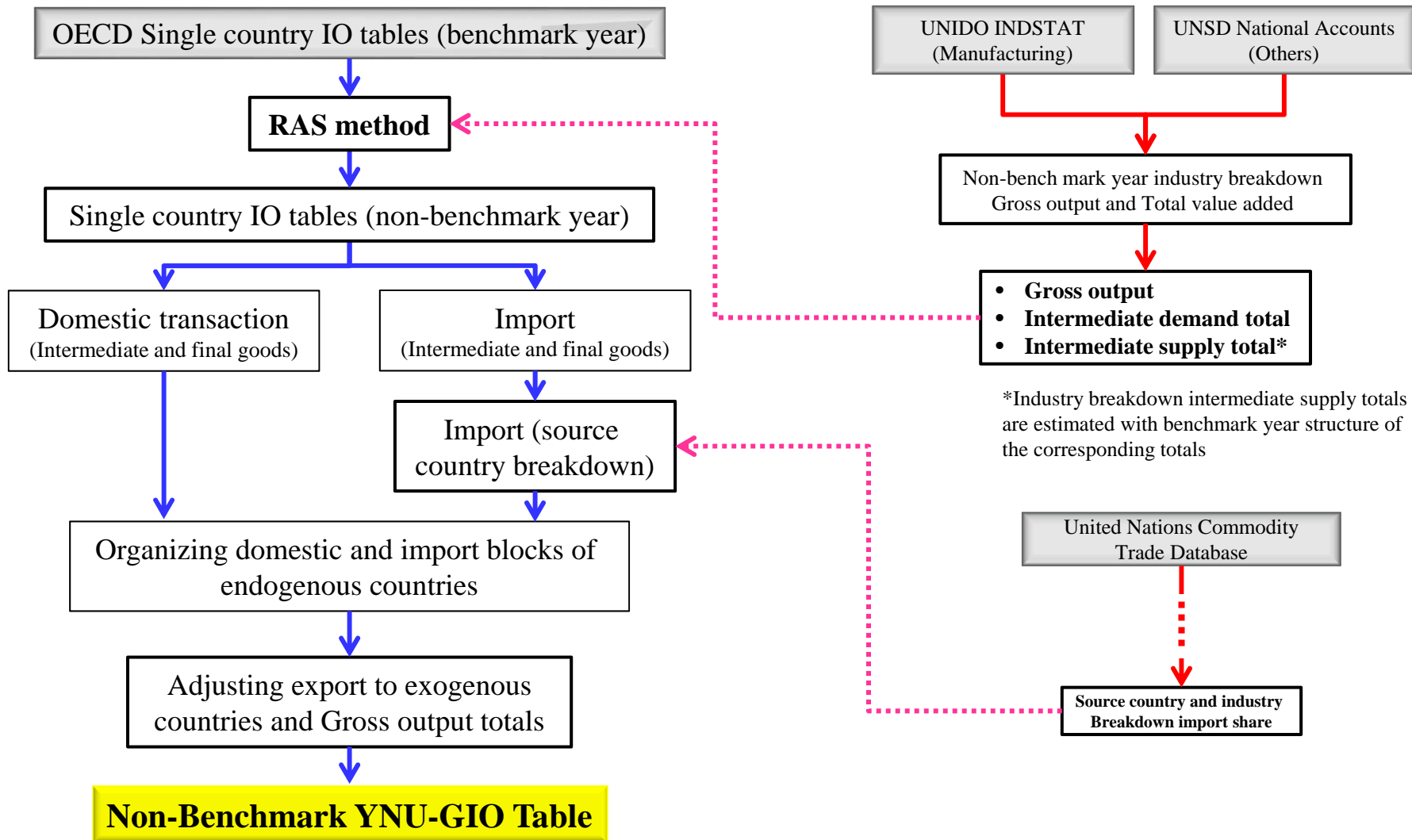
Globally Integrated IO table



Construction of YNU-GIO Table



Construction of YNU-GIO Table (Contd.)



List of Endogenous Countries

- Asia
- | | | | | | |
|----|-------|----|----------|----|-----------|
| 1. | Japan | 4. | Taiwan | 7. | Indonesia |
| 2. | China | 5. | Malaysia | 8. | Vietnam |
| 3. | Korea | 6. | Thailand | 9. | India |

- North America
- | | | | | | |
|----|-----|----|--------|----|--------|
| 1. | USA | 2. | Canada | 3. | Mexico |
|----|-----|----|--------|----|--------|

- Europe
- | | | | | | |
|----|---------|----|------------|----|-------------|
| 1. | France | 2. | Germany | 3. | EU9 |
| 1. | Austria | 4. | Ireland | 7. | Netherlands |
| 2. | Belgium | 5. | Italy | 8. | Portugal |
| 3. | Finland | 6. | Luxembourg | 9. | Spain |

- Others
- | | | | | | |
|----|-----------|----|--------|----|--------------|
| 1. | Australia | 2. | Brazil | 3. | South Africa |
|----|-----------|----|--------|----|--------------|

List of Exogenous Countries

Asia31

1. Afghanistan
2. Bangladesh
3. Bhutan
4. Maldives
5. Nepal
6. Pakistan
7. Sri Lanka
8. Armenia
9. Azerbaijan
10. Bahrain
11. Brunei
12. Cambodia
13. Macau
14. North Korea
15. Georgia
16. Israel
17. Jordan
18. Kazakhstan
19. Kyrgyzstan
20. Lao PDR
21. Lebanon
22. Mongolia
23. Myanmar
24. Oman
25. Syria
26. Tajikistan
27. Turkey
28. Turkmenistan
29. Uzbekistan
30. Yemen
31. Sweden

Europe16

1. Bulgaria
2. Cyprus
3. Czech Rep.
4. Denmark
5. Estonia
6. Greece
7. Hungary
8. Latvia
9. Lithuania
10. Malta
11. Poland
12. Romania
13. Russia
14. Slovakia
15. Slovenia
16. Sweden

OPEC12

1. Algeria
 2. Angola
 3. Ecuador
 4. Iran
 5. Iraq
 6. Kuwait
 7. Libya
 8. Nigeria
 9. Qatar
 10. Saudi Arabia
 11. UAE
 12. Venezuela
-

List of Manufacturing Industries

GIO YNUGIO Industry List (Manufacturing)

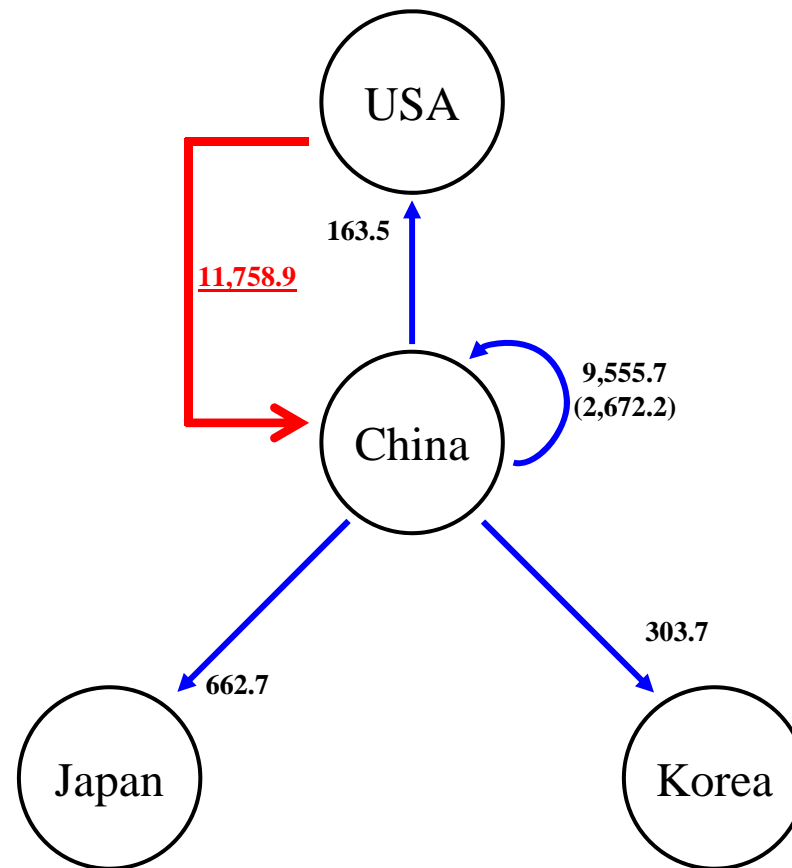
- Y03 Food products, beverages and tobacco
- Y04 Textiles, textile products, leather and footwear
- Y05 Wood and products of wood and cork
- Y06 Pulp, paper, paper products, printing and publishing
- Y07 Coke, refined petroleum products and nuclear fuel
- Y08 Chemicals and pharmaceuticals
- Y09 Rubber and plastics products
- Y10 Other non-metallic mineral products
- Y11 Basic metals
- Y12 Fabricated metal products, except machinery and equipment
- Y13 General Machinery
- Y14 Office, accounting and computing machinery
- Y15 Electrical machinery and apparatus, nec
- Y16 Radio, television and communication equipment
- Y17 Medical, precision and optical instruments
- Y18 Motor vehicles, trailers and semi-trailers
- Y19 Other transport equipment
- Y20 Other Manufacturing

Electric Machinery

Transport Equipment

Shock Transmission Mechanism

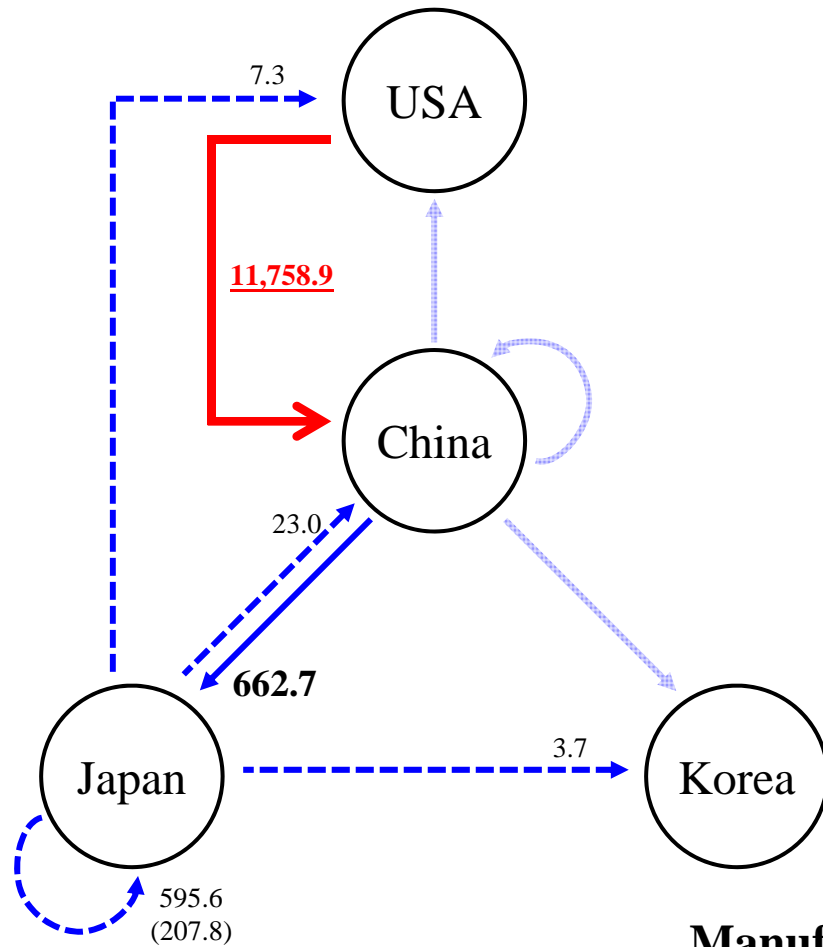
Direct Shock Transmission (Million US\$) through China



