

Exchange Rates and Trade in East Asia

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Presentation at the Asian Development Bank
9 April 2012

Overview

- ❑ This presentation will consist of 6 parts:
 - ❑ 1) East Asian Production Networks
 - ❑ 2) A Specific Example: The Global Value Chain for Notebook PCs
 - ❑ 3) Triangular Trading Patterns In East Asia
 - ❑ 4) China's Role in Regional Supply Chains
 - ❑ 5) Evidence on Exchange Rate Changes and Processing Trade
 - ❑ 6) Policy Implications
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1) East Asian Production Networks

- ❑ Fragmentation in East Asia is particularly sophisticated and well-developed compared to networks in the rest of the world (e.g., parts and components exports from the U.S. for assembly in Mexico)
 - ❑ Involves complicated combination of intra-firm trade, arm's length transactions, and outsourcing.
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Definition of Production Networks

By a lead firm's "cross-border production network" (CPN) we mean the inter- and intra-firm relationships through which the firm organizes the entire range of its business activities: from research and development, product definition and design, to supply of inputs, manufacturing (or production of a service), distribution, and support services. We thus include the entire network of cross-border relationships between a lead firm and its own affiliates and subsidiaries, but also its subcontractors, suppliers, service providers, or other firms participating in cooperative relationships, such as standard setting or R&D [research and development] analysis.

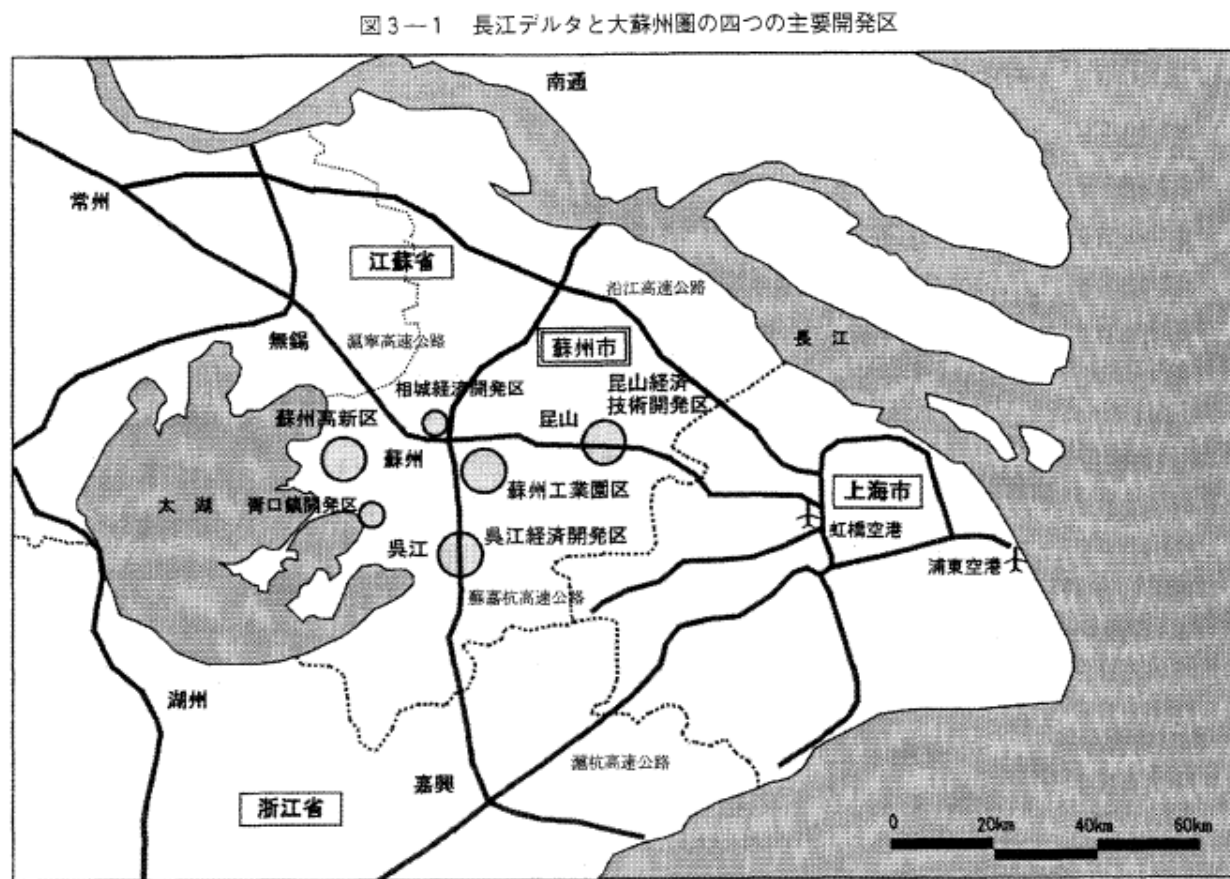
Borras et al. (2000)

Vertical Intra-Industry Trade

- These networks have allowed firms to exploit comparative advantage by slicing up production processes and allocating the production blocks throughout Asia.
 - The production-distribution networks thus created can be characterized as vertical intra-industry trade (VIIT).
 - VIIT differs from the exchange of final goods for vertical inter-industry between the North and the South (e.g., between capital goods and apparel) and for horizontal intra-industry trade between the North and the North (e.g., between two differentiated types of automobiles).
 - VIIT makes it possible to exploit differences in factor endowment in the fragmented production blocks between developing, emerging, and developed economies in the region
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2) A Specific Example: The Global Value Chain for Notebook PCs

- (1) The lion's share of international production of notebook PCs takes place in the Yangtze River Delta of China



A Specific Example: The Global Value Chain for Notebook PCs (continued)

- (a) In late 2001, the government of Taipei, China de-regulated “outgoing” FDI from notebook PC companies in Taipei, China into China
- (b) Taipei, China’s Original Design Manufacturers (ODMs) had to accompany professional suppliers in China to provide training

(2) Multi-layered production networks

- (a) high-value added suppliers of OS (Microsoft) and MPU (Intel)
 - (b) internationally well-known branded makers (HP, Apple, Toshiba, etc.)
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A Specific Example: The Global Value Chain for Notebook PCs (continued)

- (c) Taipei, China's professional suppliers, consisting of
 - (i) 50~100 relatively large scale firms
 - (ii) up to ten thousand employees per firm
 - (iii) highly professional suppliers of connectors, batteries, switches, displays, etc.

 - (d) a large number of producers of basic industrial materials
 - (i) several thousands of small-medium scale firms
 - (ii) varying number of employees averaging a few hundreds
 - (iii) engaging in casting, forging, plating, module assembling, etc: these are manufacturing base
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A Specific Example: The Global Value Chain for Notebook PCs (continued)

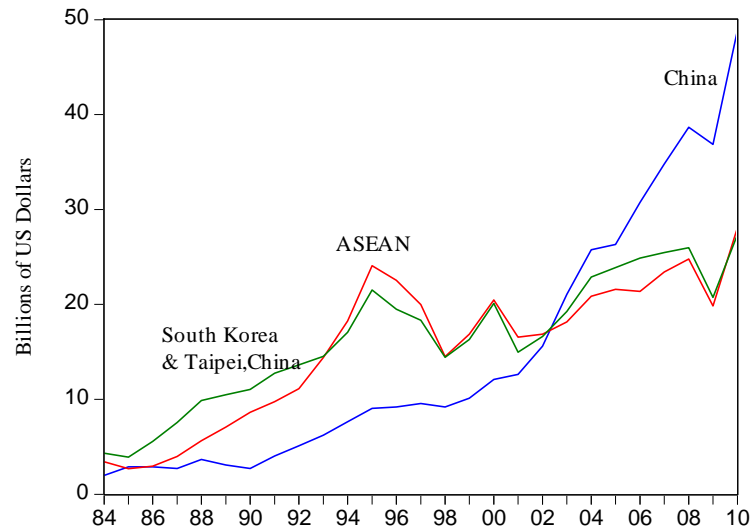
- (3) Handling great uncertainties and risks
 - (a) High degree of uncertainties:
 - (i) extremely rapid technological changes
 - (ii) volatilities of market demand
 - (iii) ever shorter product-cycles
 - (b) Adopt literally real time management systems regarding every aspect of production and transaction arrangements: “build to order” systems, through the use of ITCs
 - (c) Some Taipei, China’s assembly firms have kept inventories lean by processing 98 percent of order within 3 days. Productivity growth within this value chain has been amazing.
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3) Triangular Trading Patterns in East Asia

- In general, Japan, Korea, Taipei, China, and MNCs located in ASEAN produce sophisticated technology-intensive intermediate goods and capital goods and ship them to China and ASEAN for assembly by relatively low skilled workers. The finished products are then exported largely to the West. These production and distribution networks have promoted economic efficiency and helped to make East Asia as a whole (not just China) the manufacturing center of the world.
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Intermediate Goods Trade in East Asia

- FDI flows into a country are associated with increases in intermediate goods exports to that country.
 - Examining the flow of intermediate goods can shed light on the evolution of triangular trading patterns in Asia.
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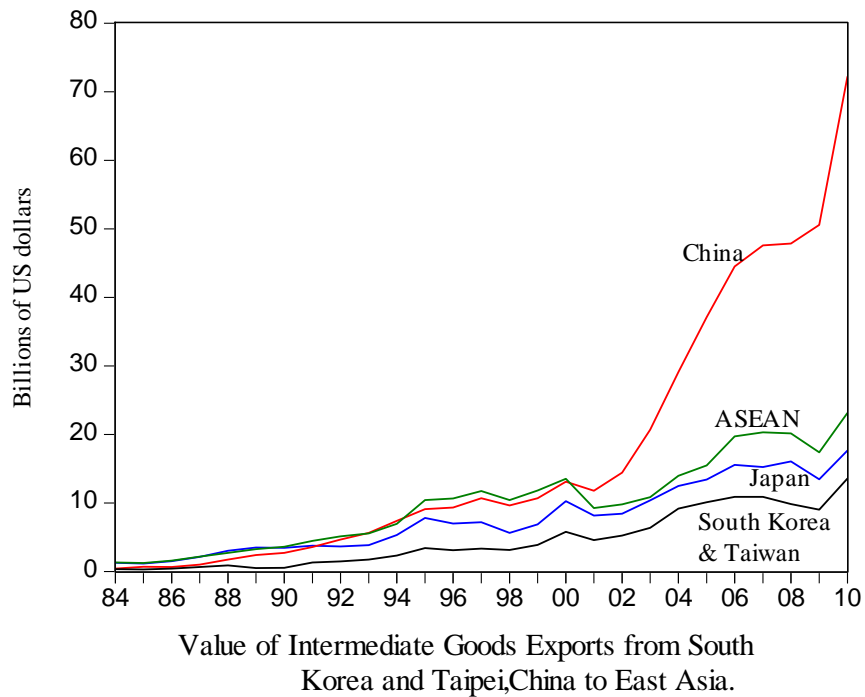


Value of Japanese Intermediate Goods Exports to East Asia

Note: ASEAN includes Malaysia, the Philippines, Singapore, and Thailand.
Source: CEPII-CHELEM Database.

