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Global Production Sharing: Emerging Patterns and Policy Implications

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Structure

- Introduction: Purpose and scope
- The process of global production sharing
- Trends and patterns of global production sharing
- Policy implications
- Conclusion

Introduction: Purpose and Scope

What is global production sharing?

Example: Apple iPhone 3G

The iPhone is ‘made’ (in reality, ‘assembled’) in China:

- Entire iPhone production in the world is recorded as exports (at FOB value) from China, and
- iPhone imports to any country show up its trade data as imports from China

But, China’s value added in the iPhone production chain is 3.6% of the ex-factory price

Parts and components come from Japan (35.1%), Korea (13.3%), Germany (17.5%) and the USA 6.3%) and other (unclassified) countries (27.8)

Apple iPhone: Components and Cost



ANU

Component	Manufacturer/country	Cost (US\$)
Flash memory	Toshiba, Japan	24.00
Display module		19.25
Touch screen		16.00
FEM	Murata, Japan	1.35
Application processor	Samsung, Korea	14.46
SDRAM-Mobile		8.50
DDR		13.00
Baseband	Infineon, Germany	9.55
Camera module		2.80
RF Transceiver		2.25
Power IC RF function		1.25
Power IC application processor	Dialog Semiconductor, Germany	1.30
Bluetooth/FM/WLAN	Broadcom, USA	5.95
Memory MCP	Numonyx, USA	3.65
Audio codec	Cirrus Logic, USA	1.15
Other material	Other countries	48.00
Total material		172.46
Manufacturing cost (value added)	China	6.50
Total ex-factory price		178.96

What is global production sharing?

‘splitting of the production process into discrete activities (tasks) which are then allocated across countries’

Alternative terms:

International production fragmentation

Vertical specialization

Slicing the value chain

Offshoring

What does the iPhone example tell us?

Global production sharing opens up opportunities for countries to specialise in different slices (tasks) of the production process.

The conventional approach to trade flow analysis, which attributes the commercial value of a product to the last country of origin, is becoming increasingly misleading.

It is not ‘cloth for wine’ any more!

What do I intend to do in this presentation?

- Examine the extent, trends and patterns of global production sharing (with emphasis on Asia)
- Discuss policy implications of this new form of international specialisation

This presentation draws upon:



Athukorala, Prema-chandra (2006) ‘Product Fragmentation and Trade Patterns in East Asia’, *Asian Economic Papers*, 4(3), 1-27.

Athukorala, Prema-chandra (2009), ‘The Rise of China and East Asian Export Performance: Is the Crowding-out Fear Warranted?’, *World Economy*, , 32(2), 234–66.

Athukorala, Prema-chandra (ed.) (2010), *The Rise of Asia: Trade and Investment in Global Perspective*, London: Routledge (Chapters 2, 3, and 5)

Athukorala, Prema-chandra (2010) ‘Production Networks and Trade Patterns in East Asia: Regionalization or Globalization?’, *Asian Economic Papers*, 10(1) (forthcoming)

Athukorala, Prema-chandra and Nobuaki Yamashita (2009) ‘Global Production Sharing and Sino-US Trade relations’, *China and World Economy*, 17(2), 39-56.

Athukorala, Prema-chandra (2010) ‘Global Production Sharing and the Measurement of Price Elasticities in International Trade’ (draft paper)

The Process of global production sharing

Brief history

Not an entirely new phenomenon:

‘over a large part of the field of industry, an increasingly intricate nexus of specialized undertakings has inserted itself between the production of raw materials and the consumer of the final product’.

Young, Allyn (1928) ‘Increasing Returns and Economic Progress’, *Economic Journal*, 38, 527-542.

But began to expand rapidly only from about the late 1960s

First in clothing and electronics industries and then spread into many other industries such as sport footwear, automobile, televisions and radio receivers, sewing machines, office equipment, electrical machinery, power and machine tools, cameras and watches, and printing and publishing.