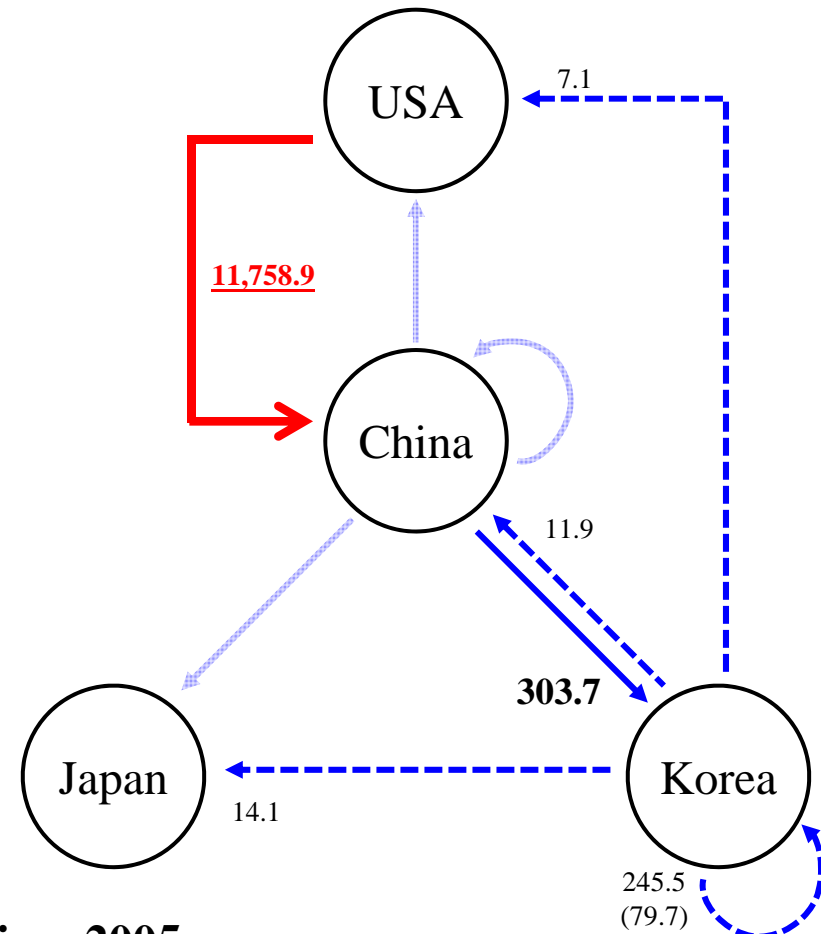
Manufacturing, 2005

Shock Transmission (Million US\$) through China at First Stage Via ...

... Japan

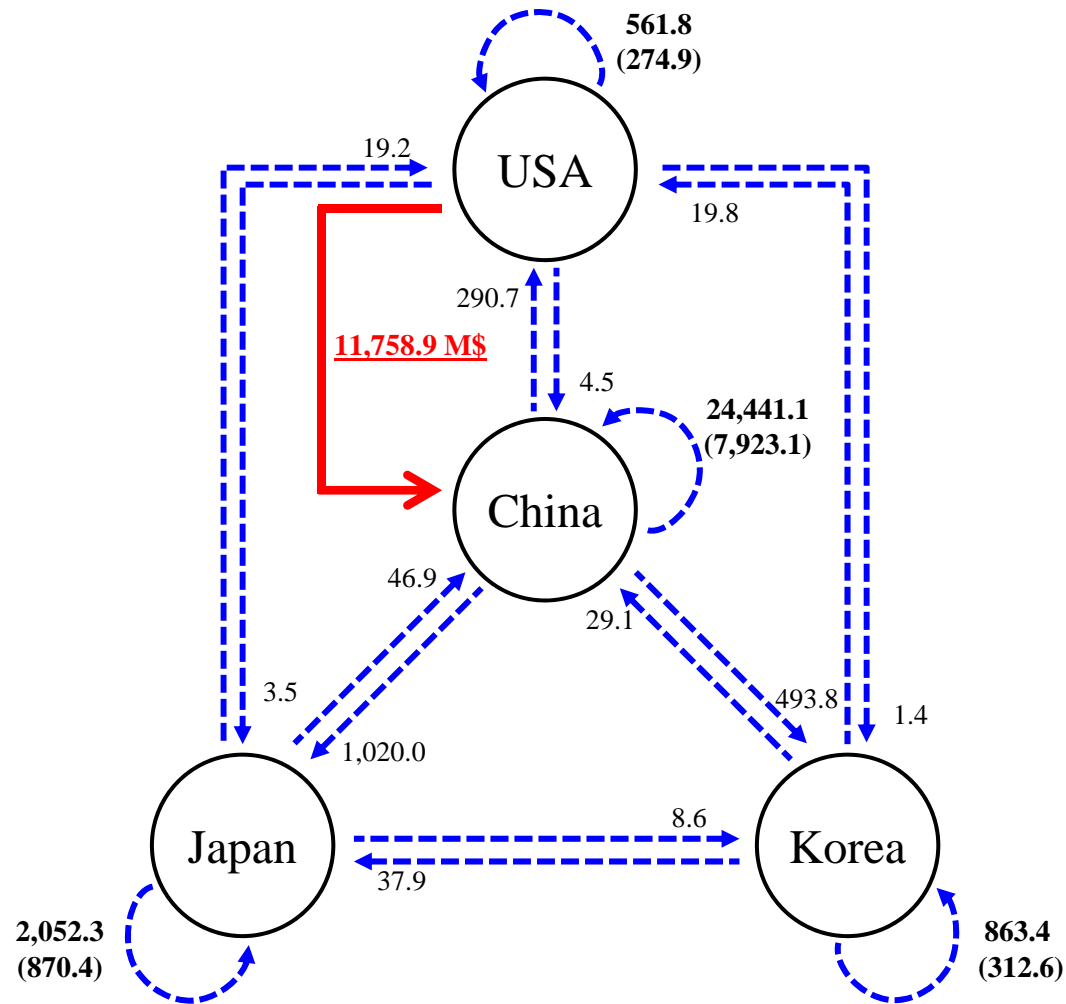


... Korea



Manufacturing, 2005

Shock Transmission (Million US\$): — 10% decline in China's exports to the USA —

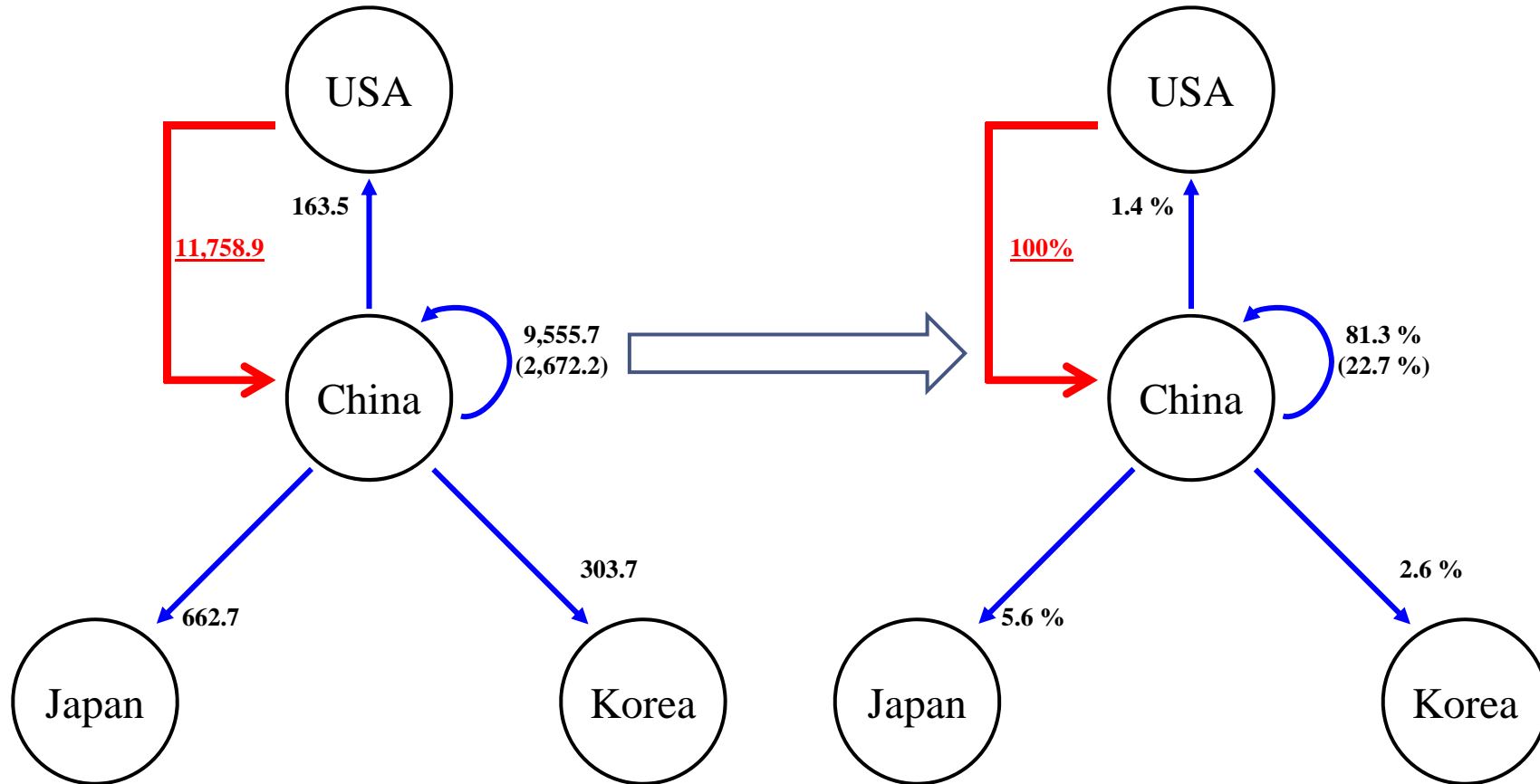


Measurement of Shock Transmission

Shock Transmission and its measurement

Direct Shock Transmission (Mil. US\$)...

Direct Shock Transmission Index (%)...