Value of Japanese Intermediate Goods Exports to East Asia (Billions of U.S. Dollars)

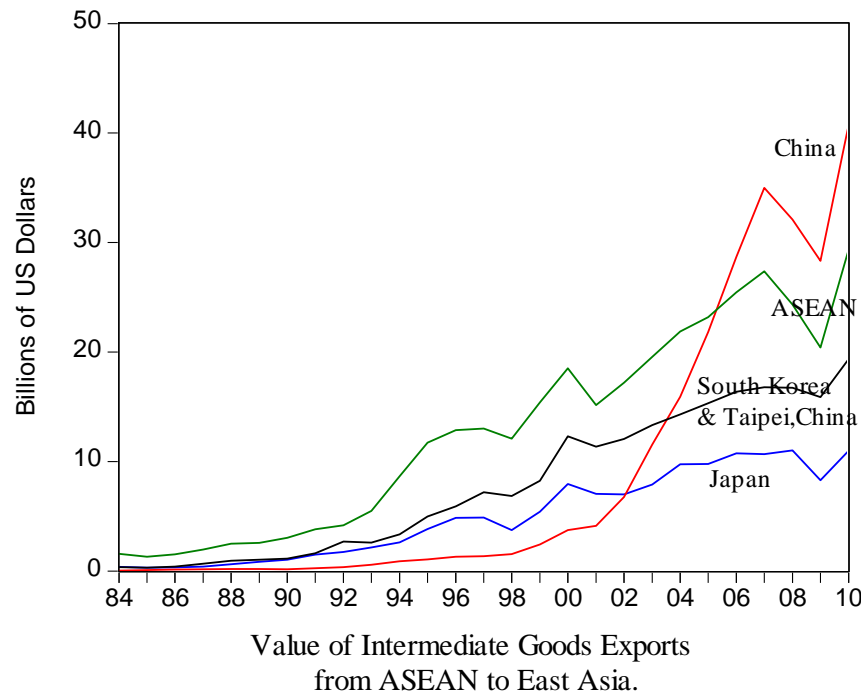
Region	1990	1995	2000	2005	2008	2009	2010
China	2.7	9.1	12.1	26.3	38.7	36.9	48.9
ASEAN 4	8.6	24.1	20.5	21.6	24.8	19.8	28.1
S.Korea+Taipei, China	11.0	21.5	20.1	23.9	26.0	20.7	27.4



Note: ASEAN includes Malaysia, the Philippines, Singapore, and Thailand.
 Source: CEPII-CHELEM database.

Value of S. Korea's and Taipei, China's Intermediate Goods Exports to East Asia (Billions of U.S. Dollars)

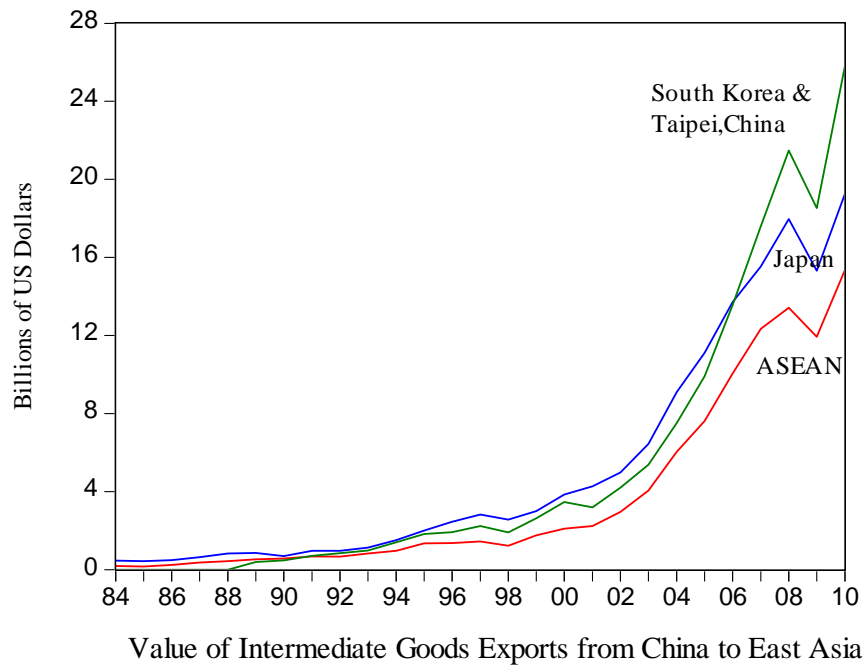
Region	1990	1995	2000	2005	2008	2009	2010
Japan	3.4	7.8	10.2	13.4	16.0	13.4	17.7
China	2.7	9.1	13.1	37.1	47.9	50.5	72.3
ASEAN 4	3.6	10.4	13.5	15.5	20.2	17.4	23.1
S.Korea+Taipei,China	0.5	3.4	5.8	10.1	9.8	9.0	13.6



Note: ASEAN includes Malaysia, the Philippines, Singapore, and Thailand.
 Source: CEPII-CHELEM database.

Value of ASEAN 4's Intermediate Goods Exports to East Asia (Billions of U.S. Dollars)

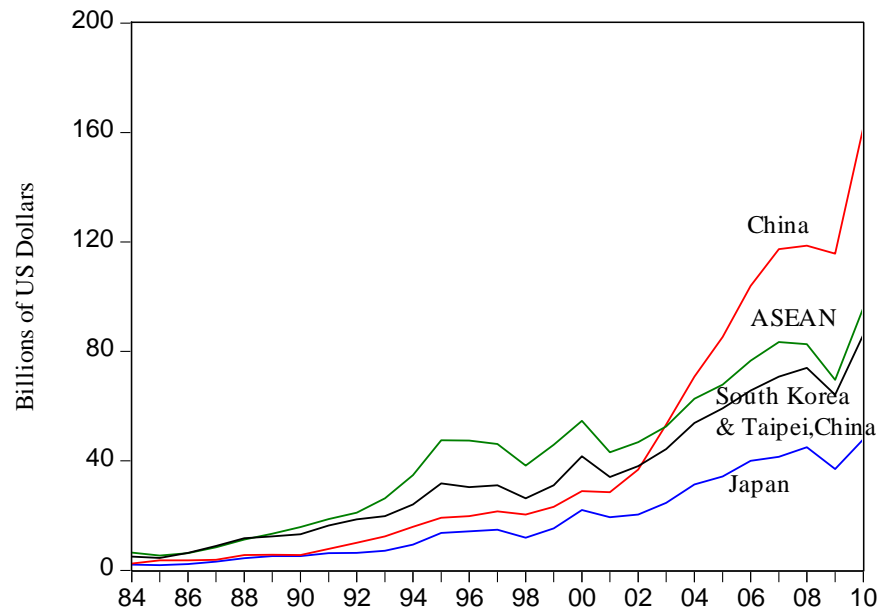
Region	1990	1995	2000	2005	2008	2009	2010
Japan	1.0	3.8	8.0	9.8	11.0	8.3	11.0
China	0.2	1.1	3.7	21.8	32.1	28.3	40.8
ASEAN 4	3.0	11.7	18.5	23.2	24.3	20.4	29.4
S.Korea+Taipei,China	1.1	5.0	12.3	15.3	16.7	15.9	19.4



Note: ASEAN includes Malaysia, the Philippines, Singapore, and Thailand
 Source: CEPII-CHELEM Database

Value of China's Intermediate Goods Exports to East Asia (Billions of U.S. Dollars)

Region	1990	1995	2000	2005	2008	2009	2010
Japan	0.7	2.0	3.8	11.1	18.0	15.3	19.3
ASEAN 4	0.6	1.3	2.1	7.6	13.4	11.9	15.4
S.Korea+Taipei,China	0.5	1.8	3.5	9.9	21.5	18.5	25.8

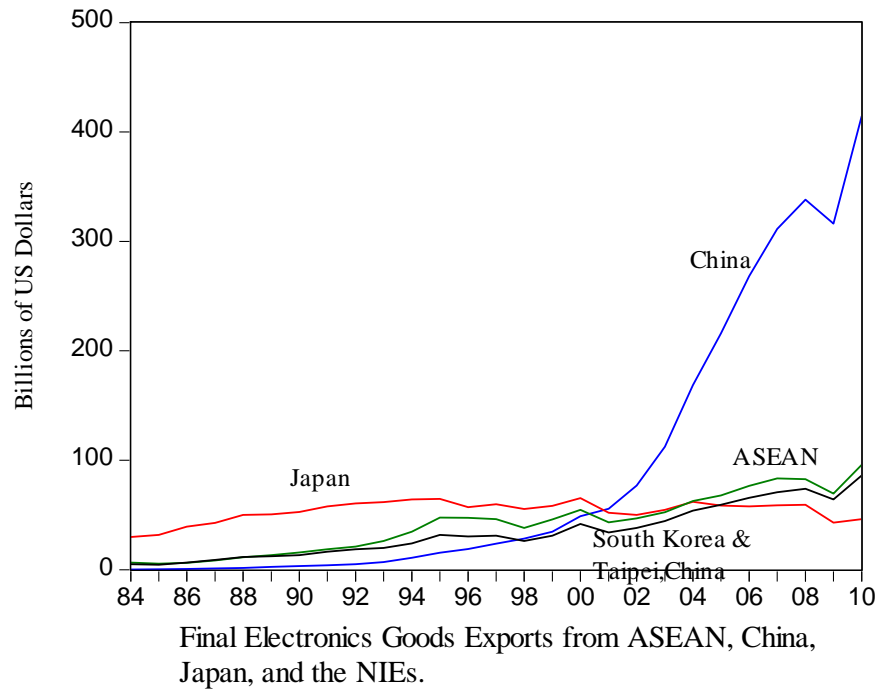


Intermediate Goods Exports from East Asia as a Whole to Individual Countries or Regions.

Note: ASEAN includes Malaysia, the Philippines, Singapore, and Thailand.
Source: CEPII-CHELEM Database

Value of Intermediate Goods Imports of Individual East Asian Countries and Regions from East Asia as a Whole (Billions of U.S. Dollars)

Region	1990	1995	2000	2005	2008	2009	2010
Japan	5.2	13.6	22.0	34.3	45.0	37.1	47.9
China	5.6	19.2	28.9	85.2	118.6	115.7	161.9
ASEAN 4	15.8	47.5	54.6	67.9	82.7	69.6	95.9
S.Korea+Taipei,China	13.2	31.8	41.7	59.2	74.0	64.2	86.1