Three phases in the post-war global spread

- (1) two-way exchange between home and host country: component assembly/testing in the host country to be incorporate in final assembly in the home country
- (2) component assembly networks encompassing many countries (final assembly in the home country)
- (3) Full-fledged production networks involving component production/assembly/testing and final assembly encompassing host countries

Three mutually reinforcing factors have contributed to the rapid expansion production fragmentation

1. Advancement in production technology, enabling the industry to slice up the value chain into finer components.
2. Technological innovations in communication and transportation that have contributed to significant reduction in the cost of ‘service links’ involved in coordinating international operations
3. Liberalisation policy reforms in both home and host countries

The Role of MNEs/FDI

MNEs are the key players in global production sharing:

A close relationship between foreign direct investment (FDI) and trade in parts and components and final assembly

In recent years, production sharing practices have begun to spread beyond the domain of MNEs:

- As production operations in host countries become firmly established, MNE subsidiaries have begun to subcontract some activities to local (host-country) firms to which they provide detailed specifications and even fragments of their own technology.

Many firms which are not part of MNE networks have begun to procure components globally through arm's-length trade.

But, the bulk of global production sharing within global high-tech industries still takes place under the aegis of MNEs (This is particularly the case in setting up production units in countries that are newcomers to global production networks.)

Many 'traditional' MNEs (brand-name owners) in electronics and related industries now rely increasingly on independent contract manufacturers for the operation of their global-scale production networks – (a process that has been facilitated by the standardisation of some parts and components)

Trends and patterns of global production sharing

Quantifying global production sharing

Data source: UN Comtrade database (SITC Rev. 3)

- (1) Parts and components: directly identified
- (2) Final assembly: recorded trade in six product categories* in which global production sharing is concentrated minus parts and components belonging those product categories
- (3) ‘Conventional’ manufacturing trade:
total manufacturing (SITC 5 through 8 less SITC 68) minus (1) + (2)

* Office machines and automatic data processing machines (SITC 75); telecommunication and sound recording equipment (SITC 87); electrical goods (SITC 77 – 772 – 776); road vehicles (SITC 78); professional and scientific equipment (SITC 87); and photographic apparatus (SITC 88)

Table 1: Share of Network Products in Manufacturing Trade, 2006/7 (%)



(a) Exports	Parts and components	Final assembly	Total network trade
East Asia	34.1	26.2	60.3
Japan	34.4	32.6	67.0
Developing East Asia	34.0	24.5	58.5
China (PRC)	25.6	26.2	51.8
Hong Kong, China	33.3	17.8	51.1
Taiwan	43.8	21.6	65.8
Korea, RP	44.1	25.4	69.5
ASEAN	44.2	21.9	66.1
Indonesia	21.5	16.8	38.4
Malaysia	53.6	25.1	78.8
Philippines	71.7	15.6	87.3
Singapore	49.3	17.2	66.5
Thailand	29.9	33.0	62.9
Viet Nam	11.0	7.6	18.5
India	10.4	3.8	14.2
Developed countries	25.2	23.6	48.8
Developing countries	29.2	24.3	53.6
World	27.1	23.8	50.9