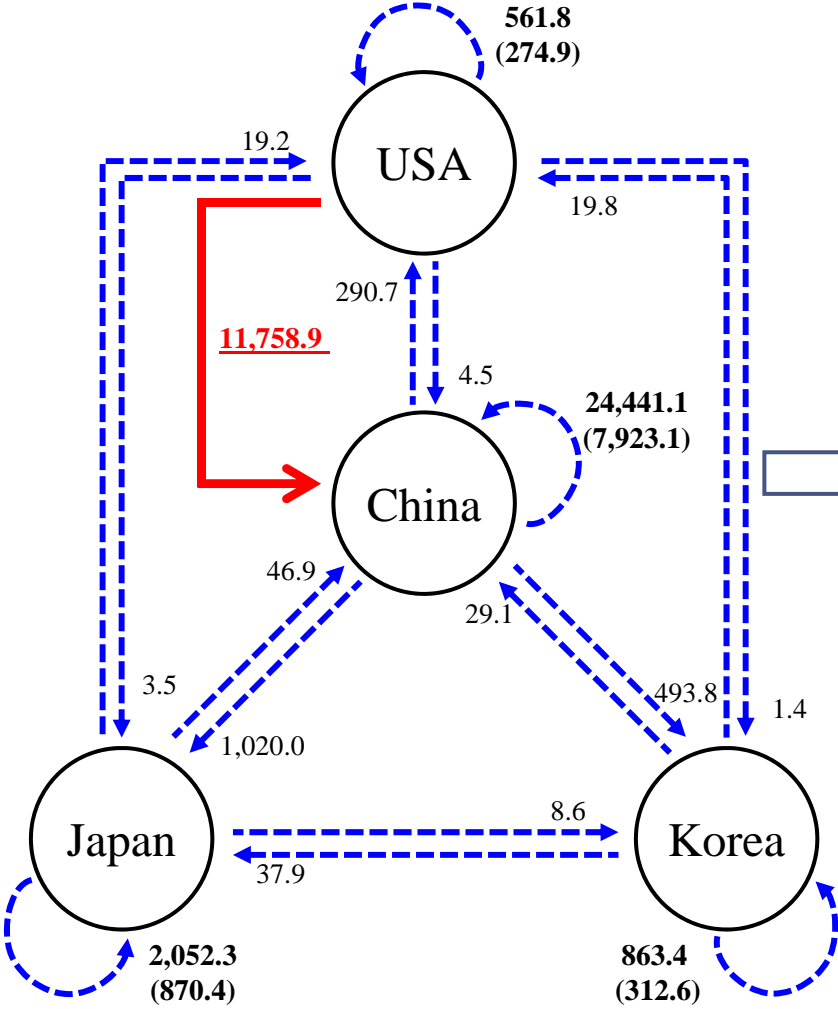


Manufacturing, 2005

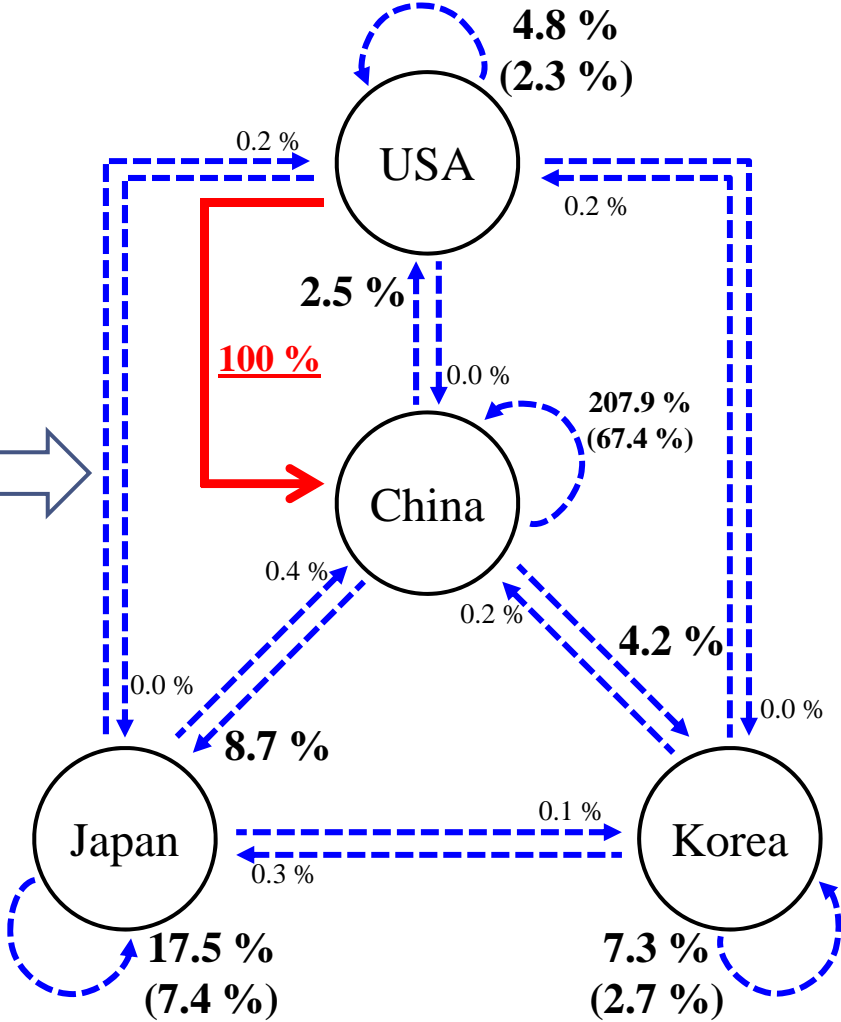


Shock Transmission and its measurement

Shock Transmission (Mil. US\$)...



Shock Transmission Index (%) ...



Empirical Analysis I

—*What actually happened in Asia and Europe?*—

Simultaneous Shock Transmission Index (SSTI)

(1) Actual decline in Asian export to USA in Mil. US\$

(2) Transmission of Shock (percent of actual decline) through these endogenous countries...

(3) ... to these endogenous and exogenous countries via *intermediate inputs* channel

(5) ... to *Value-Added* (primary inputs) of each endogenous countries

ASIA 43,251	2009 (All Manufacturing)													Total
	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	
JPN	57.3	2.0	0.6	0.6	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	61.5
CHN	1.4	62.0	0.6	0.5	1.6	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.2	66.9
KOR	0.4	1.3	10.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	12.4
TWN	0.2	1.0	0.1	4.7	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	6.4
MAL	0.1	0.2	0.1	0.1	3.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2
THL	0.2	0.3	0.0	0.0	0.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
IDN	0.2	0.1	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0
FRA	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.9
GER	0.3	0.7	0.2	0.1	0.2	0.0	0.0	0.0	1.3	0.1	0.0	0.0	0.0	2.9
EU 9	0.2	0.7	0.1	0.1	0.1	0.1	0.0	0.1	0.1	1.2	0.0	0.0	0.0	2.8
UK	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.7
USA	0.7	0.7	0.3	0.2	0.7	0.1	0.0	0.0	0.0	0.0	0.0	2.5	0.1	5.5
Rest 7	0.6	1.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	5.1	7.7
HK	0.0	0.3	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
SGP	0.0	0.1	0.0	0.2	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Rest_Asia 31	0.2	0.5	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Rest_Europe 16	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.9
OPEC	0.6	0.4	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.7
ROW	0.1	0.5	0.1	0.1	0.3	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	1.4
Value-Added	38.9	29.6	5.1	3.1	2.7	2.8	1.8	0.3	1.1	1.0	0.3	2.5	3.7	93.0
Total	101.9	102.2	17.9	10.5	11.4	6.4	2.4	0.9	2.9	2.8	0.7	5.5	10.0	275.6

(4) for example, transmission of shock to USA from Korea

SSTI_{USA,KOR}

SSTI in Asian Exports of All Manufacturing

—Actual decline in 2009 for all Asian endogenous countries—

ASIA	2009 (All Manufacturing)													
43,251	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	Total
JPN	57.3	2.0	0.6	0.6	0.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	61.5
CHN	1.4	62.0	0.6	0.5	1.6	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.2	66.9
KOR	0.4	1.3	10.2	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	12.4
TWN	0.2	1.0	0.1	4.7	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	6.4
MAL	0.1	0.2	0.1	0.1	3.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2
THL	0.2	0.3	0.0	0.0	0.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
IDN	0.2	0.1	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	1.0
FRA	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.0	0.0	0.9
GER	0.3	0.7	0.2	0.1	0.2	0.0	0.0	0.0	1.3	0.1	0.0	0.0	0.0	2.9
EU 9	0.2	0.7	0.1	0.1	0.1	0.1	0.0	0.1	0.1	1.2	0.0	0.0	0.0	2.8
UK	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.7
USA	0.7	0.7	0.3	0.2	0.7	0.1	0.0	0.0	0.0	0.0	0.0	2.5	0.1	5.5
Rest 7	0.6	1.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	5.1	7.7
HK	0.0	0.3	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7
SGP	0.0	0.1	0.0	0.2	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Rest_Asia 31	0.2	0.5	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Rest_Europe 16	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.9
OPEC	0.6	0.4	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.7
ROW	0.1	0.5	0.1	0.1	0.3	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	1.4
Value-Added	38.9	29.6	5.1	3.1	2.7	2.8	1.8	0.3	1.1	1.0	0.3	2.5	3.7	93.0
Total	101.9	102.2	17.9	10.5	11.4	6.4	2.4	0.9	2.9	2.8	0.7	5.5	10.0	275.6

SSTI in European Exports of All Manufacturing

—Actual decline in 2009 for all European endogenous countries—

Europe	2009 (All Manufacturing)													Total
	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	
22,261														
JPN	1.5	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.5	0.4	0.2	0.0	0.0	3.0
CHN	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.2	0.6	1.0	0.2	0.1	0.0	5.4
KOR	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.9
TWN	0.0	0.1	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.6
MAL	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.3
THL	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3
IDN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
FRA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	1.3	1.6	0.6	0.0	0.0	20.6
GER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	40.2	3.3	1.0	0.0	0.0	45.9
EU 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	4.2	32.9	1.3	0.0	0.0	40.4
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.9	12.7	0.0	0.0	14.9
USA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.8	0.5	2.6	0.1	5.5
Rest 7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6	0.2	0.2	1.4	3.1
HK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
SGP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2
Rest_Asia 31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.1	0.0	0.0	1.0
Rest_Europe 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	4.1	1.8	0.5	0.0	0.0	6.9
OPEC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.5
ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.0	1.1	0.2	0.0	0.0	2.9
Value-Added	1.3	1.6	0.3	0.2	0.1	0.1	0.2	12.6	30.9	26.1	11.2	2.5	1.3	88.3
Total	3.0	5.4	0.9	0.6	0.3	0.3	0.2	35.7	85.4	71.6	29.1	5.5	3.0	241.1

SSTI in Asian Exports of Transport Equipment

—Actual decline in 2009 for all Asian endogenous countries—

ASIA	2009 (Transport Equipment)													Total
13,011	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	Total
JPN	125.6	0.4	0.9	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	127.2
CHN	1.8	11.4	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	14.0
KOR	0.6	0.2	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9
TWN	0.2	0.1	0.1	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6
MAL	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
THL	0.4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
IDN	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6
FRA	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.9
GER	0.6	0.2	0.3	0.0	0.0	0.0	0.0	0.0	1.1	0.1	0.0	0.0	0.0	2.4
EU 9	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.8	0.0	0.0	0.0	1.7
UK	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.6
USA	1.1	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1	3.5
Rest 7	1.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.4	3.0
HK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
SGP	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Rest_Asia 31	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Rest_Europe 16	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.8
OPEC	0.8	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
ROW	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
Value-Added	77.1	4.8	8.1	0.8	0.2	0.3	0.4	0.3	0.9	0.6	0.3	1.5	1.3	96.5
Total	211.4	18.0	30.6	2.5	0.5	0.8	0.5	0.9	2.4	1.7	0.6	3.5	3.0	276.5

SSTI in European Exports of Transport Equipment

—Actual decline in 2009 for all European endogenous countries—

Europe 7,645	2009 (Transport Equipment)													Total
	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	
JPN	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.3	0.4	0.1	0.0	3.7
CHN	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.4	0.2	0.1	0.0	3.7
KOR	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.8
TWN	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.5
MAL	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
THL	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
IDN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
FRA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	2.3	1.9	0.9	0.0	0.0	20.2
GER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	67.9	3.4	1.6	0.0	0.0	74.7
EU 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	7.6	21.2	1.5	0.0	0.0	31.7
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.8	0.7	16.0	0.0	0.0	18.9
USA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.7	0.6	0.4	2.8	0.1	5.9
Rest 7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.3	0.2	0.2	1.5	3.2
HK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
SGP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Rest_Asia 31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.2	0.2	0.0	0.0	1.2
Rest_Europe 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	8.3	1.8	0.7	0.0	0.0	11.3
OPEC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4
ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.2	0.6	0.2	0.0	0.0	2.4
Value-Added	1.5	1.1	0.2	0.2	0.1	0.1	0.1	10.3	41.3	15.3	10.7	2.6	1.2	84.5
Total	3.7	3.7	0.8	0.5	0.2	0.2	0.1	31.3	134.0	47.0	33.2	5.9	3.1	263.6