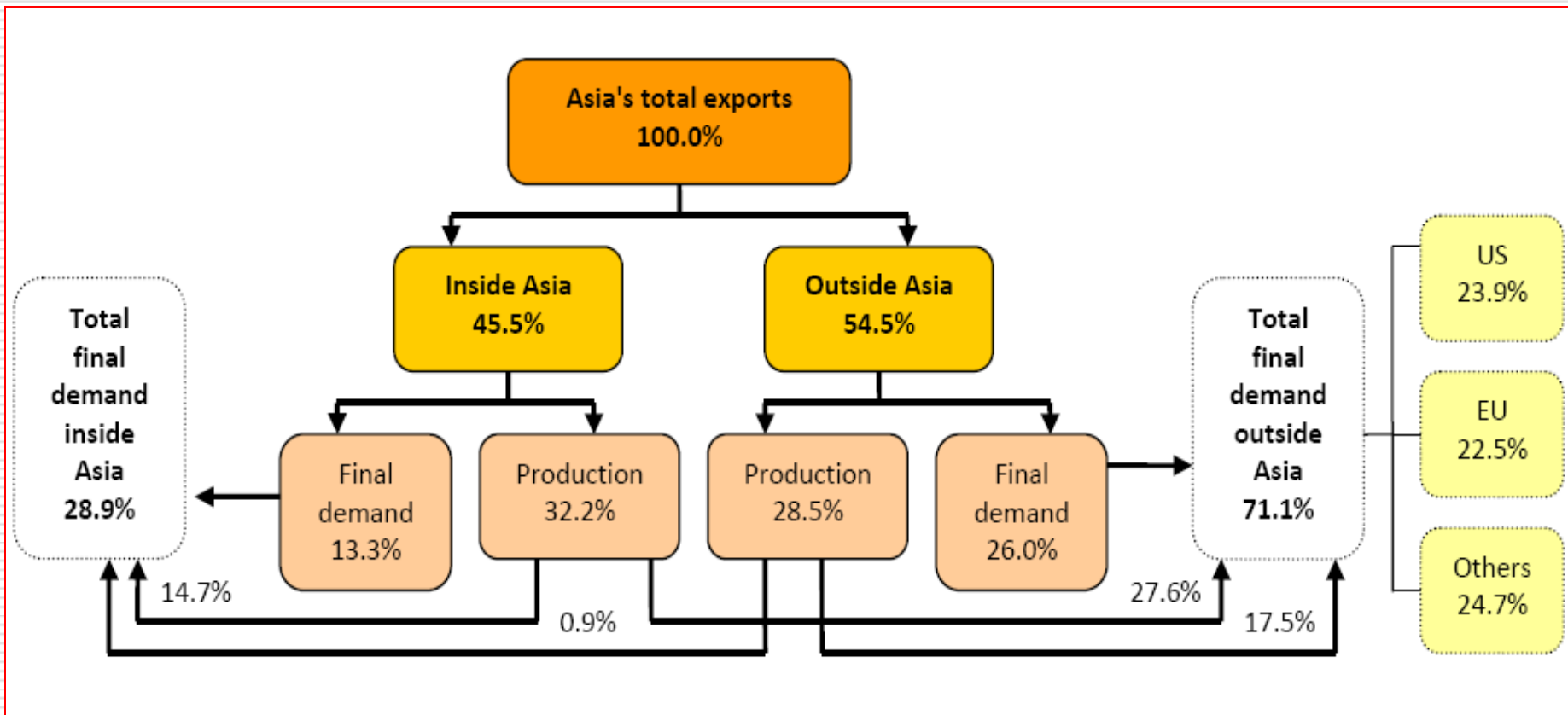


Note: ASEAN includes Malaysia, the Philippines, Singapore, and Thailand.
Source: CEPII-CHELEM Database

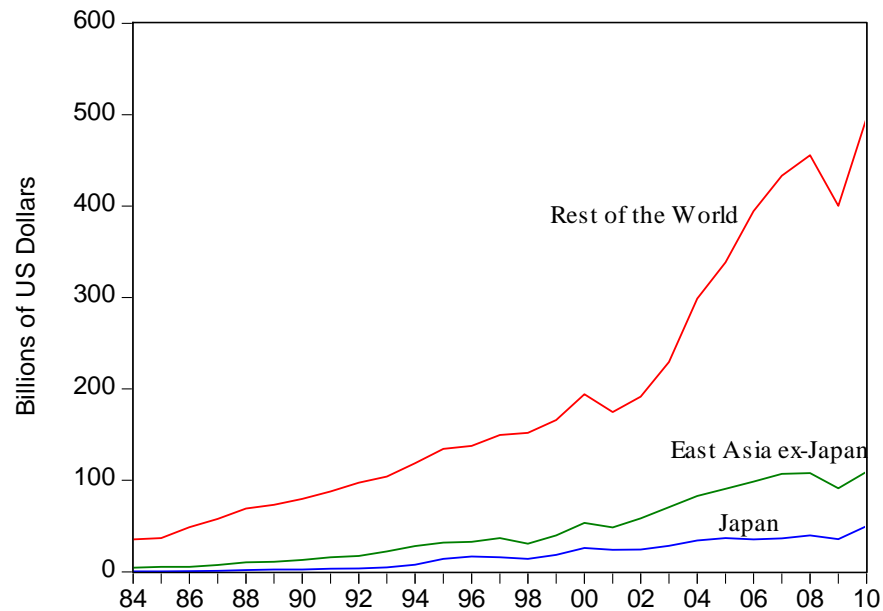
Final Electronics Exports from East Asian Countries to the World

Region	1990	1995	2000	2005	2008	2009	2010
Japan	52.8	64.6	65.3	58.7	59.2	42.9	46.2
China	3.3	15.5	48.8	215.8	338.1	316.3	414.7
ASEAN 4	15.8	47.5	54.6	67.9	82.7	69.6	95.9
S.Korea+Taipei,China	13.2	31.8	41.7	59.2	74.0	64.2	86.2

Final Demand Primarily from outside of Asia



Note: Asia includes 14 countries for which data is available: Hong Kong, China; Japan; People's Republic of China; Republic of Korea; and Taipei, China (Northeast Asia); Indonesia; Malaysia; Philippines; Singapore; Thailand; Viet Nam (Southeast Asia), Bangladesh; India; Pakistan (South Asia). Source: ADB staff estimates from Global Trade Analysis Project (GTAP) version 7. Data refers to the world economy in 2007.



Final Electronics Exports from East Asia to Japan, the Rest of East Asia, and the Rest of the World.

Note: East Asia ex-Japan includes China, Malaysia, the Philippines, Singapore, South Korea, Taipei, China, and Thailand. Rest of the World includes all importers other than Japan and East Asia ex-Japan.

Source: CEPII-CHELEM Database.

Value of Final Electronics Goods Exports from East Asia to the World (Billions of U.S. Dollars)

Region	1990	1995	2000	2005	2008	2009	2010
Japan	2.6	14.0	26.1	36.8	39.7	35.6	49.9
East Asia ex-Japan	13.0	32.0	53.6	90.7	107.9	91.4	109.5
Rest of the World	79.6	134.6	194.1	338.4	455.7	400.2	496.4

Triangular Trading Patterns in East Asia

- Intermediate goods produced in Japan, Korea, Taipei, China, and by MNCs located in ASEAN flow to ASEAN countries and China for assembly and re-export.
 - The lion's share of the final goods flows outside of Asia.
 - China has become especially important as an exporter of final goods in recent years.
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4) China's Role in Regional Supply Chains

- ❑ Given the growing importance of China in regional production networks, further study is warranted.
 - ❑ China's Customs Statistics distinguishes between imports and exports linked to processed trade and ordinary imports and exports.
 - ❑ Imports for processing are goods that are brought into China for processing and subsequent re-export. Processed exports are the goods that are produced this way. Neither the imports nor the finished goods normally enter China's domestic market.
 - ❑ Ordinary imports are goods intended for the domestic market and ordinary exports are goods that are produced using local inputs.
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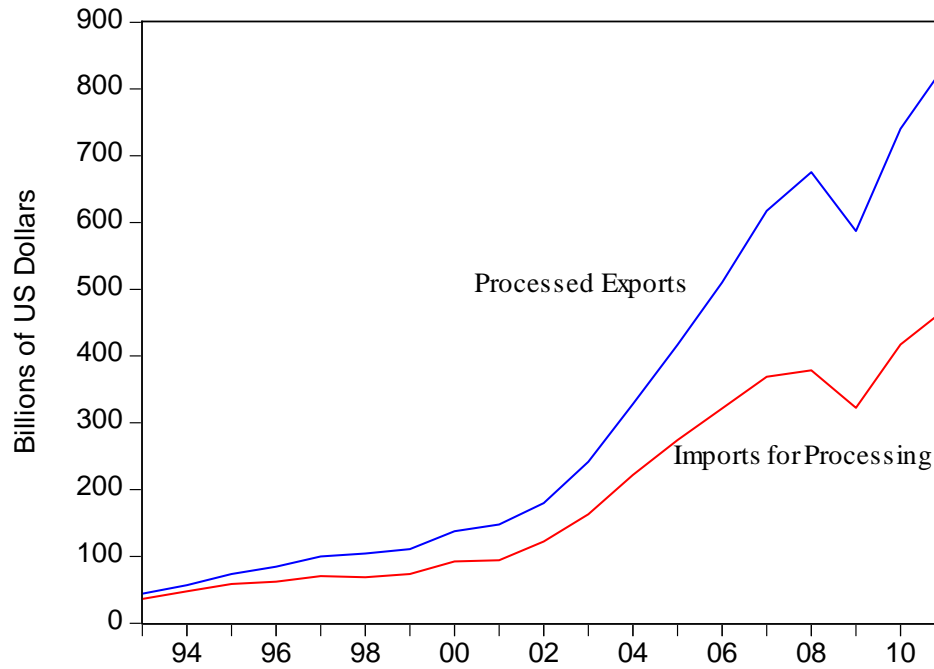


Figure 8. China's Imports for Processing and Processed Exports.

Source: CEIC Database.

Value of Imports for Processing and Processed Exports (Billions of U.S. Dollars)

	1993	1997	2000	2008	2009	2010	2011
Imports for Processing	36.4	70.3	92.6	378.5	322.4	417.5	469.9
Processed Exports	44.3	99.7	137.7	675.3	587.1	740.5	835.6

Figure 8

- China's processed exports and imports for processing have soared, interrupted only by a brief decline in 2009.
 - Processed exports equaled \$741 billion in 2010 and \$836 billion in 2011, about half of China's total exports.
 - The figure also indicates that the gap between processed exports and imports for processing began increasing after 2004, leading to a surplus in processing trade of almost \$370 billion in 2011.
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Table 1. China's Processing Trade, 2007-2010

	S. Korea	Taipei,China	ASEAN4	Japan	Singapore	Hong Kong	US	Europe	R.O.W	Total
Imports for Processing (%)										
2007	15.24	18.75	10.65	16.11	2.40	1.98	4.93	5.03	24.91	100.00
2008	15.63	18.07	10.26	16.20	2.28	1.62	5.20	5.72	25.01	100.00
2009	16.95	16.96	9.73	15.53	2.18	1.32	4.80	5.51	27.03	100.00
2010	17.05	16.78	8.05	14.78	2.38	1.30	5.10	5.04	29.52	100.00
Processed Exports (%)										
2007	3.98	1.92	3.25	9.35	2.84	22.42	23.54	18.59	14.10	100.00
2008	4.75	1.88	3.27	9.22	2.79	21.01	22.20	18.71	16.16	100.00
2009	4.96	1.86	3.40	9.13	3.36	20.57	22.68	17.50	16.54	100.00
2010	4.71	2.03	3.40	8.85	2.84	21.70	21.96	17.19	17.32	100.00
Balance in Processing Trade (billions of U.S. dollars)										
2007	-31.57	-57.18	-19.18	-1.63	8.73	131.18	127.25	96.29	-4.65	249.24
2008	-27.07	-55.71	-16.72	0.99	10.19	135.76	130.20	104.67	14.46	296.77
2009	-25.50	-43.72	-11.41	3.56	12.72	116.46	117.61	84.93	9.92	264.57
2010	-36.26	-55.03	-16.95	3.89	11.05	155.23	141.31	106.26	13.40	322.90

Table 1 (top panel)