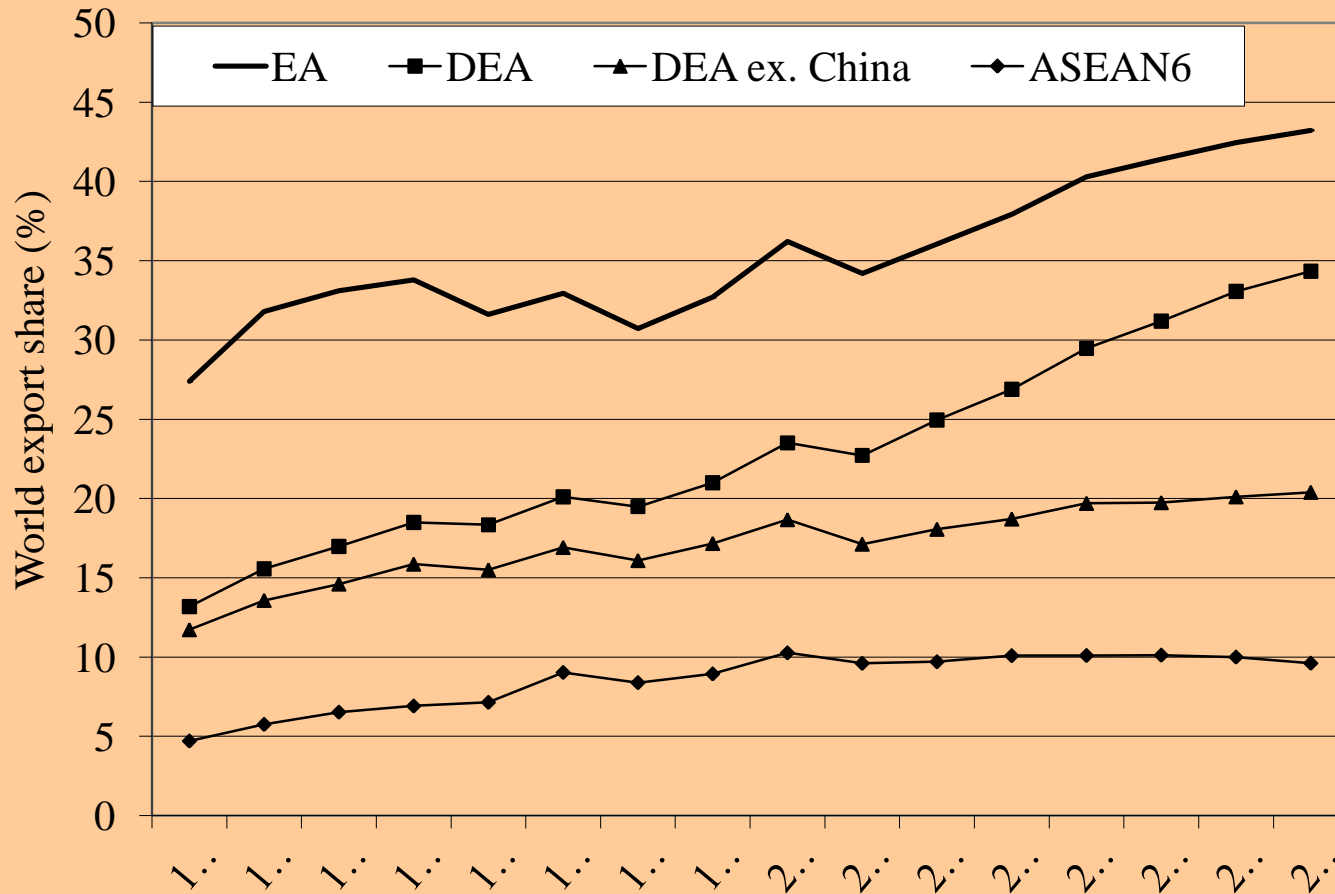
Table 1: Share of Network Products in Manufacturing Trade, 2006/7 (%) (Continued)