SSTI in Asian Exports of Electric Machinery

—Actual decline in 2009 for all Asian endogenous countries—

ASIA	2009 (Electric Machinery)													
6,683	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	Total
JPN	38.2	2.4	0.8	1.3	2.3	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	46.2
CHN	2.7	34.7	1.7	1.6	9.5	1.2	0.0	0.0	0.1	0.1	0.0	0.2	0.1	52.1
KOR	0.5	2.0	8.1	0.3	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.1
TWN	0.5	1.5	0.4	6.0	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.9
MAL	0.4	0.4	0.2	0.5	14.9	1.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	17.5
THL	0.3	0.5	0.1	0.1	2.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3
IDN	0.2	0.1	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9
FRA	0.1	0.1	0.0	0.0	0.2	0.0	0.0	0.5	0.0	0.1	0.0	0.0	0.0	1.0
GER	0.2	0.6	0.1	0.1	0.9	0.0	0.0	0.0	1.7	0.2	0.0	0.0	0.0	4.0
EU 9	0.1	0.3	0.1	0.1	0.8	0.1	0.0	0.1	0.2	1.3	0.0	0.0	0.0	3.1
UK	0.1	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.9
USA	0.6	0.6	0.4	0.4	3.8	0.5	0.0	0.0	0.0	0.1	0.0	5.1	0.1	11.6
Rest 7	0.6	0.5	0.1	0.1	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.3	2.6	4.6
HK	0.0	0.2	0.1	0.0	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
SGP	0.1	0.3	0.1	0.7	2.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2
Rest_Asia 31	0.2	0.4	0.1	0.5	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7
Rest_Europe 16	0.1	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.9
OPEC	0.5	0.2	0.2	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5
ROW	0.1	0.3	0.1	0.1	2.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	3.0
Value-Added	29.9	16.3	5.0	5.0	11.9	6.4	1.1	0.4	1.5	1.0	0.4	5.5	2.1	86.5
Total	75.3	61.8	17.6	17.3	55.8	14.6	1.4	1.0	4.0	3.1	0.9	11.6	5.4	269.8

SSTI in European Exports of Electric Machinery

—Actual decline in 2009 for all European endogenous countries—

Europe 1,487	2009 (Electric Machinery)													Total
	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	
JPN	2.5	0.5	0.1	0.2	0.1	0.0	0.0	0.1	0.6	0.6	0.4	0.0	0.0	5.0
CHN	0.1	7.9	0.2	0.2	0.1	0.0	0.0	0.2	1.8	2.8	0.8	0.1	0.1	14.1
KOR	0.0	0.4	1.2	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.1	0.0	0.0	2.5
TWN	0.0	0.3	0.0	0.9	0.0	0.0	0.0	0.0	0.3	0.4	0.4	0.0	0.0	2.4
MAL	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.3	0.2	0.1	0.0	0.0	1.3
THL	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.7
IDN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
FRA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.8	1.8	0.4	0.0	0.0	9.2
GER	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	34.2	4.5	1.0	0.0	0.0	40.3
EU 9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7	2.7	40.1	1.3	0.0	0.0	45.0
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	1.5	12.1	0.0	0.0	14.3
USA	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.7	1.5	0.7	2.8	0.1	6.3
Rest 7	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5	0.2	0.2	1.1	2.6
HK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.4
SGP	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.5
Rest_Asia 31	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.1	0.0	0.0	0.9
Rest_Europe 16	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	2.8	2.7	0.6	0.0	0.0	6.5
OPEC	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.6
ROW	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	1.0	1.4	0.2	0.0	0.0	3.1
Value-Added	2.1	4.0	0.7	0.7	0.4	0.3	0.2	5.4	26.1	30.0	13.9	3.0	1.1	87.8
Total	5.0	14.1	2.5	2.4	1.3	0.7	0.2	14.0	72.9	89.3	32.7	6.3	2.5	243.9

SSTI in Asian Exports of Other Manufacturing

—Actual decline in 2009 for all Asian endogenous countries—

ASIA	2009 (Other Manufacturing)													Total
7,002	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	Total
JPN	7.1	4.1	0.2	0.5	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	12.7
CHN	0.3	136.0	0.3	0.4	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.4	137.8
KOR	0.1	2.2	4.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	6.8
TWN	0.0	1.4	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	6.1
MAL	0.0	0.2	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
THL	0.0	0.6	0.0	0.0	0.1	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.4
IDN	0.0	0.2	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.7
FRA	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.0	0.9
GER	0.0	1.3	0.0	0.1	0.0	0.0	0.0	0.0	1.4	0.2	0.0	0.0	0.1	3.3
EU 9	0.1	2.1	0.0	0.1	0.0	0.2	0.0	0.1	0.2	2.2	0.0	0.0	0.1	5.0
UK	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.7
USA	0.2	1.3	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.0	2.0	0.2	4.3
Rest 7	0.2	4.3	0.1	0.1	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	6.7	12.1
HK	0.0	0.8	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.2
SGP	0.0	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Rest_Asia 31	0.0	1.6	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Rest_Europe 16	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	1.1
OPEC	0.3	0.8	0.1	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.9
ROW	0.0	1.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	1.5
Value-Added	6.2	62.8	2.3	3.0	1.1	2.6	2.7	0.3	1.3	1.9	0.3	1.9	4.5	91.0
Total	14.8	222.0	7.5	9.6	3.5	5.6	3.1	0.9	3.3	5.0	0.7	4.3	13.5	293.9

SSTI in European Exports of Other Manufacturing

—Actual decline in 2009 for all European endogenous countries—

Europe	2009 (Other Manufacturing)													Total
	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	
824														
JPN	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.1	0.0	0.0	1.7
CHN	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.4	0.3	2.0	0.2	0.0	0.0	7.6
KOR	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.6
TWN	0.0	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4
MAL	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
THL	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.5
IDN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2
FRA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.1	0.3	1.5	0.2	0.0	0.0	15.0
GER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	12.4	3.8	0.2	0.0	0.0	17.1
EU 9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.1	56.2	0.5	0.0	0.0	59.4
UK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	1.0	6.3	0.0	0.0	7.7
USA	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.9	0.3	1.6	0.1	3.4
Rest 7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	1.2	0.1	0.1	1.9	3.9
HK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.4
SGP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Rest_Asia 31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.7	0.1	0.0	0.0	1.2
Rest_Europe 16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.7	2.5	0.3	0.0	0.0	5.1
OPEC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.6
ROW	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.4	1.8	0.2	0.0	0.0	3.0
Value-Added	0.7	2.3	0.2	0.1	0.1	0.2	0.1	13.6	14.2	47.5	7.4	1.5	1.5	89.4
Total	1.7	7.6	0.6	0.4	0.2	0.5	0.2	31.3	31.4	120.6	15.9	3.4	3.7	217.6

What actually happened in Asia & Europe?

- ▶ *SSTI* provides a useful measurement for the actual shock transmission
 - ▶ Assume the US imports of finished goods decline from the region (either Asia or Europe).
 - ▶ China, Japan and Germany are severely affected by the US import shock.
 - ▶ The degree of impact on value-added sector is larger in Japan than in China.
 - ▶ The shock transmission pattern differs markedly across industries.
 - ▶ Transport equipment: Japan is most hit by the shock.
 - ▶ Electric machinery: Although the US import decline from China was much smaller than that from Japan, China's domestic production and trade are most affected by the shock.

Empirical Analysis II

—*Industry Specific Shock Transmission
through Intermediate Inputs*—

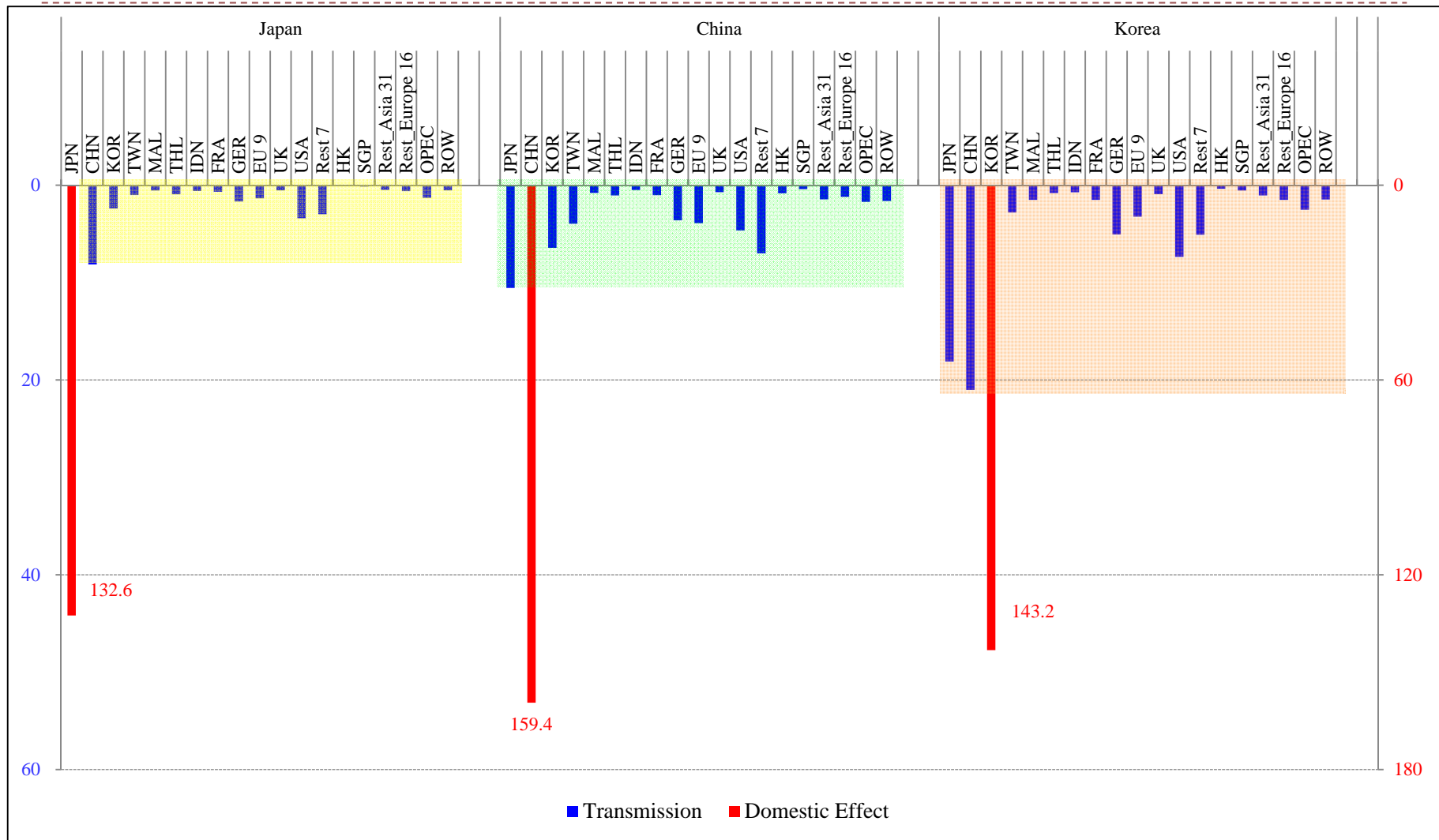
Shock Transmission Index (*STI*)