- In 2010, 60 percent of imports for processing came from South Korea, Taipei, China, Japan, and ASEAN is large.
 - In addition, 16 percent of imports for processing into China come from China (Xing, 2011). Thus more than 75 percent of China's imports for processing come from East Asia.
 - Only 5 percent each comes from the EU and the US.
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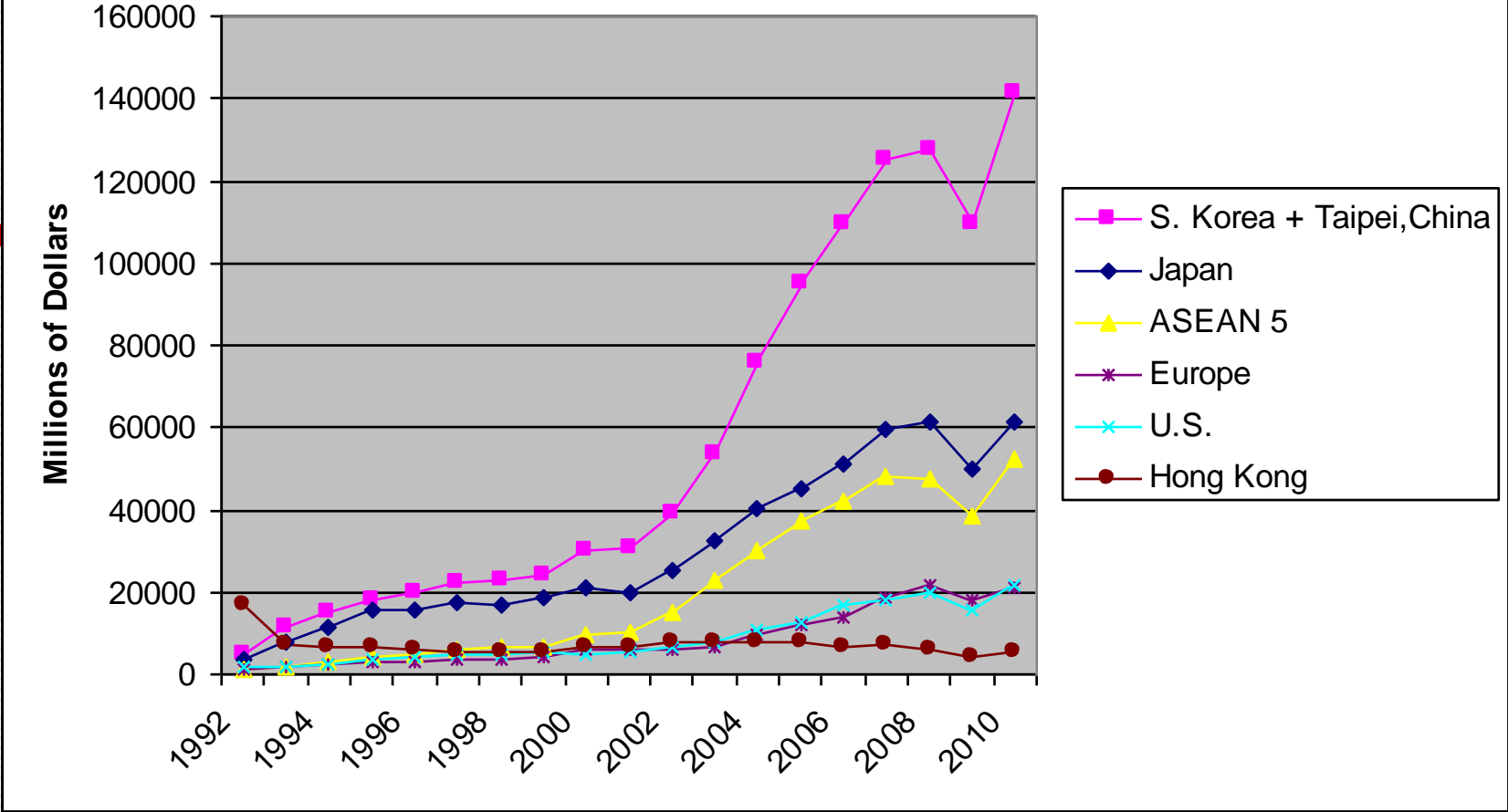
Table 1 (middle panel)

- Table 1 shows that 20 percent of processed exports go to East Asia and 80 percent go outside the region. 22 percent each go to Hong Kong and to the US, 17 percent goes to Europe, and 17 percent goes to the rest of the world.
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Table 1 (bottom panel)

- Since parts and components come primarily from East Asia and not from the West and finished products go primarily outside of East Asia and especially to the West, China runs deficits of about \$100 billion with East Asia and surpluses of \$150 billion with the US and Hong Kong and \$100 billion with Europe.
- Many of the goods exported to Hong Kong and Singapore are re-shipped to the US and Europe. Taking account of this, China's surplus with the US and Europe would be even larger. Using US data, which treat Chinese entrepôt trade through Hong Kong and Singapore as coming from China, China's trade surplus with the US in 2011 equaled \$300 billion.
- Thus China's processing trade remains dependent on demand from the West and especially from the US.

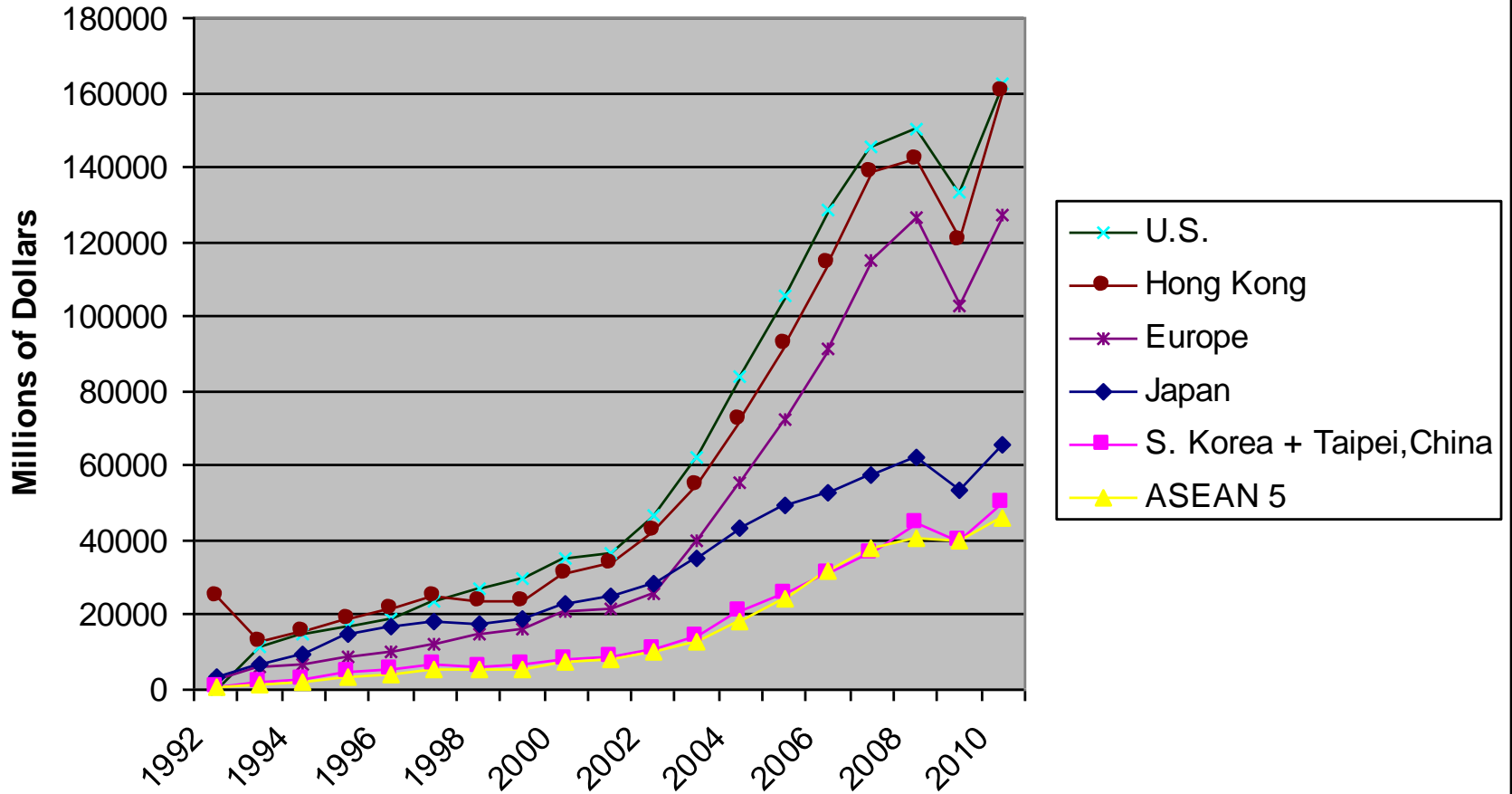
Figure 6a: China's Imports for Processing by Country and Region



Source: China Customs Statistics.

Note: ASEAN 5 includes Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

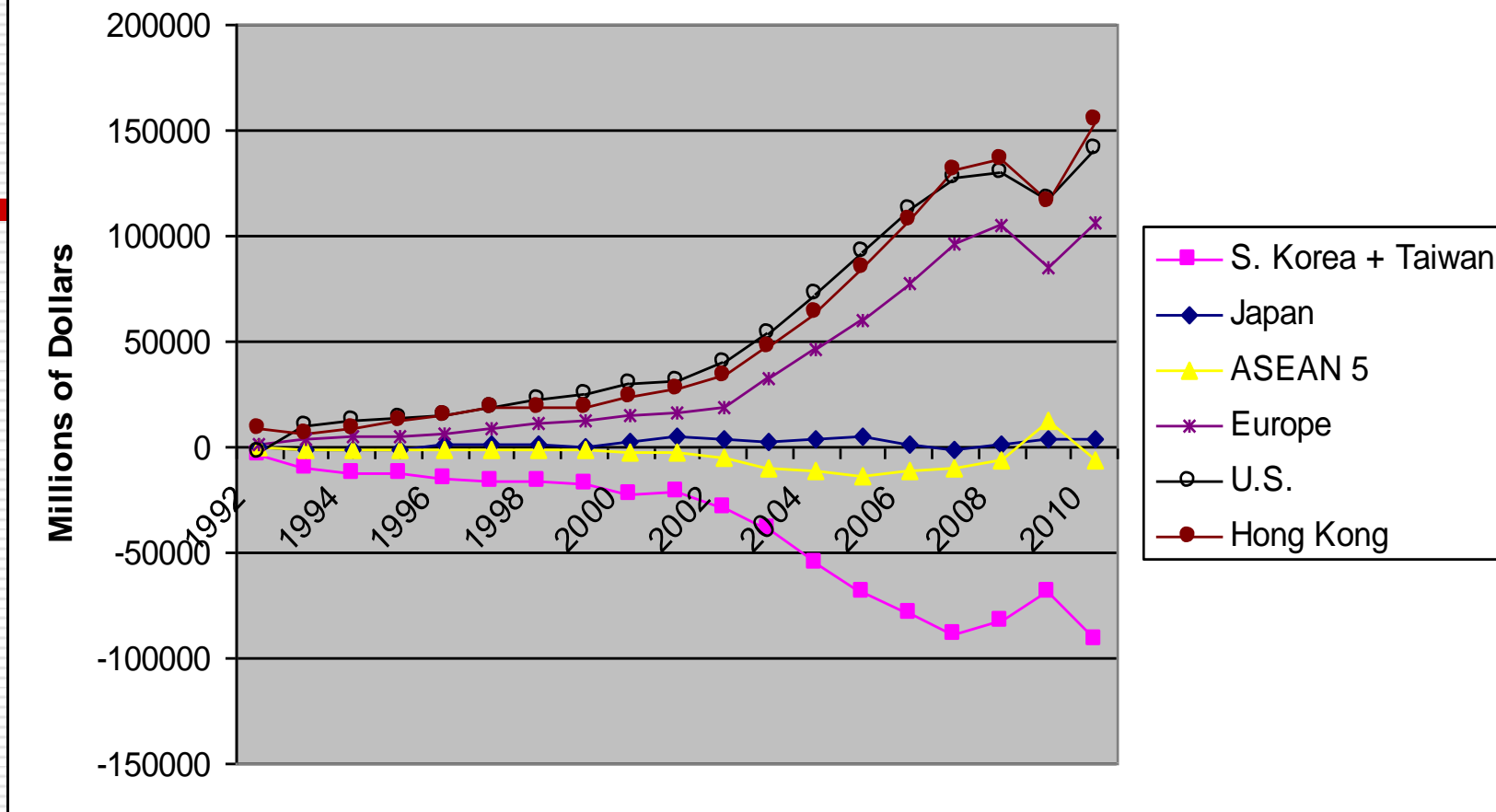
Figure 6b: China's Processed Exports by Country and Region



Source: China Customs Statistics.