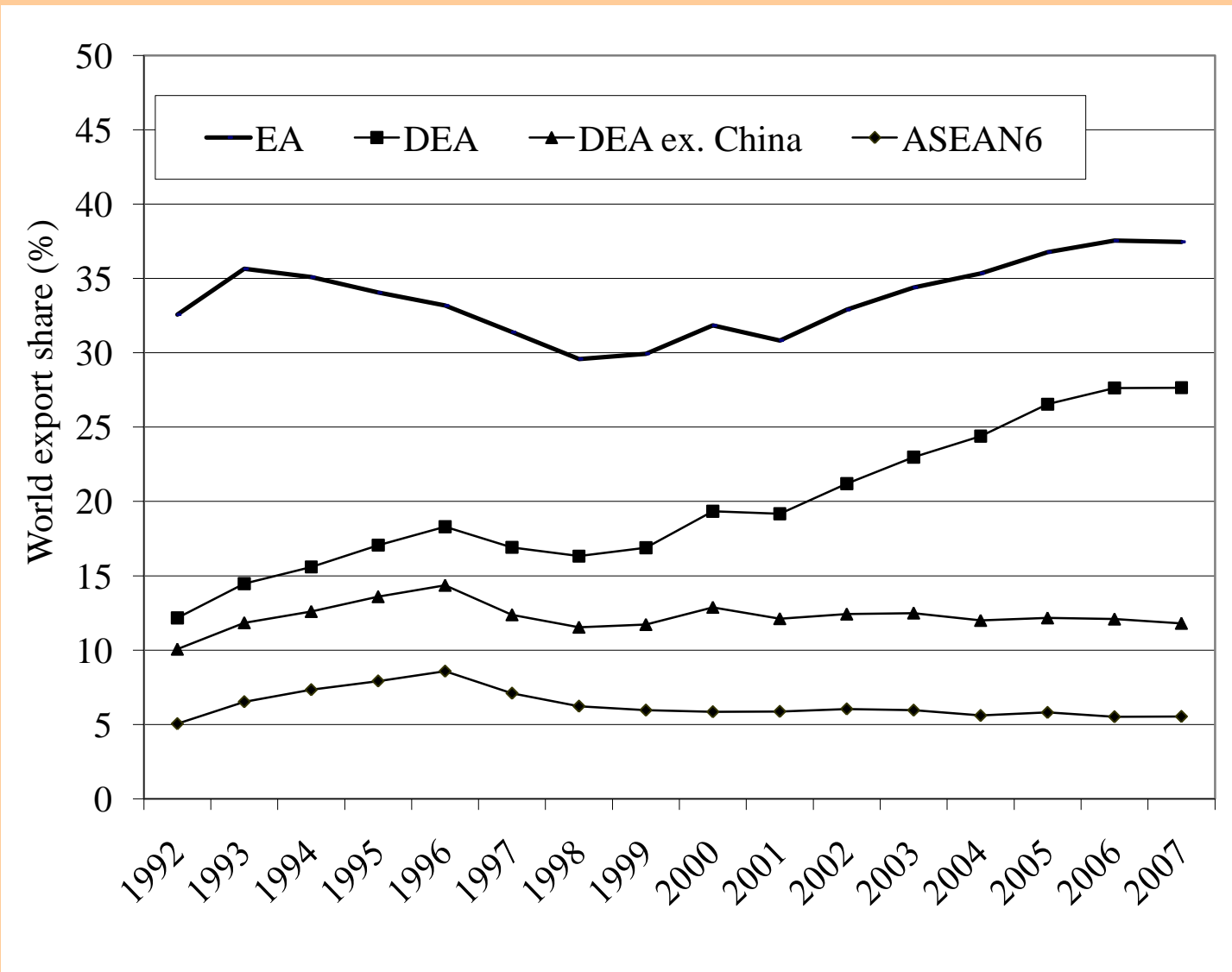
(b) Imports	Parts and components	Final assembly	Total network trade
East Asia	42.1	17.8	59.9
Japan	29.9	21.9	51.7
Developing East Asia	42.2	17.1	61.3
China (PRC)	44.0	19.8	63.7
Hong Kong, China	48.5	13.5	62.1
Taiwan	38.9	16.8	55.7
Korea, RP	31.9	17.4	49.3
ASEAN	47.9	16.2	64.1
Indonesia	21.8	15.8	37.7
Malaysia	50.0	22.0	72.0
Philippines	61.3	17.4	78.6
Singapore	60.4	17.3	77.7
Thailand	36.1	12.4	48.5
Viet Nam	19.1	9.7	28.5
India	22.9	17.0	39.9
Developed countries	23.4	25.5	48.9
Developing countries	33.6	19.9	53.5
World	27.3	23.3	50.7