—Actual decline of US import in 2009—

Japan	2009 (All Manufacturing)													
17,474	JPN	CHN	KOR	TWN	MAL	THL	IDN	FRA	GER	EU 9	UK	USA	Rest 7	Total
JPN	132.0	0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	132.6
CHN	3.0	4.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	8.1
KOR	0.9	0.1	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
TWN	0.5	0.1	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
MAL	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
THL	0.6	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9
IDN	0.4	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6
FRA	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.7
GER	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1	0.0	0.0	0.0	1.7
EU 9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	1.4
UK	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.5
USA	1.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1	3.4
Rest 7	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.3	3.0
HK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
SGP	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Rest_Asia 31	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Rest_Europe 16	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.6
OPEC	1.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
ROW	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Value-Added	88.2	2.3	0.7	0.3	0.2	0.4	0.4	0.2	0.6	0.5	0.2	1.5	1.2	96.8
Total	232.6	8.1	2.4	1.0	0.5	0.9	0.6	0.7	1.7	1.4	0.5	3.4	3.0	256.7

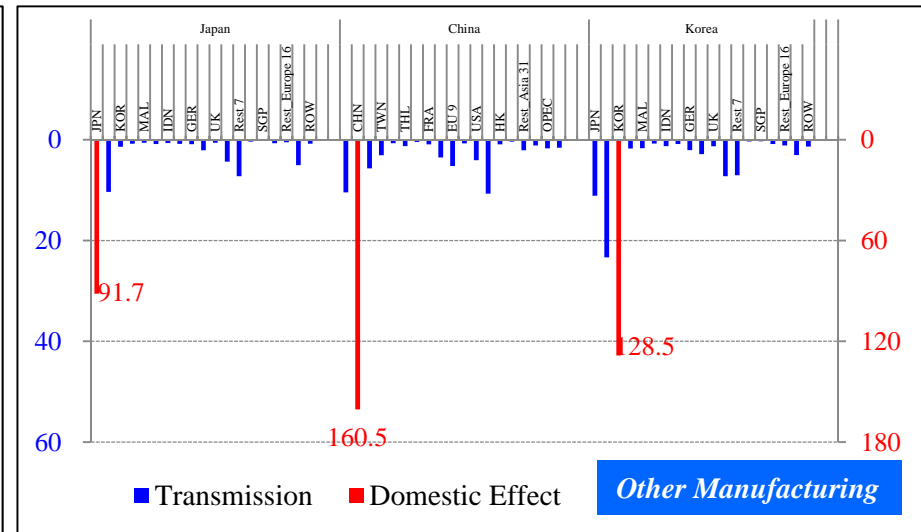
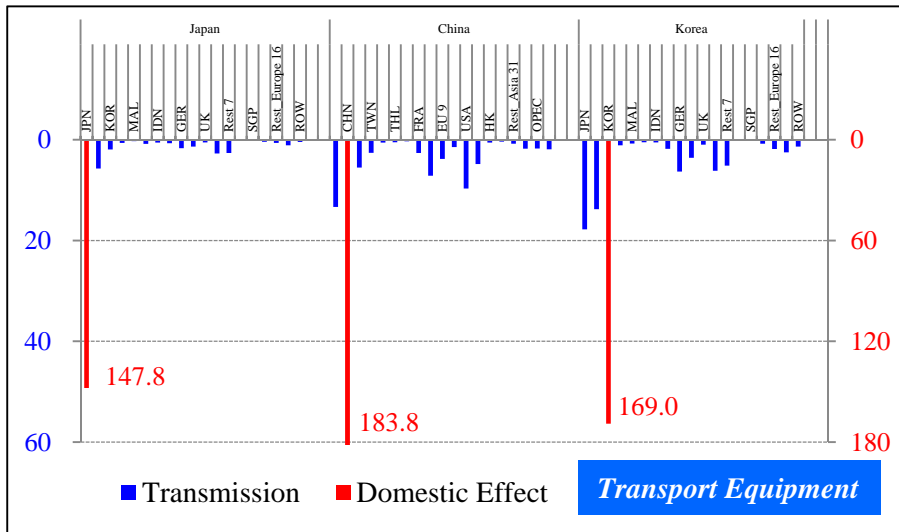
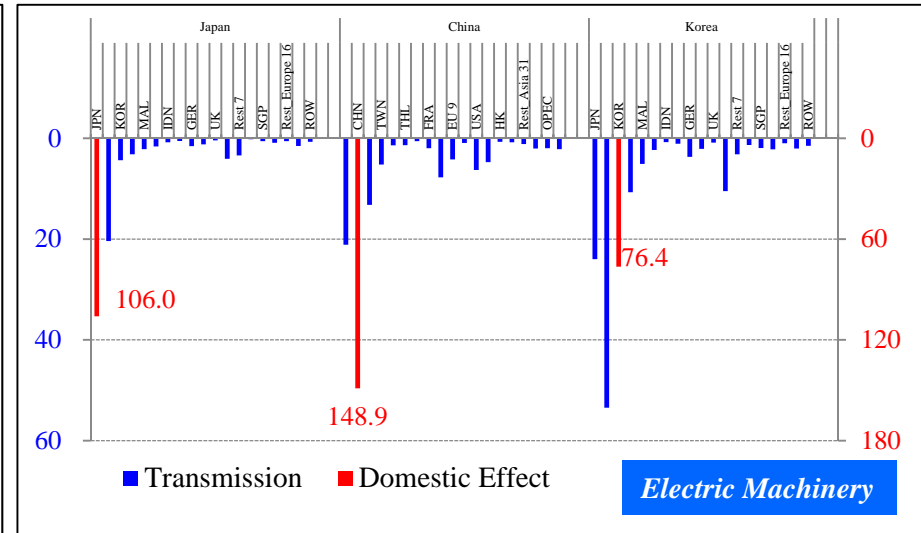
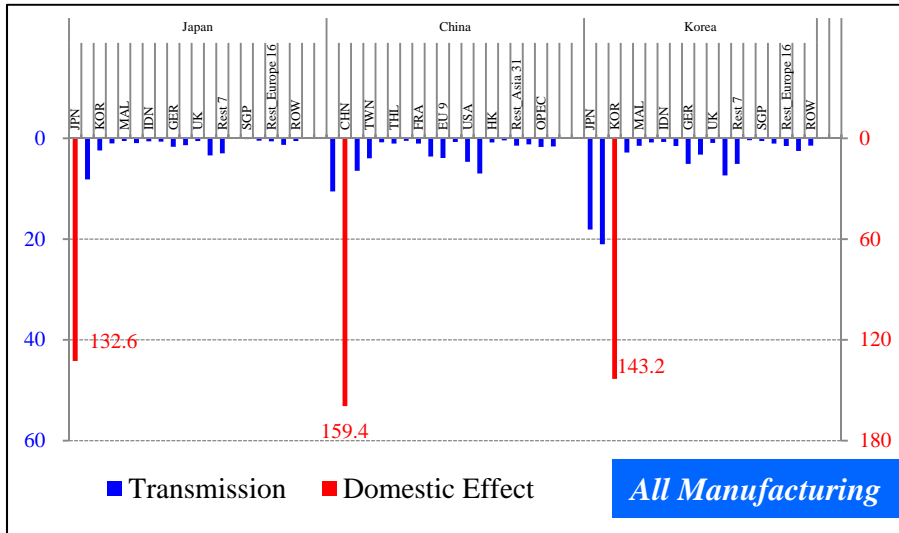
Shock Transmission: All Manufacturing, 2009

—Japan, China and Korea—



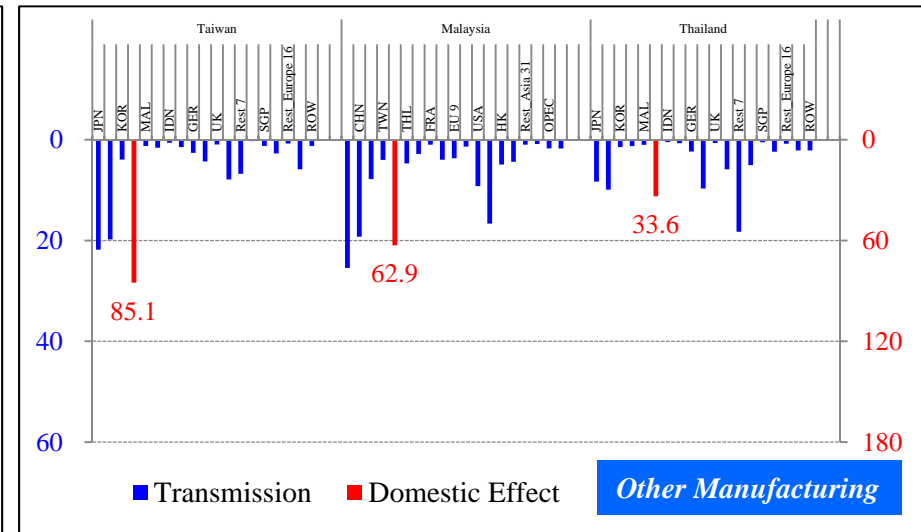
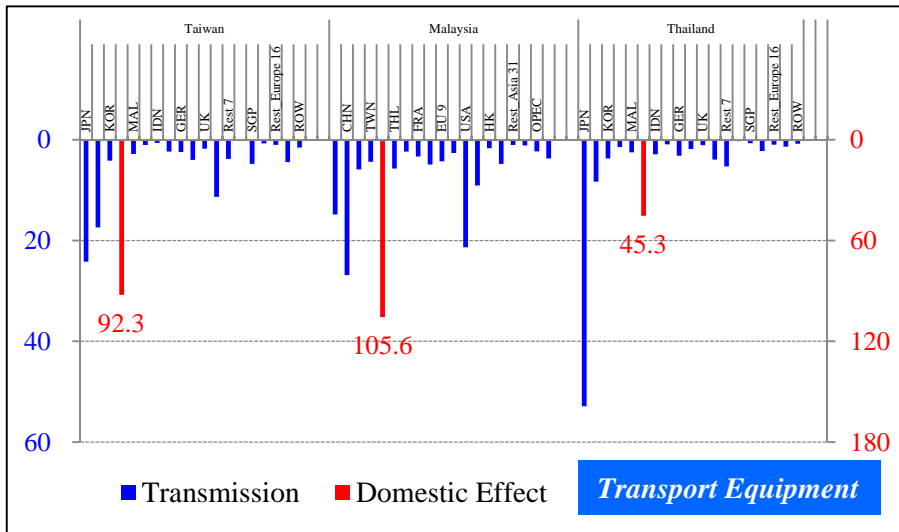
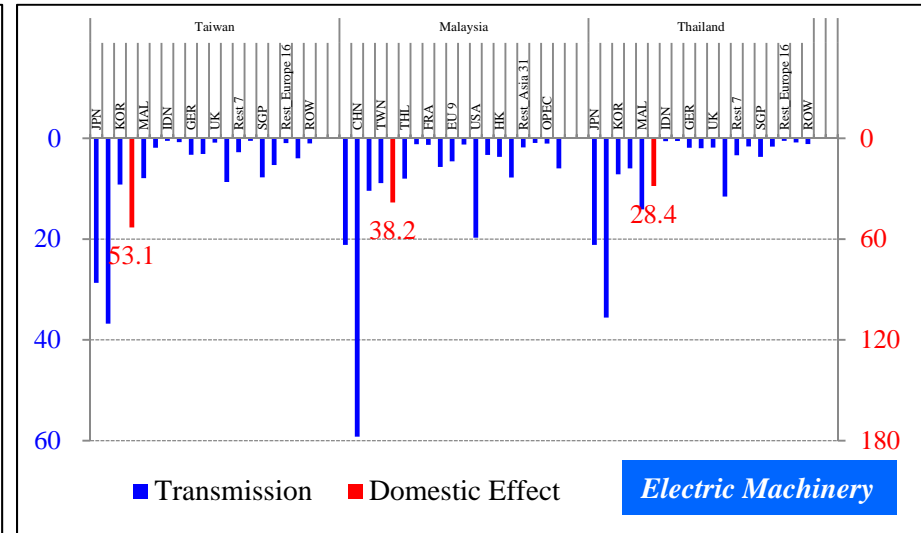
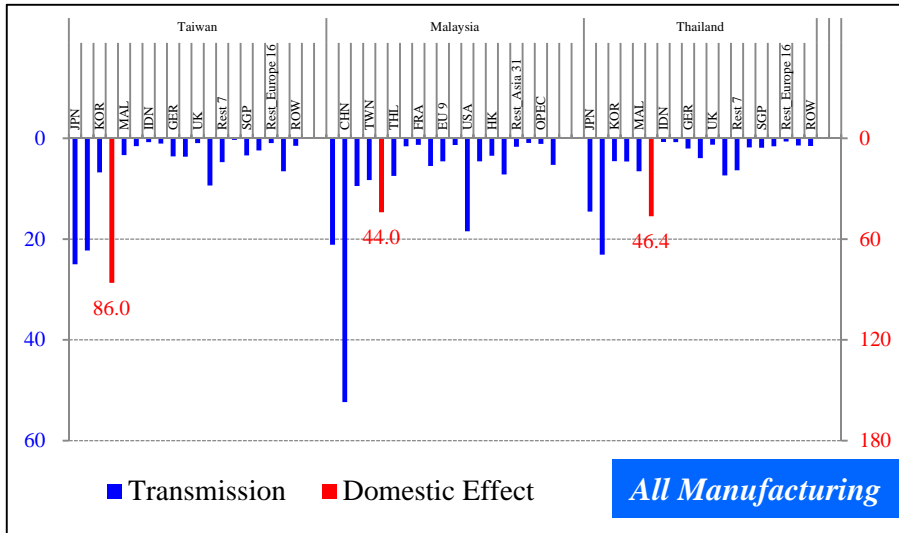
Industry-specific Shock Transmission: 2009