Note: ASEAN 5 includes Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Figure 6c. China's Trade Balance in Processed Goods by Country and Region



Source: China Customs Statistics.

Note: ASEAN 5 includes Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

5) Exchange Rate Changes and Processing Trade

- The majority of the value-added of processed exports comes from other (primarily East Asian countries).
 - A generalized appreciation in East Asia would thus have a larger effect on the foreign currency cost of processed exports than a unilateral RMB appreciation.
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Imperfect Substitutes Framework

- The quantity of China's exports *demanded* depends on income in the other countries and the price of China's exports relative to the price of domestically produced goods in those countries. The quantity of exports *supplied* by China depends on the export price relative to China's price level.
- By equating supply and demand we can derive export equations:

$$ex_t = a_{10} + a_{11}rer_t + a_{12}y_t + \varepsilon_{1t} \quad (1)$$

Identification of Trade Elasticities

- Infinite supply elasticity would make it possible to identify the parameters in equation (1). China has 150 to 200 million redundant rural laborers. Large pool of workers should enable Chinese exporters to increase supply at constant prices.
 - In addition, IMF (2005) states that imported inputs for exports into East Asian processor economies should vary one-for-one with processed exports. Thus sophisticated intermediate and capital goods tend to flow elastically into China's processed export industries to accommodate increases in demand in the rest of the world.
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Weighted Exchange Rates

- We need to capture China's value-added and the value-added coming from other countries.
- Following Tong and Zheng (2008), China's value-added in processing trade (VA) can be calculated by:

$$VA = (VPE - VIP)/VPE$$

where VPE is the value of processed exports and VIP is the value of imports for processing.

Value of Imports for Processing

- The lion's share of imports for processing come from ASEAN, Japan, South Korea, and Taipei, China. The two other leading suppliers are Germany and the U.S. For each of these countries we calculate weights w_i each year by dividing each country's imports for processing by the total imports for processing coming from the nine major suppliers together.
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Integrated Exchange Rate

- We can use the weights on imports for processing and China's value added to calculate an integrated exchange rate index (irer) for China's processed exports:

$$\text{irer}_t = \text{irer}_{t-1} (\text{chinareer}_t / \text{chinareer}_{t-1})^{\text{VA}_t} \prod (\text{reer}_{i,t} / \text{reer}_{i,t-1})^{(1-\text{VA}_t)w_{it}}$$

where chinareer is China's real effective exchange rate, reer_i is the real effective exchange rate for supply chain country i . An increase in chinareer, reer, and irer all represent exchange rate appreciations.

Figure 3a. Integrated Real Effective Exchange Rate Index for the Entire Value of China's Processed Exports

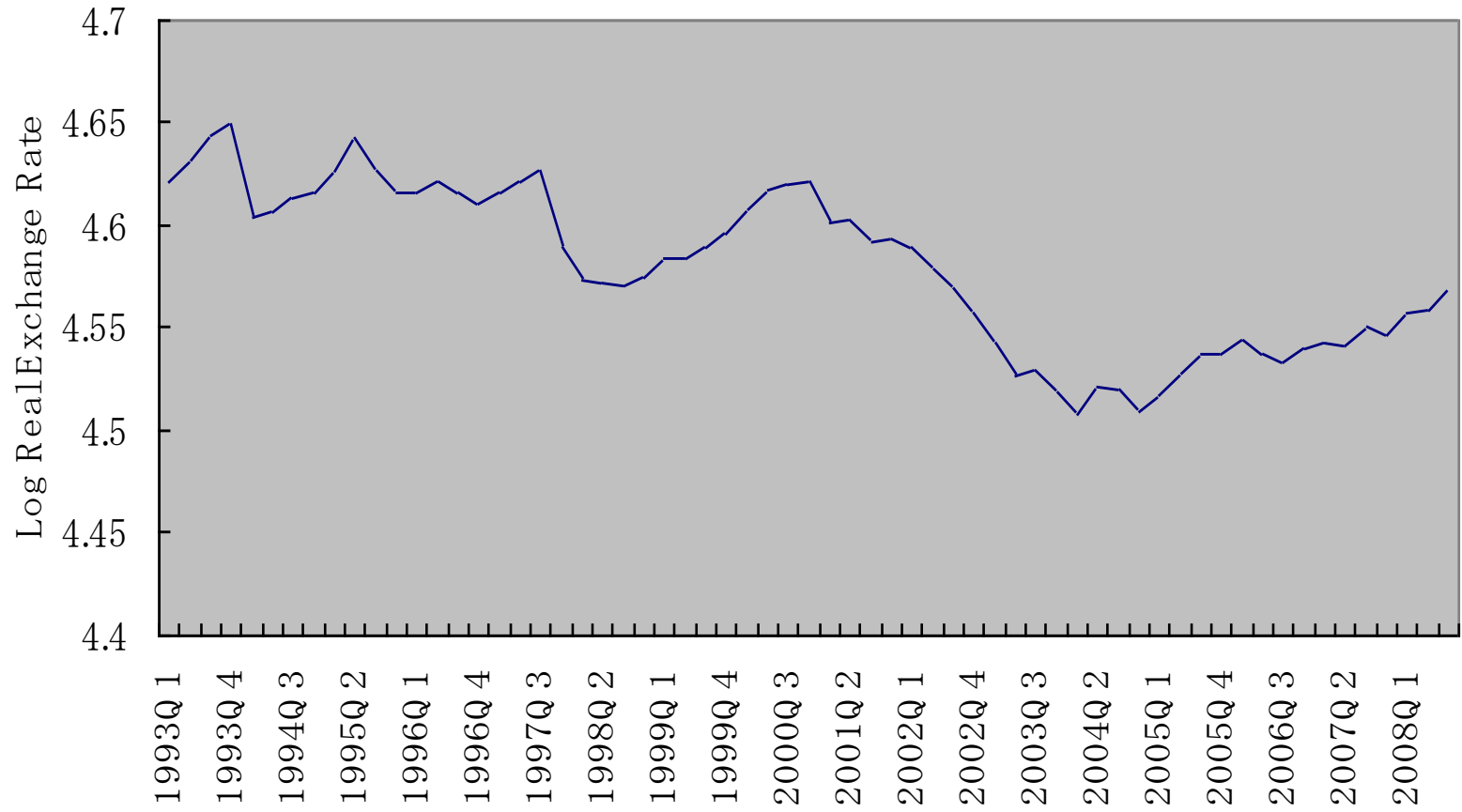
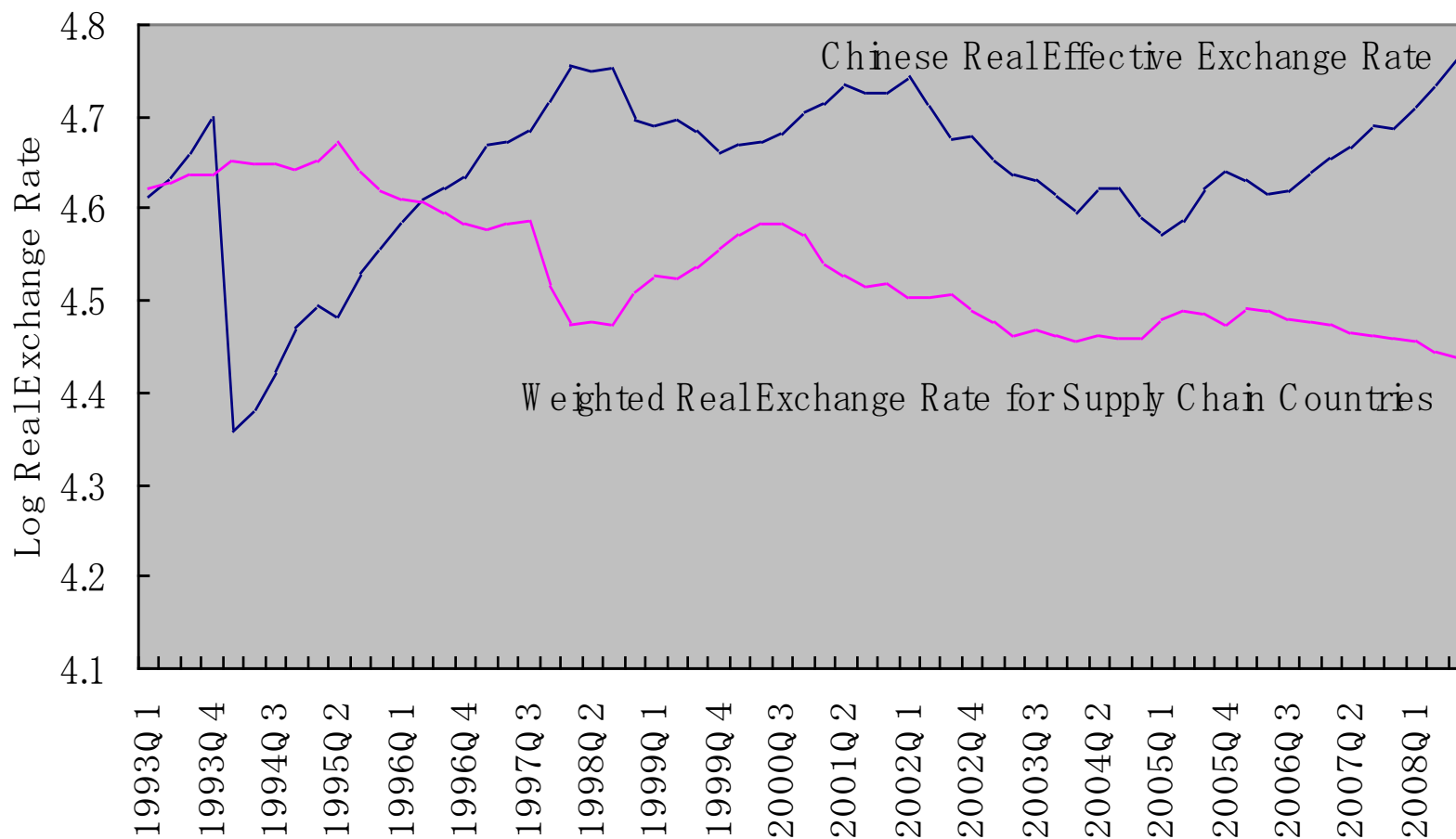


Figure 3b. Chinese Real Effective Exchange Rate and Weighted Real Exchange Rate for Supply Chain Countries



Source: International Monetary Fund, Bank for International Settlement, and calculations by the author.

Note: An increase in the real exchange rate corresponds to an appreciation.

Deflating Exports

- Exports from the China Customs Statistics are measured in dollars. Following previous researchers, exports were deflated in three ways:
 - 1) The Hong Kong export price deflator.
 - 2) The U.S. producer price index.
 - 3) The U.S. consumer price index.
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Other Explanatory Variables

- ❑ Real income in Europe, North America, Japan, South Korea, and Australia. Since the lion's share of exports go to high income countries, this should help capture demand factors in importing countries.
 - ❑ FDI Stock. 84 percent of processed exports were produced by foreign-invested enterprises. Thus the FDI stock may be an important explanatory variable.
 - ❑ A WTO dummy variable.
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Estimation

- Following Cheung, Chinn, and Fujii, estimate model using DOLS.
 - Include two leads and two lags in the estimation.
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Equation to be Estimated

□
$$X_t = \beta_0 + \beta_1 \text{irer}_t + \beta_2 \text{rgdp}_t + \beta_3 \text{FDI} + \beta_4 \text{WTO}_t + \beta_5 \text{TIME} + \sum \Phi_{1,k} \Delta \text{irer}_{t-k} + \sum \Phi_{2,k} \Delta \text{rgdp}_{t-k} + \sum \Phi_{3,k} \Delta \text{FDI}_{t-k} + u_{i,t}$$

where:

X_t represents real processed exports from China to the world,

irer_t represents either the integrated real exchange rate

rgdp_t equals real income in higher income countries,

FDI_t denotes the stock of FDI,

Time is a time trend, and

WTO is a dummy variable.

DOLS Estimates of China's Processed Exports over the Period 1993-2008

Independent Variables	Exports deflated by:					
	Hong Kong unit value (1)	Hong Kong unit value (2)	PPI-finished goods (3)	PPI-finished goods (4)	U.S. CPI (5)	U.S. CPI (6)
Rest of the World GDP Integrated	7.93*** (0.36)	6.68 (2.56)	6.72*** (0.37)	5.63** (2.55)	6.93*** (0.38)	6.34** (2.73)
RER	-3.09*** (0.38)	-2.86*** (0.55)	-2.61*** (0.37)	-2.41** (0.52)	-2.29*** (0.39)	-2.18*** (0.57)
FDI Stock	-0.13 (0.09)	-0.12 (0.08)	0.05 (0.09)	0.06 (0.09)	0.00 (0.92)	0.01 (0.09)
WTO Dummy	-0.01 (0.03)	-0.01 (0.03)	-0.02 (0.04)	-0.02 (0.04)	-0.04 (0.04)	-0.03 (0.04)
Time		0.01 (0.02)		0.01 (0.02)		0.00 (0.02)
Adjusted R-squared	0.99	0.99	0.99	0.99	0.99	0.99
SER	0.06	0.06	0.06	0.06	0.07	0.07
Serial Independence	0.62	0.63	0.47	0.48	0.48	0.48
Heteroskedasticity	0.69	0.71	0.80	0.84	0.74	0.72
ARCH	0.48	0.47	0.41	0.33	0.63	0.63
No. of observation	58	58	58	58	58	58

Note: DOLS (2, 2) estimates. Heteroskedasticity-consistent standard errors are in parentheses.

*** (**) [*] denotes significance at the 1% (5%) [10%] level.

aProbability values from a Lagrange Multiplier test for the null hypothesis that there is no fourth order serial correlation.

bProbability values from a Lagrange Multiplier test for the null hypothesis of homoskedasticity from a regression of the squared residuals on the original regressions.

cProbability values from a Lagrange Multiplier test for the null hypothesis that there is no fourth order autoregressive conditional heteroskedasticity.

Results for ROW Income

- For income, a 1 percent drop in ROW income would reduce China's processed exports by 5.6 to 7.9 percent.
 - Chinn (2009), using an error-correction model to explain the fall in U.S. imports during the crisis, reported an income elasticity of 6.9.
 - Ahmed (2009), using a first difference specification to explain China's processed exports, found an income elasticity of 6.3.
 - Consistent with recent experience. Between 2008:3 and 2009:1, ROW income fell by 4 percent and processed exports fell by 50 percent.
 - Processed exports very sensitive to ROW income.
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Results for Exchange Rates

- Coefficient on integrated exchange rate always statistically significant.
 - Ahmed (2009), in recent Federal Reserve working paper, similarly reported that exchange rates throughout Asian supply chain countries are important for explaining China's processed exports.
 - An appreciation throughout Asia would cause a large drop in processed exports.
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DOLS Estimates of China's Processed Exports over the Period 1993-2008

Independent variables	Exports deflated by:					
	Hong Kong unit value (1)	Hong Kong unit value (2)	PPI-finished goods (3)	PPI-finished goods (4)	U.S. CPI (5)	U.S. CPI (6)
Rest of the World GDP	7.08*** (0.48)	6.33** (2.60)	6.10*** (0.49)	5.37* (2.74)	6.30*** (0.49)	5.83** (2.69)
Supplier's RER	-1.84*** (0.53)	-1.77** (0.64)	-1.79*** (0.55)	-1.71** (0.65)	-1.61*** (0.57)	-1.56** (0.66)
RMB RER	-1.90*** (0.36)	-1.85*** (0.34)	-1.49*** (0.35)	-1.44*** (0.32)	-1.53*** (0.35)	-1.49*** (0.33)
FDI Stock	0.25 (0.25)	0.23 (0.24)	0.26 (0.26)	0.24 (0.25)	0.21 (0.26)	0.20 (0.25)
WTO Dummy	-0.05 (0.04)	-0.04 (0.04)	-0.04 (0.04)	-0.04 (0.04)	-0.07 (0.04)	-0.07 (0.04)
Time		0.00 (0.02)		0.00 (0.02)		0.00 (0.02)
Adjusted R-squared	0.99	0.99	0.99	0.99	0.99	0.99
SER	0.04	0.04	0.04	0.04	0.04	0.04
Serial Independence	0.14	0.15	0.24	0.26	0.12	0.13
Heteroskedasticity	0.80	0.85	0.74	0.81	0.81	0.86
ARCH	0.64	0.72	0.78	0.81	0.74	0.79
No. of observation	58	58	58	58	58	58

Note: DOLS (2, 2) estimates. Heteroskedasticity-consistent standard errors are in parentheses.

*** (**) [*] denotes significance at the 1% (5%) [10%] level.

aProbability values from a Lagrange Multiplier test for the null hypothesis that there is no fourth order serial correlation.

bProbability values from a Lagrange Multiplier test for the null hypothesis of homoskedasticity from a regression of the squared residuals on the original regressions.

cProbability values from a Lagrange Multiplier test for the null hypothesis that there is no fourth order autoregressive conditional heteroskedasticity.

Results for RMB and Supply Chain Countries Separately

- Income in the rest of the world remains an important explanatory variable. A 1 percent drop in ROW income would reduce China's processed exports by 5.6 to 7.9 percent.
 - Exchange rates in both China and in supply chain countries affect processed exports.
 - A 10 percent appreciation of the renminbi would reduce processed exports by 16 percent.
 - A 10 percent appreciation of the renminbi would reduce processed exports by 17 percent.
-

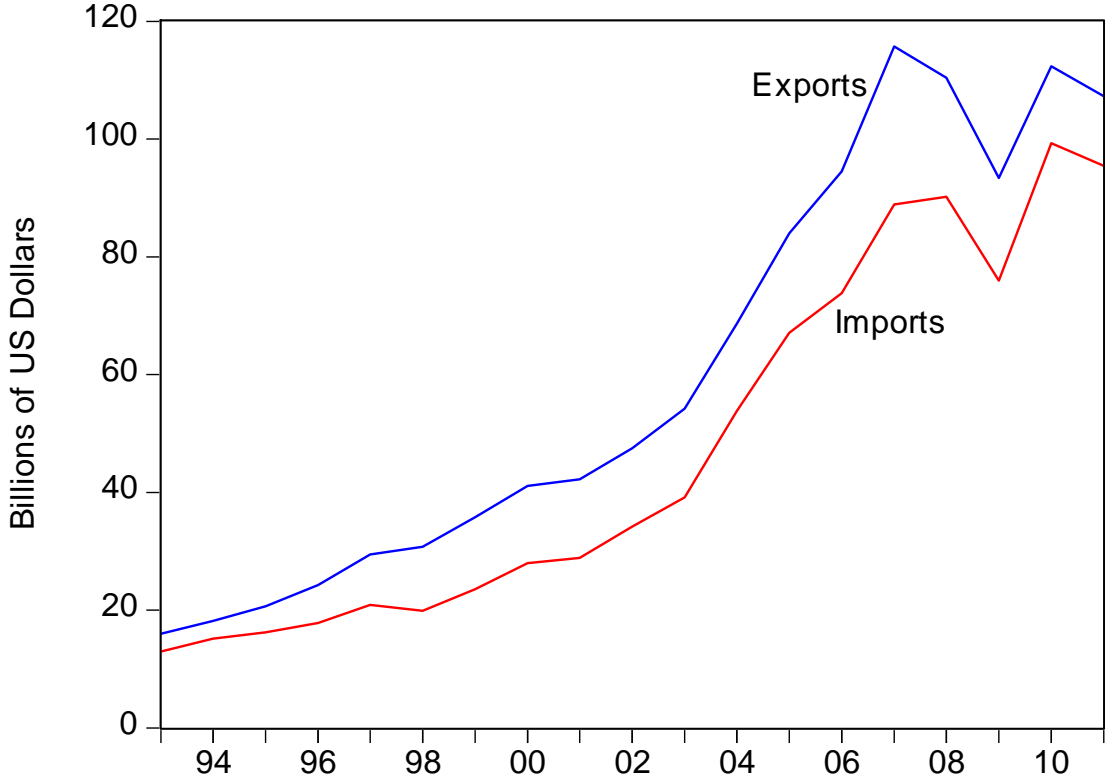
Disaggregating Processed Exports

- China's processing trade can be disaggregated into processing and assembly (PAA) trade and processing with imported materials (PWIM) trade.
 - PAA trade refers to foreign suppliers importing intermediate goods that belong to them and using these inputs to produce goods for re-export. PWIM trade refers to foreign suppliers importing inputs from other firms and using these to produce goods for re-export.
-

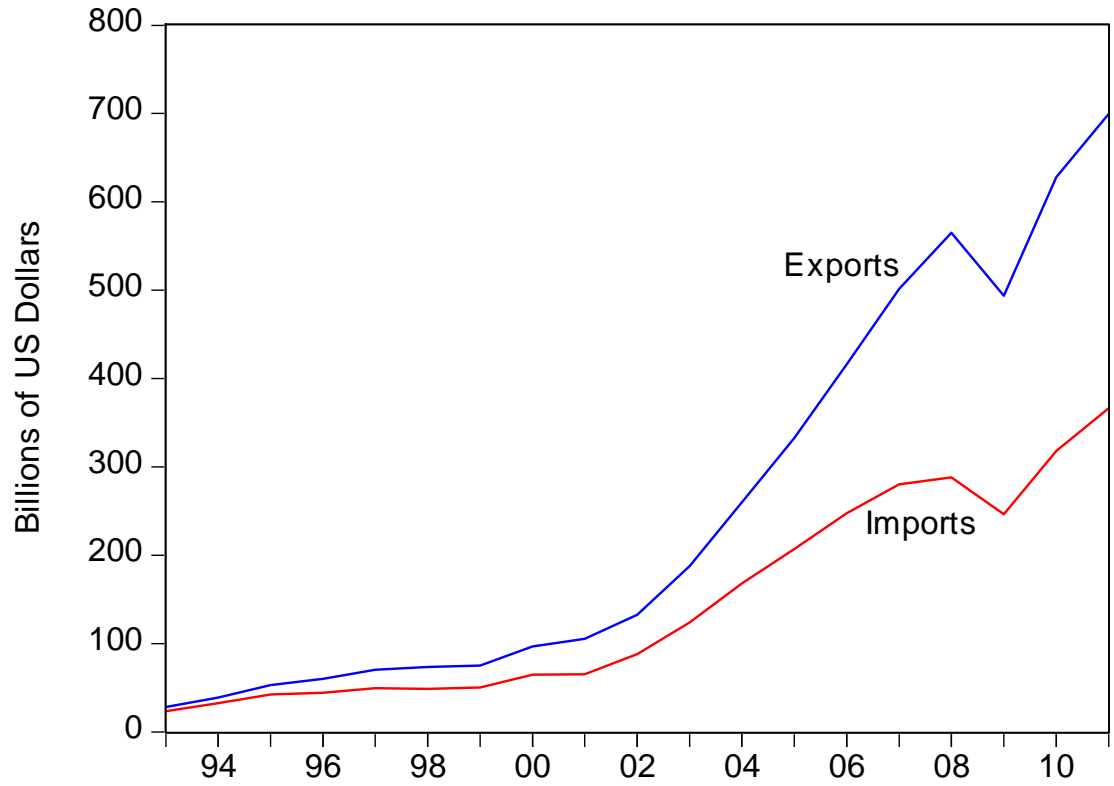
China's Value-added in PAA and PWIM Trade