—Intermediate Inputs: Japan, China and Korea—



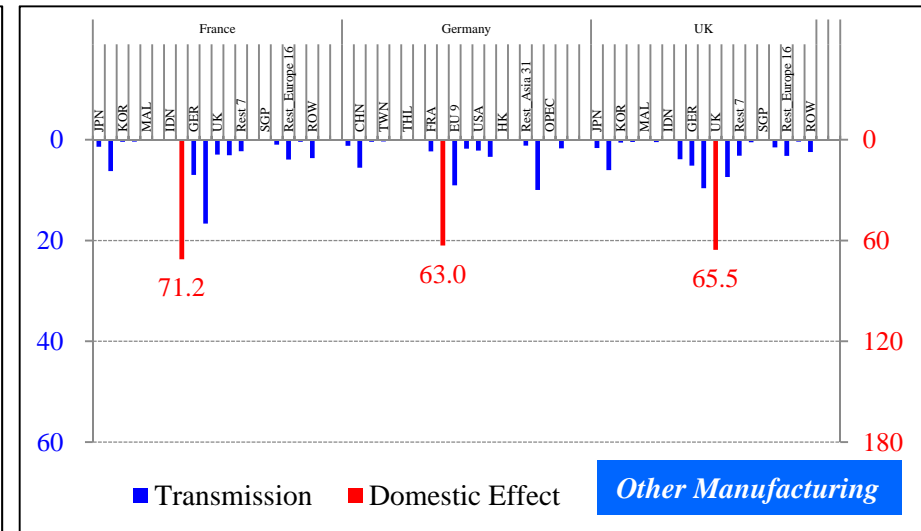
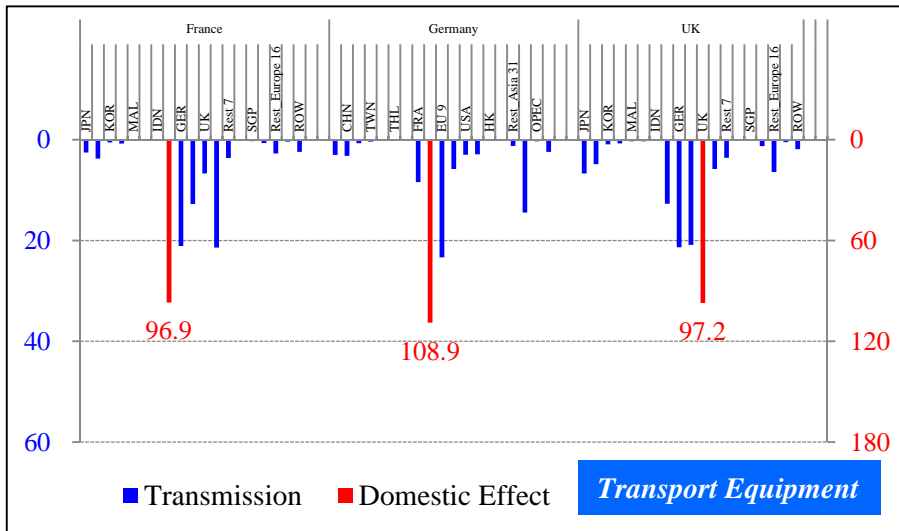
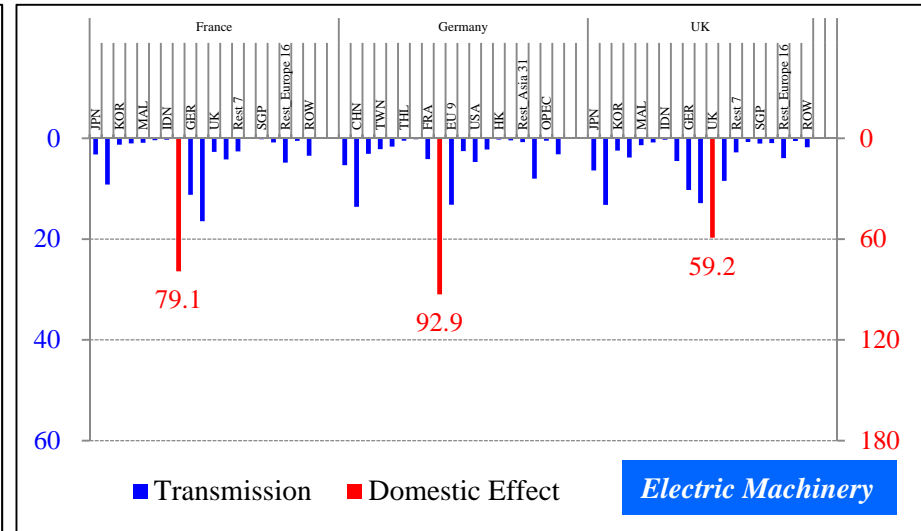
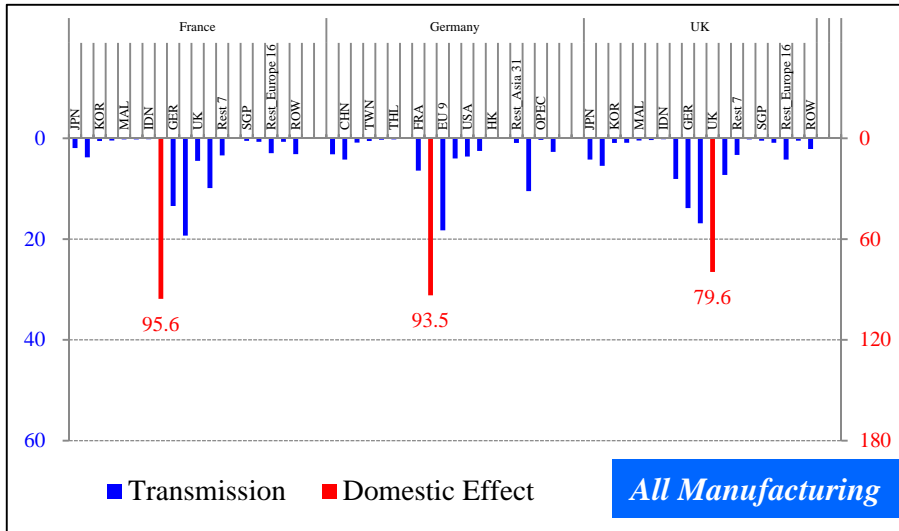
Industry-specific Shock Transmission: 2009

—Intermediate Inputs: Taiwan, Malaysia and Thailand—



Industry-specific Shock Transmission: 2009

—Intermediate Inputs: France, Germany and UK—



Summary: *STI* (Intermediate Inputs)

- ▶ *STI* is another useful measure for the degree of shock transmission.
 - ▶ Assume the US imports of finished goods decline from a single country (such as Japan, China, etc).
 - ▶ Domestic effect is much larger in Japan, China and Korea than in Taiwan, Malaysia and Thailand.
 - ▶ But, the degree of shock transmission to Japan and China is very large in Taiwan, Malaysia and Thailand.
 - ▶ Transport equipment: Shock transmission to Japan is very large, especially in Thailand.
 - ▶ Electric machinery: Shock transmission to China is very large.

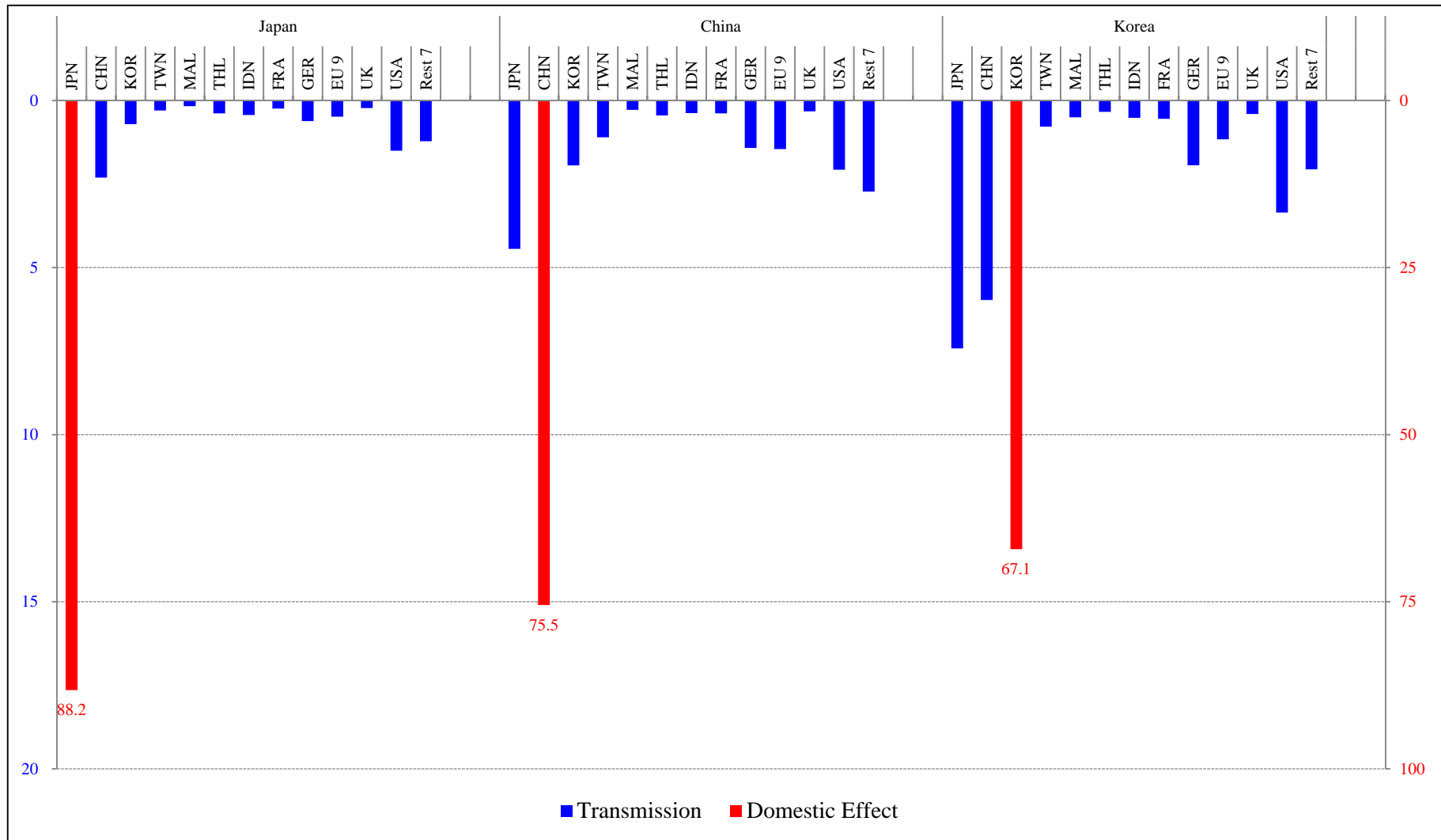
Summary: *STI* (Intermediate Inputs)