- Figure 1a shows that China's value-added in the first category is small.
 - Figure 1b shows that China's value-added in the second category is large.
 - Figure 2 shows China's trade balance in PAA trade and PWIM trade. Its surplus in PAA trade is only about 10 billion US dollars and its surplus in PWIM trade exceeds 300 billion US dollars.
-

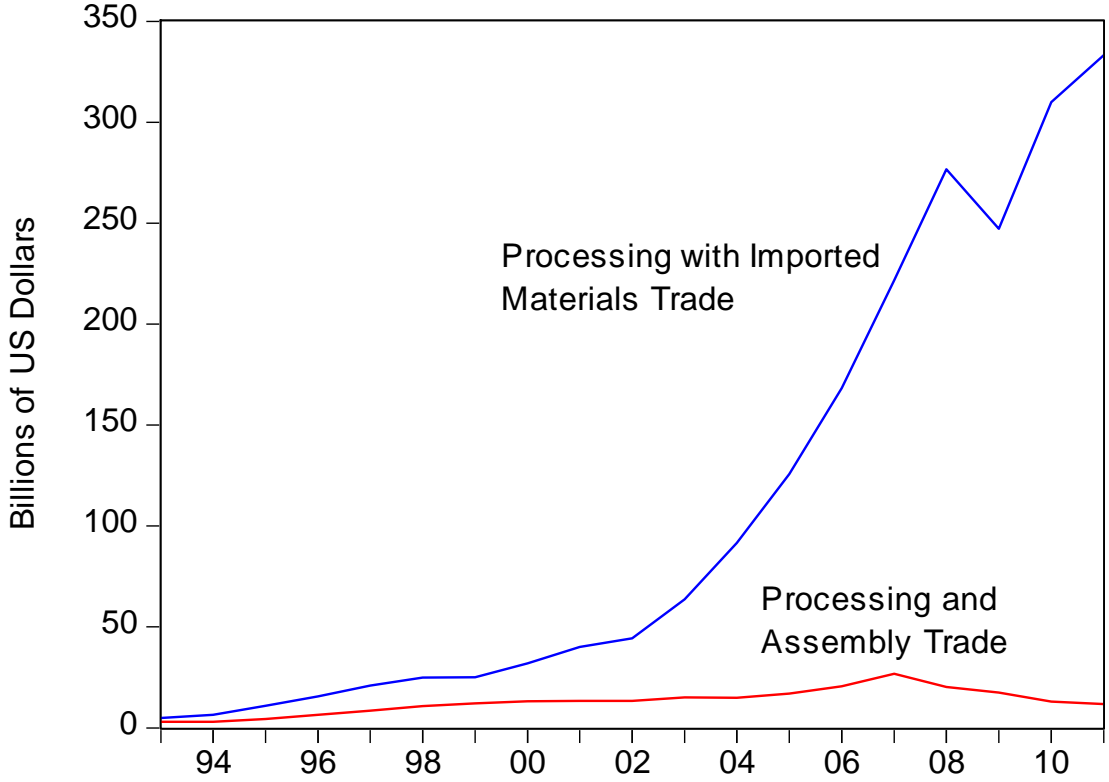
PAA Exports and Imports



PWIM Exports and Imports



PAA and PWIM Surpluses



Predicted Effects of Exchange Rates on PWIM and PAA

- Koopman *et al.* (2008) noted that the effect of exchange rate changes in processing countries on trade volumes should depend on the share of domestic content in exports.
 - The renminbi should thus have a large effect on PWIM exports and a small or negligible effect on PAA exports.
 - Exchange rates in supply chain countries should affect both categories, since in both cases much of the value added comes from imported parts and components.
-

DOLS Results for PAA Exports

<i>Independent Variables</i>	<i>Exports deflated by:</i>					
	<i>Hong Kong</i>	<i>Hong Kong</i>	<i>PPI-</i>	<i>PPI-</i>	<i>U.S. CPI</i>	<i>U.S. CPI</i>
	<i>unit value index</i>	<i>unit value index</i>	<i>finished goods</i>	<i>finished goods</i>		
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>
Rest of the World GDP	5.76*** (0.46)	8.42*** (2.74)	4.55*** (0.47)	7.37** (3.01)	4.76*** (0.47)	8.08** (2.77)
Integrated RER	-1.39*** (0.47)	-1.88*** (0.58)	-0.91* (0.47)	-1.43** (0.56)	-0.59 (0.47)	-1.20*** (0.55)
FDI Stock	-0.06 (0.09)	-0.08 (0.10)	0.12 (0.10)	0.10 (0.11)	0.07 (0.09)	0.05 (0.10)
WTO Dummy	-0.04 (0.04)	-0.05 (0.04)	-0.05 (0.04)	-0.06 (0.05)	-0.06 (0.04)	-0.08* (0.04)
Time		-0.02 (0.02)		-0.02 (0.02)		-0.02 (0.02)
Adjusted R-squared	0.993	0.993	0.990	0.990	0.990	0.990
SER	0.05	0.05	0.05	0.05	0.05	0.05
Serial Independence ^a	0.36	0.34	0.37	0.36	0.27	0.20
Heteroskedasticity ^b	0.86	0.80	0.75	0.64	0.69	0.49
ARCH ^c	0.58	0.38	0.51	0.25	0.63	0.23
No. of observations	58	58	58	58	58	58

DOLS Results for PAA Exports

<i>Independent variables</i>	<i>Exports deflated by:</i>					
	<i>Hong Kong unit value index</i>	<i>Hong Kong unit value index</i>	<i>PPI-finished goods</i>	<i>PPI-finished goods</i>	<i>U.S. CPI</i>	<i>U.S. CPI</i>
	(1)	(2)	(3)	(4)	(5)	(6)
Rest of the World GDP	6.19*** (0.68)	8.34** (3.19)	5.21*** (0.70)	7.37** (3.37)	5.42*** (0.68)	7.84** (3.15)
Supplier's RER	-1.45* (0.73)	-1.68* (0.86)	-1.39* (0.70)	-1.62* (0.85)	-1.21* (0.70)	-1.48* (0.82)
RMB RER	-0.18 (0.49)	-0.34 (0.49)	0.23 (0.48)	0.07 (0.49)	0.20 (0.48)	-0.02 (0.48)
FDI Stock	-0.36 (0.36)	-0.30 (0.36)	0.34 (0.36)	-0.28 (0.36)	-0.40 (0.35)	-0.33 (0.35)
WTO Dummy	-0.04 (0.04)	-0.05 (0.05)	-0.04 (0.04)	-0.04 (0.05)	-0.06 (0.04)	-0.07 (0.05)
Time		-0.01 (0.02)		0.01 (0.02)		-0.02 (0.02)
Adjusted R-squared	0.993	0.993	0.990	0.995	0.990	0.989
SER	0.05	0.05	0.05	0.05	0.05	0.05
Serial Independence ^a	0.38	0.34	0.33	0.33	0.28	0.24
Heteroskedasticity ^b	0.83	0.83	0.91	0.90	0.78	0.76
ARCH ^c	0.53	0.48	0.44	0.51	0.48	0.49
No. of observations	58	58	58	58	58	58

DOLS Results for PWIM Exports

<i>Independent Variables</i>	<i>Exports deflated by:</i>					
	<i>Hong Kong</i>	<i>Hong Kong</i>	<i>PPI-finished</i>	<i>PPI-finished</i>	<i>U.S. CPI</i>	<i>U.S. CPI</i>
	<i>unit value index</i>	<i>unit value index</i>	<i>goods</i>	<i>goods</i>		
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>
Rest of the World GDP	8.46*** (0.39)	5.74* (3.07)	7.25*** (0.39)	4.69 (2.96)	7.46*** (0.40)	5.40 (3.24)
Integrated RER	-3.72*** (0.41)	-3.22*** (0.64)	-3.24*** (0.40)	-2.77*** (0.61)	-2.92*** (0.42)	-2.54*** (0.67)
FDI Stock	-0.12 (0.10)	-0.09 (0.09)	0.06 (0.10)	0.08 (0.10)	0.02 (0.11)	0.04 (0.10)
WTO Dummy	0.01 (0.04)	0.03 (0.04)	0.00 (0.04)	0.02 (0.04)	-0.01 (0.04)	-0.00 (0.04)
Time		0.02 (0.02)		0.02 (0.02)		0.01 (0.02)
Adjusted R-squared	0.996	0.996	0.997	0.998	0.997	0.997
SER	0.05	0.05	0.05	0.05	0.05	0.05
Serial Independence ^a	0.54	0.54	0.47	0.57	0.49	0.53
Heteroskedasticity ^b	0.81	0.64	0.80	0.82	0.74	0.67
ARCH ^c	0.40	0.67	0.41	0.28	0.70	0.75
No. of observations	58	58	58	58	58	58

DOLS Results for PWIM Exports

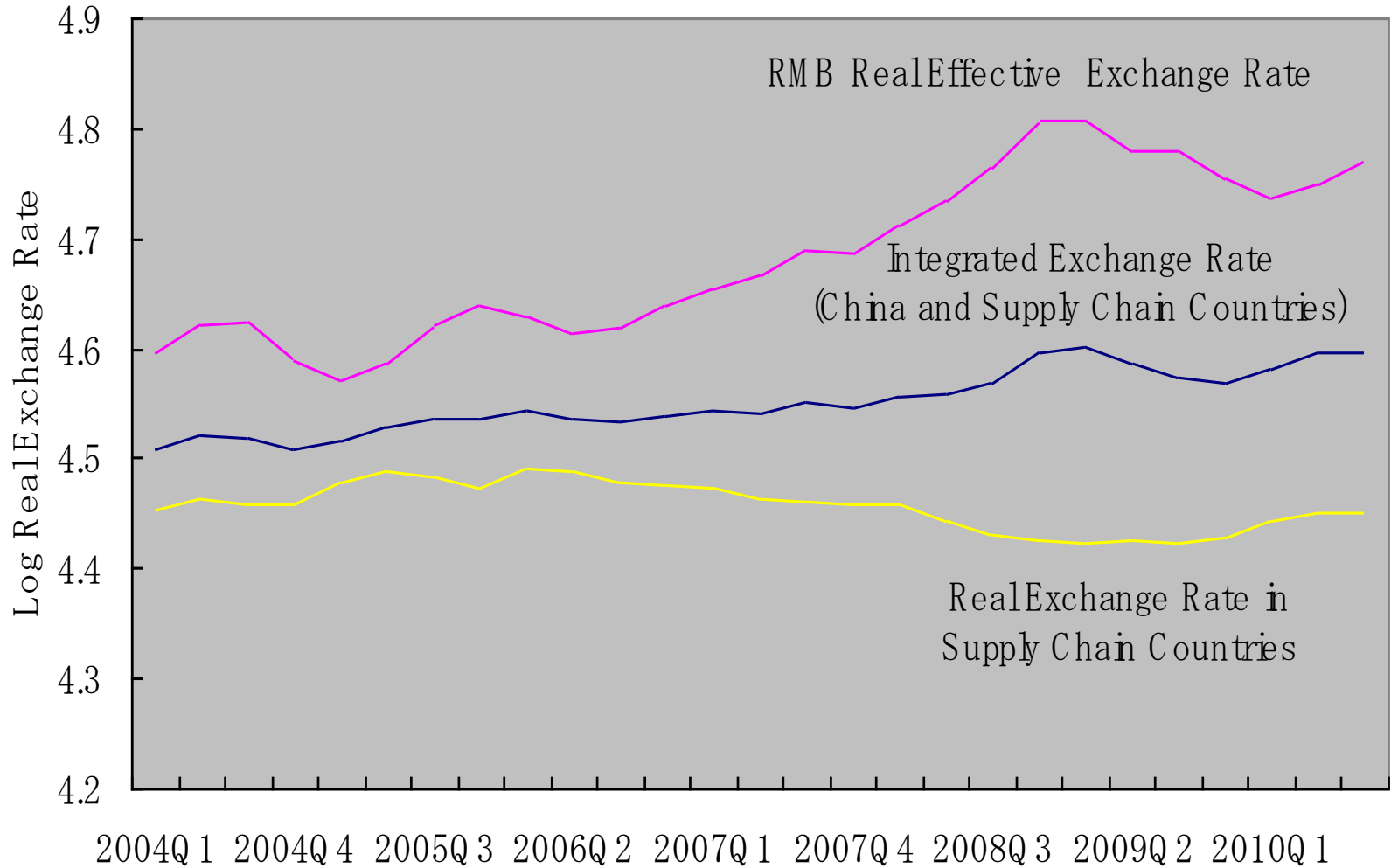
<i>Independent variables</i>	<i>Exports deflated by:</i>					
	<i>Hong Kong unit value index</i>	<i>Hong Kong unit value index</i>	<i>PPI-finished goods</i>	<i>PPI-finished goods</i>	<i>U.S. CPI</i>	<i>U.S. CPI</i>
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>	<i>(6)</i>
Rest of the World GDP	7.15*** (0.49)	5.43* (2.87)	6.17*** (0.51)	4.46 (2.95)	6.38*** (0.51)	4.92 (2.98)
Supplier's RER	-2.02*** (0.55)	-1.83*** (0.67)	-1.95*** (0.58)	-1.77** (0.69)	-1.78*** (0.60)	-1.62** (0.71)
RMB RER	-2.51*** (0.39)	-2.39*** (0.37)	-2.10*** (0.37)	-1.97*** (0.34)	-2.13*** (0.38)	-2.02*** (0.37)
FDI Stock	0.50* (0.26)	0.45* (0.25)	0.52 (0.27)	0.47* (0.26)	0.46 (0.28)	0.42 (0.27)
WTO Dummy	-0.03 (0.04)	-0.02 (0.04)	-0.02 (0.04)	-0.02 (0.04)	-0.05 (0.05)	-0.05 (0.05)
Time		0.01 (0.02)		0.01 (0.02)		0.01 (0.02)
Adjusted R-squared	0.998	0.998	0.997	0.997	0.997	0.997
SER	0.04	0.05	0.04	0.04	0.04	0.04
Serial Independence ^a	0.22	0.23	0.33	0.33	0.21	0.23
Heteroskedasticity ^b	0.79	0.88	0.69	0.81	0.81	0.89
ARCH ^c	0.73	0.94	0.91	0.98	0.74	0.90P
No. of observations	58	58	58	58	58	58

Results

- An appreciation of the renminbi would cause a large decrease in PWIM exports but would not affect PAA exports.
 - An appreciation in East Asian supply chain countries, however, would cause a large decrease in both PWIM and PAA exports.
 - Since PWIM exports are six times as large as PAA exports, these results imply that an appreciation of the renminbi would matter for processing exports.
-

One gets a very different picture of the price competitiveness of China's exports by including supply chain countries

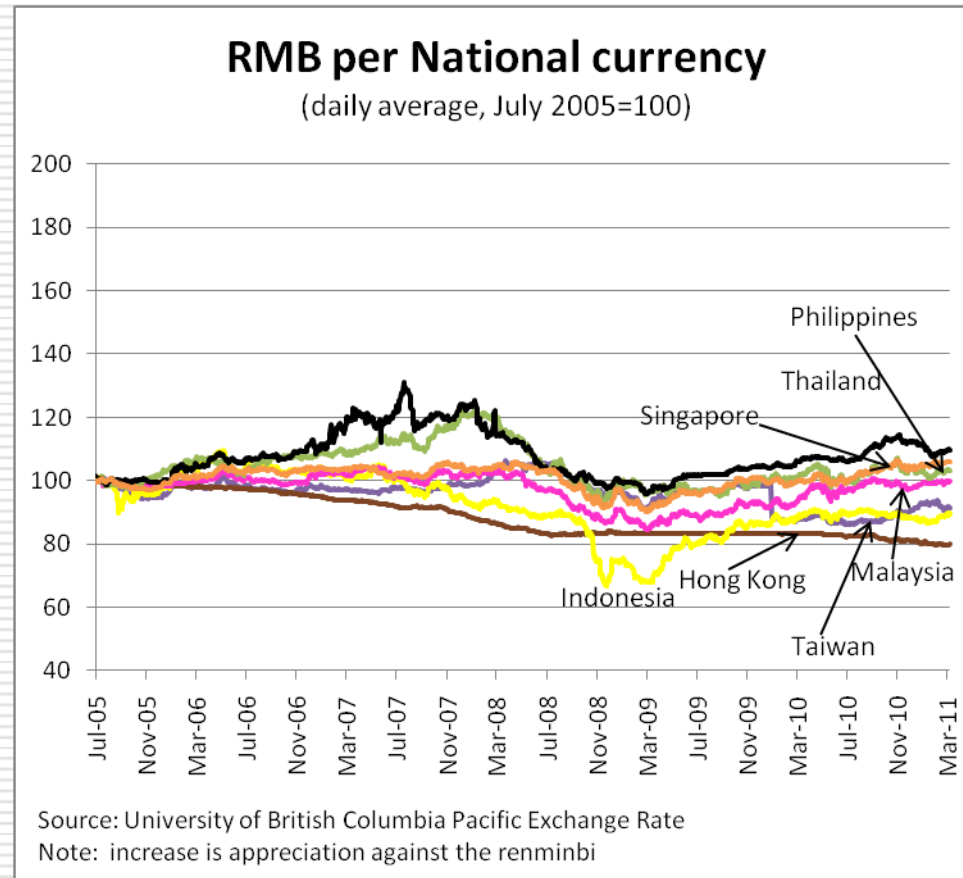
Figure 4. Chinese Real Effective Exchange Rate, Weighted Exchange Rate for Supply Chain Countries, and Integrated REER for China's Proceeded Exports



6) Policy Implications

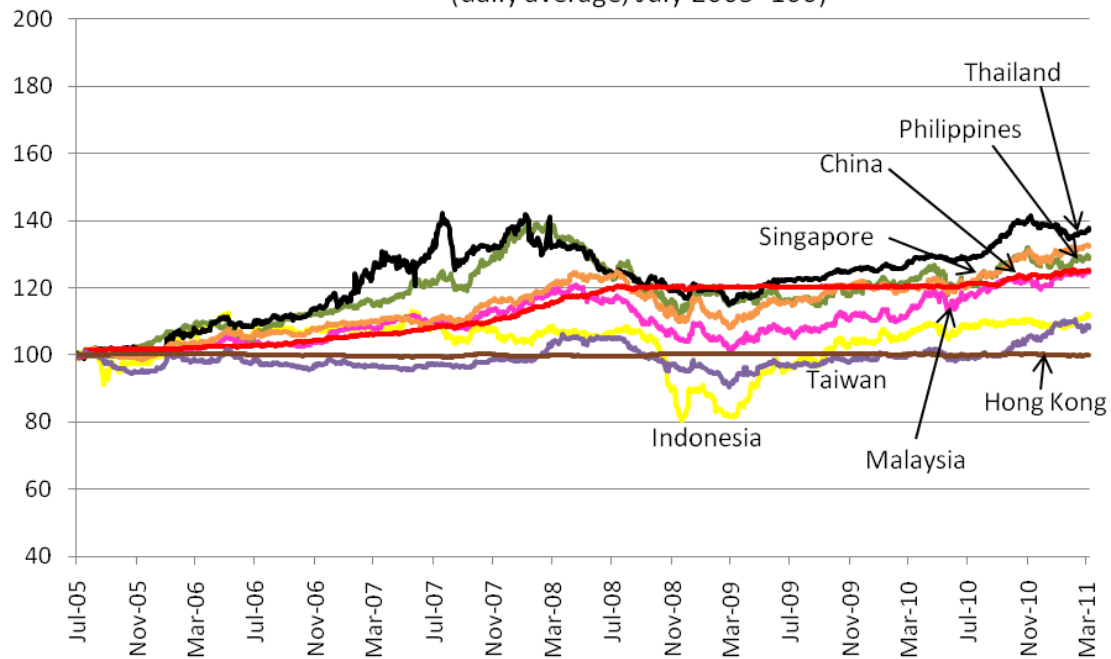
- ❑ China could pursue its self-proclaimed goal of adopting an exchange rate regime characterized by a multiple-currency, basket-based reference rate and a reasonably wide band.
 - ❑ Ma and McCauley (2011) and Aglieta et al. (2011) found that before there was considerable exchange rate stability in the region before the crisis when China and other Asian economies managed their exchange rates relative to currency baskets.
 - ❑ Henning and Katada (2011) reported that other emerging Asian currencies now move more closely with the renminbi than with the US dollar.
-

Recently Exchange Rates in Emerging Asia follow RMB more than USD (Henning & Katada)



USD per National currency

(daily average, July 2005=100)



Source: University of British Columbia, Pacific Exchange Rate

Note: increase is appreciation against the US\$

Joint Appreciations in East Asia

- If China shifts to a more flexible regime targeted to a basket of currencies and if other Asian economies target their own baskets, then the huge surpluses that East Asia is running against the U.S. and Europe in processing trade would cause currencies in the region to appreciate in concert against the U.S. dollar and the euro.
 - Market forces could then allocate these appreciations across supply chain countries as a function of the size of their surpluses in processing trade.
-

Benefits to East Asia from Concerted Appreciations

- Intra-regional exchange rate stability would facilitate the flow of parts and components and FDI within regional production networks.
 - Effective exchange rate appreciations would be less.
 - Asian consumers could import more from the ROW and Asian firms could produce for domestic markets.
-

Domestic Absorption-Increasing Policies

- ❑ The contractionary impact of exchange rate appreciations could be offset by domestic-absorption increasing policies.
 - ❑ Invest in education and health care for rural students. These students will be the urban workers of tomorrow, and the better their human capital the more productive China will be.
 - ❑ Educated students are more adept at absorbing new technologies (Urata, Matsuura, and Wei, 2006).
 - ❑ Poor nutrition, health, and vision restrict rural students' ability to learn.
 - ❑ In the urban sector China could invest in public transportation, schools for the children of migrants, and affordable housing.
-

Conclusion

- ❑ Production networks are well developed in Asia.
 - ❑ The majority of the value-added of China's processed exports comes from supply chain countries.
 - ❑ Exchange rate changes in both China and in East Asian supply chain countries affect processed exports.
 - ❑ If China adopted an exchange rate regime characterized by a multiple-currency, basket-based reference rate and a reasonably wide band, East Asian currencies could appreciate together against the US dollar and the euro.
-

Thank You