- ▶ European countries appear to transmit the shock more symmetrically to the regional countries.
 - ▶ But, further analysis is necessary by calculating the shock transmission across EU 9 countries.
- ▶ Regional shock transmission:
 - ▶ China is at the center of the regional shock transmission in Asia.
 - ▶ Even though not affected much by the global shock, China is affected to a larger extent by the regional shock transmission.
 - ▶ Japan: asymmetric shock transmission pattern
 - ▶ Japan tends to absorb most of the global shock domestically, while Japan tends to be affected by regional shock transmission.

Empirical Analysis III

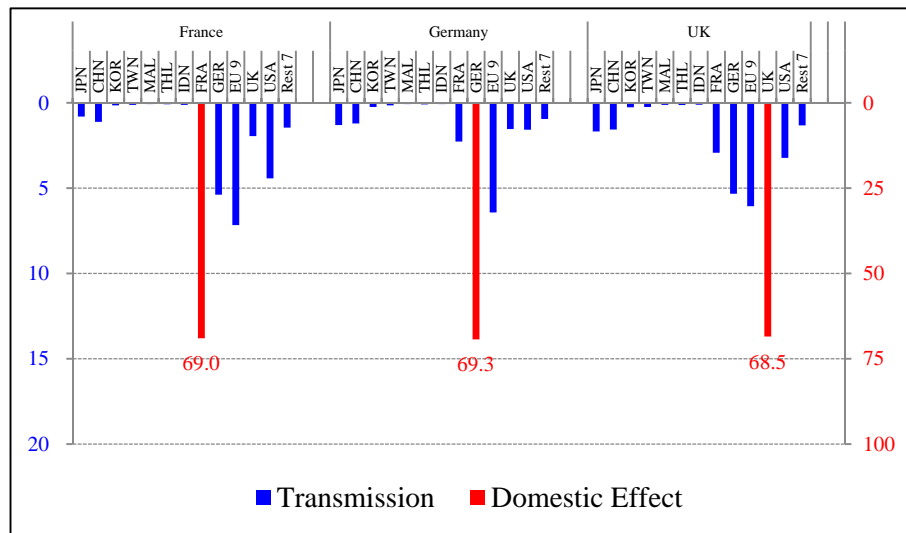
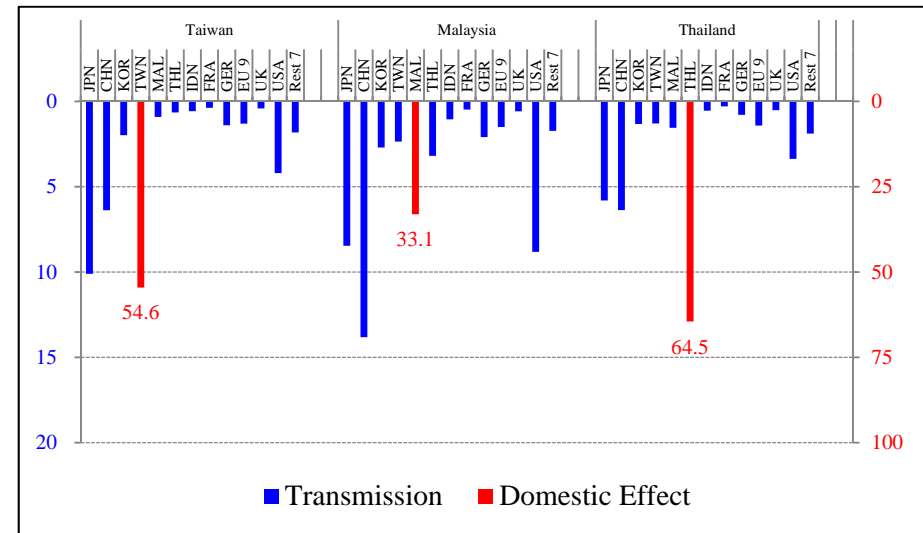
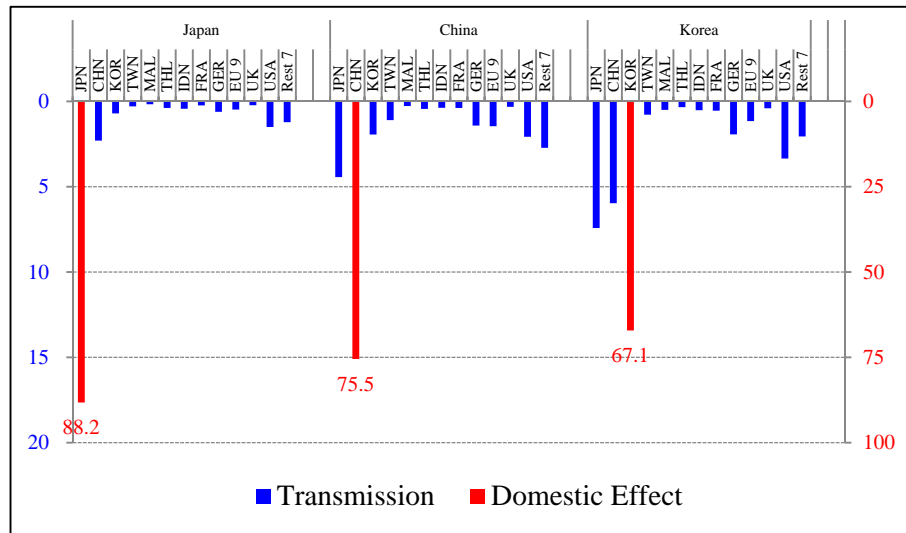
—*Industry Specific Shock Transmission
through Value Added Inputs*—

Shock Transmission to Value added (VA) sector —All Manufacturing—



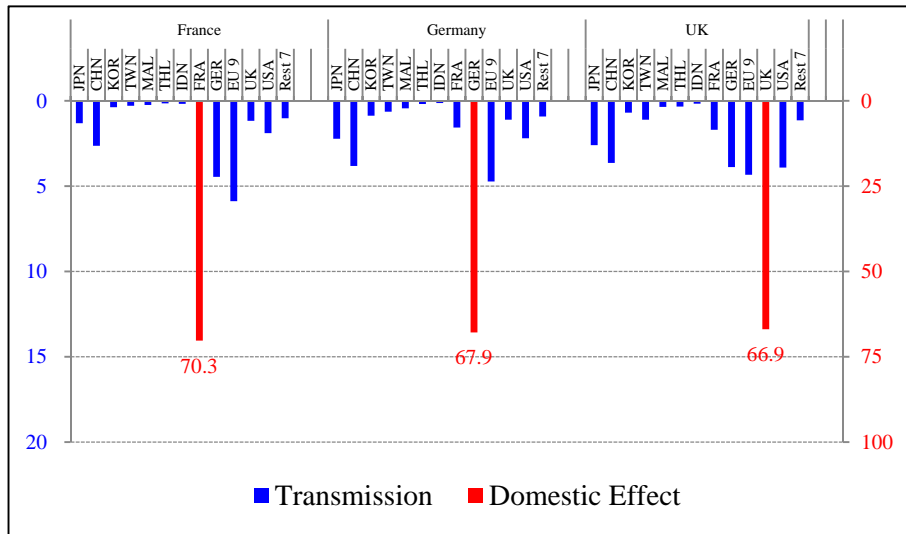
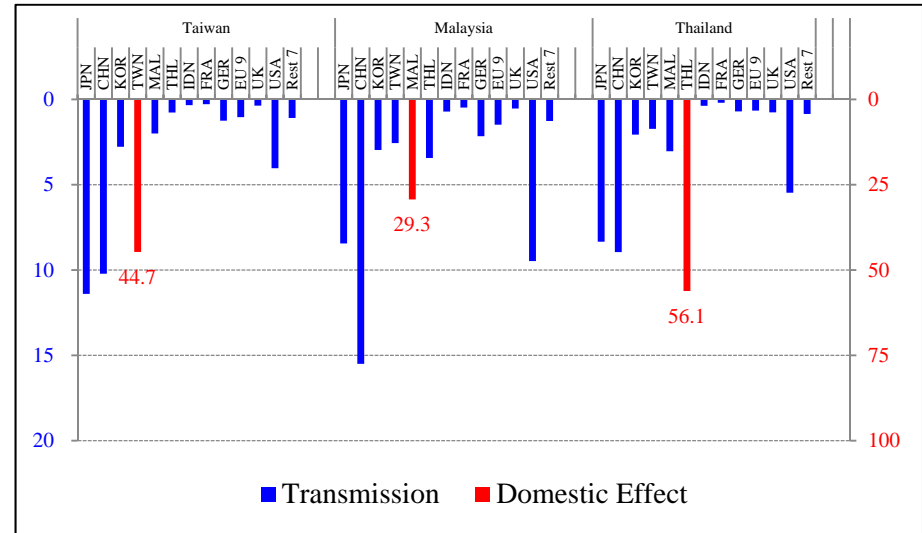
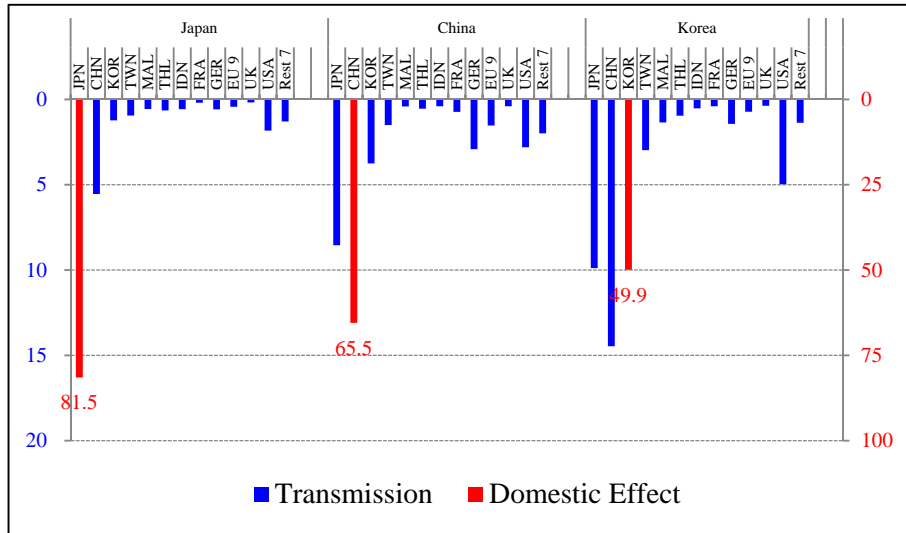
Industry-specific Shock Transmission to VA: 2009

—All Manufacturing Industries—



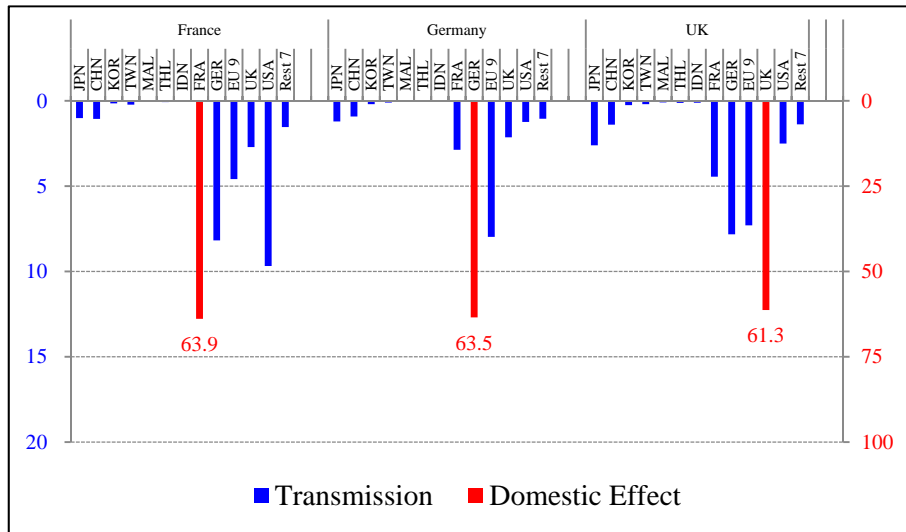
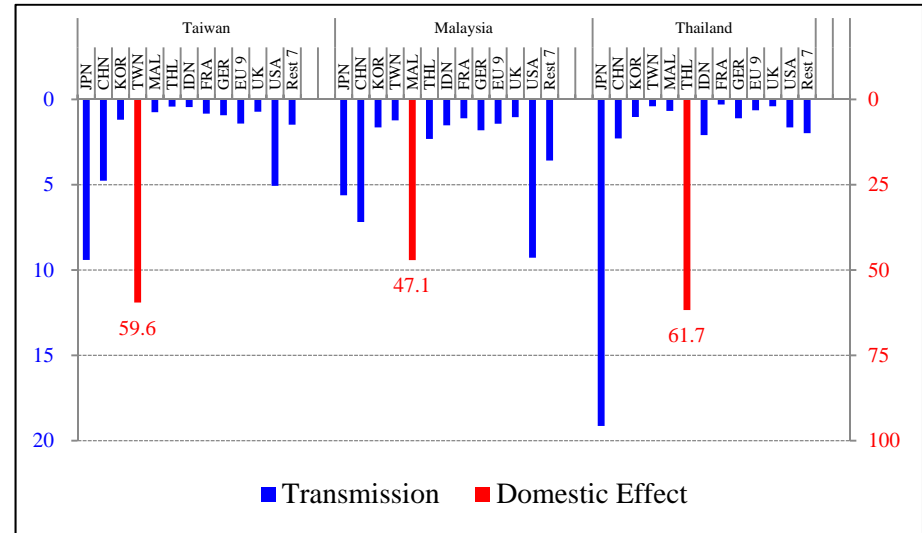
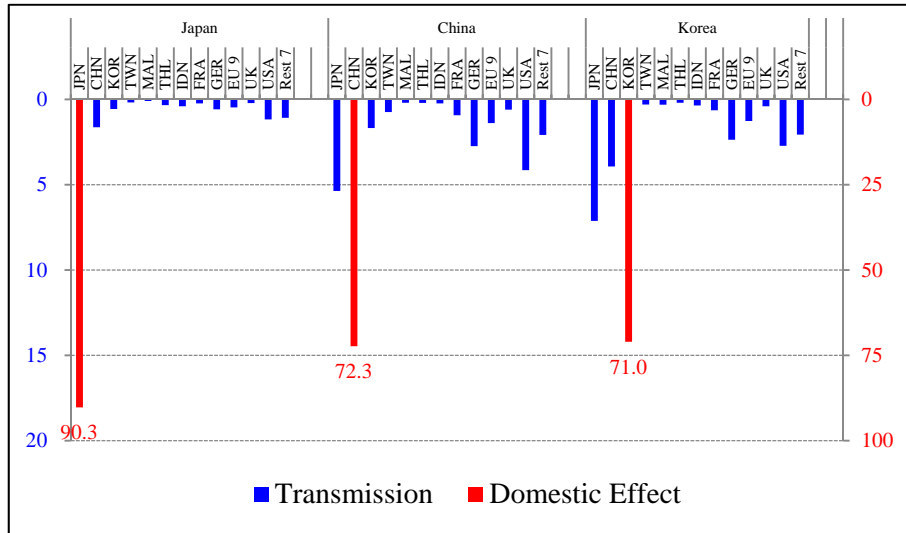
Industry-specific Shock Transmission to VA: 2009

—Electric Machinery—



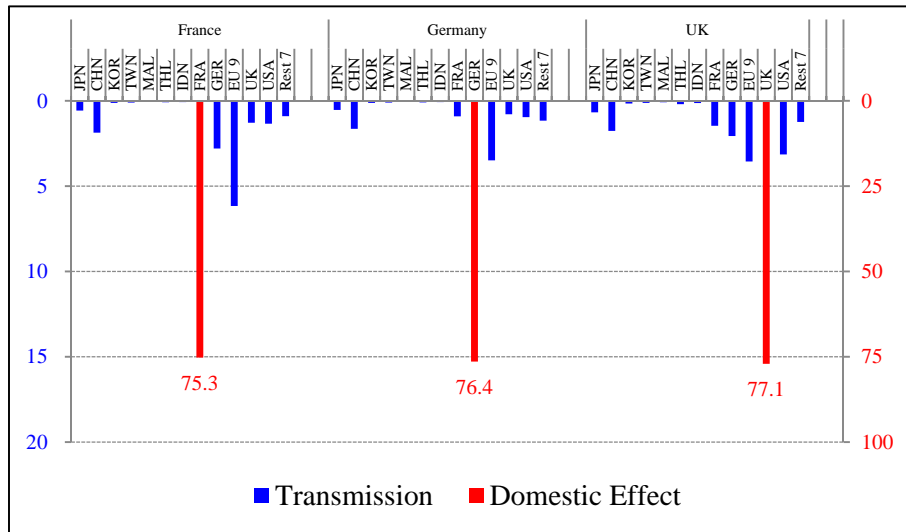
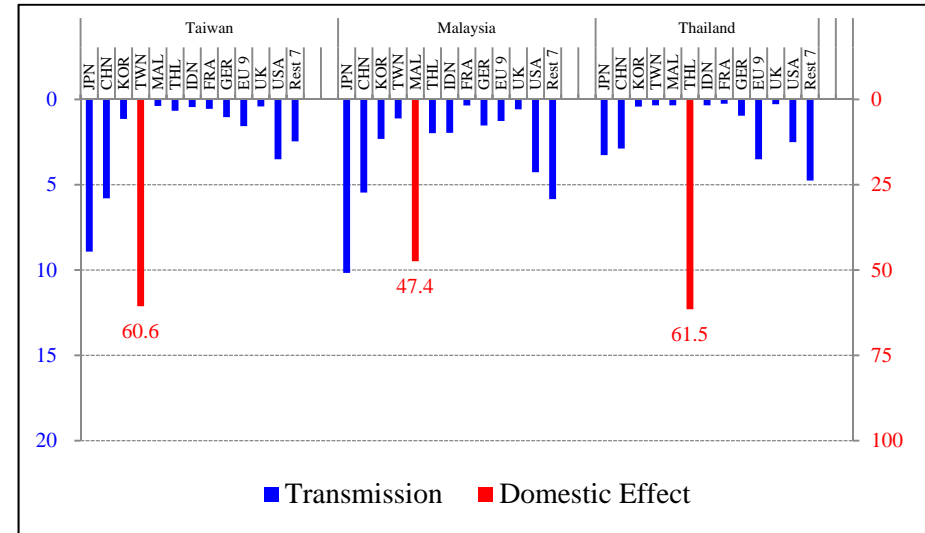
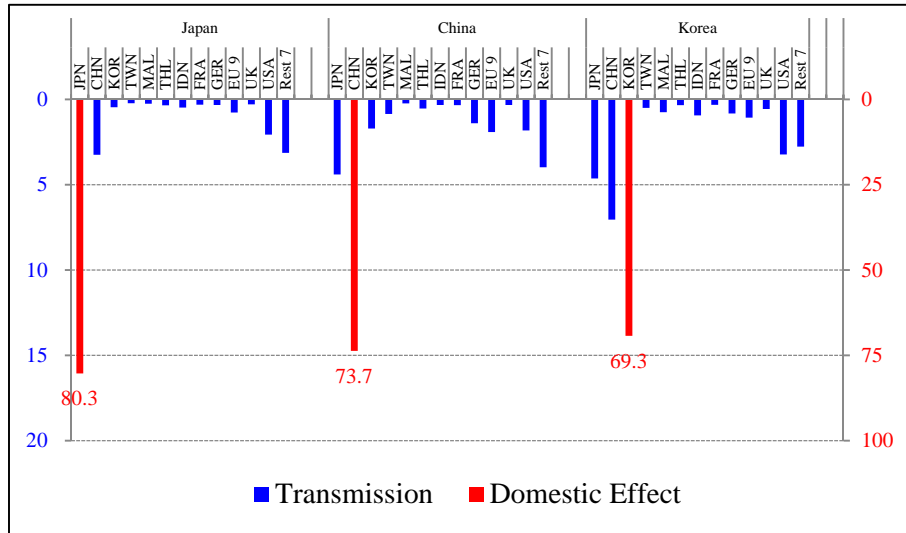
Industry-specific Shock Transmission to VA: 2009

—Transport Equipment—



Industry-specific Shock Transmission to VA: 2009

—Other Manufacturing—



Summary of *STI* (Value Added)

- ▶ The findings of the *STI* (Value-Added) are quite similar to those of *STI* (Intermediate Inputs).
 - ▶ Japan: **asymmetric** shock transmission pattern.
 - ▶ Japanese VA sector is most affected by Japanese export decline to the US compared to other country's export decline to the US
 - ▶ China: at the **center** of **regional** shock transmission.
 - ▶ Europe: regional shock transmission appears more symmetric, but the further investigation is necessary on individual EU 9 countries.

Tentative Conclusion

- ▶ Global (US) and regional (intra-Asia) shock transmission:
 - ▶ Japan shows very different shock transmission pattern
 - ▶ Affected substantially by the **global (US) shock** in the **transport equipment** and **electric machinery** industries.
 - ▶ The shock is **not transmitted regionally** from **Japan** to **other Asian countries**. The **global shock** tends to be **absorbed in the Japanese domestic sectors**.
 - ▶ China is at the **center of regional shock transmission**.
 - ▶ Even though the electric machinery industry was not affected by the global (US) shock, the shock is regionally transmitted to China.

Further work is necessary...

- ▶ Various types of shocks:
 - ▶ Demand driven shock can be generated in **other endogenous countries** (e.g., China, Japan, Korea, European countries etc.)
 - ▶
- ▶ Further analysis of individual EU 9 countries is necessary for comparative study between Asia and Europe.
- ▶ Linking Business Cycle Synchronization and effect on Value-added (VA) sector:
 - ▶ **Effect on VA** may be informative to analyze the shock transmission effect.