Figure 1: East Asia in World Network trade

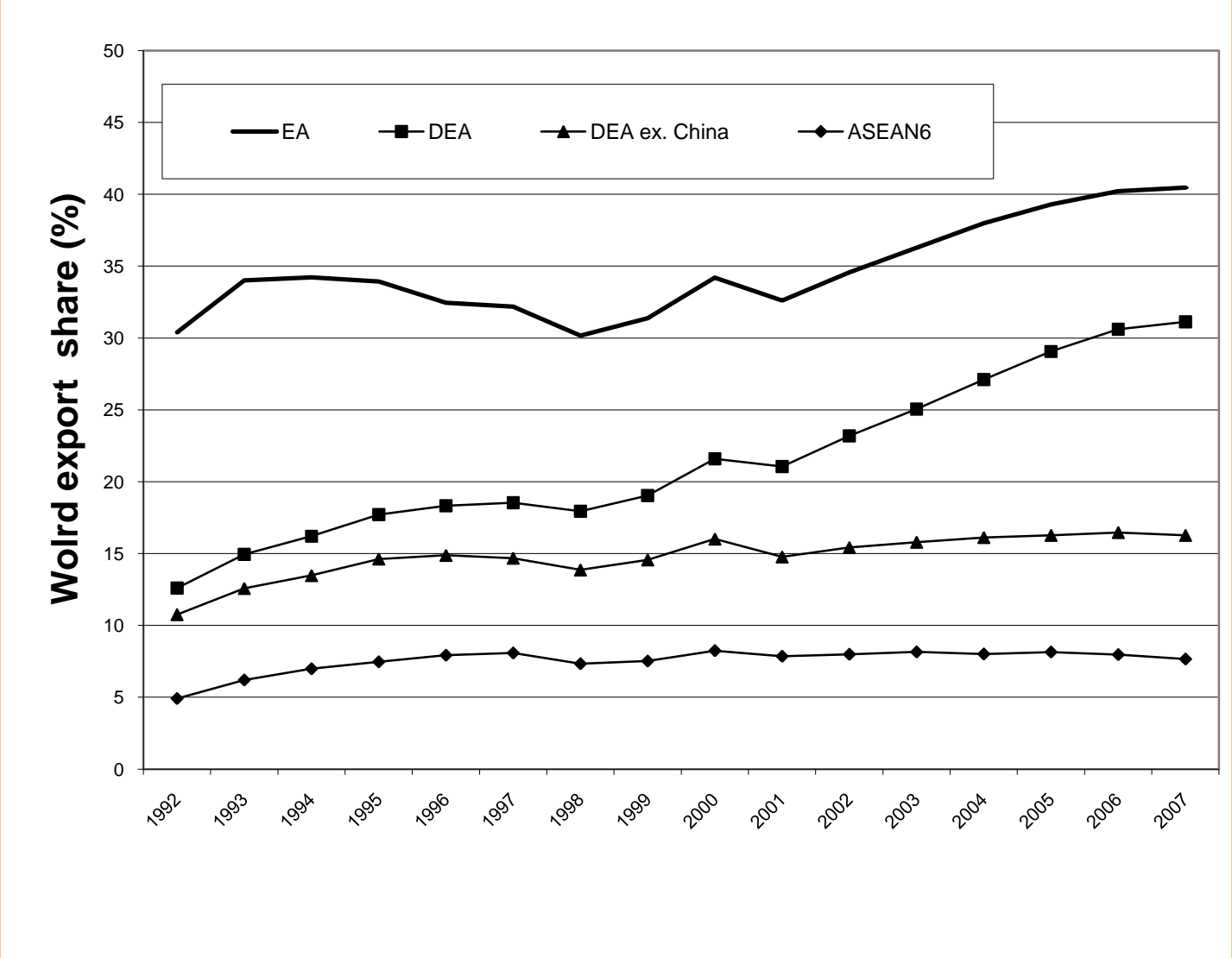
(a) Parts and components exports



(b) Final assembly exports



(c) Total network exports



Key points

- Growth of network trade at a much faster rate than total world manufacturing trade:

1992/3	23.8% of total mfg. exports
2006/7	45.5%

- A shift away from mature industrial economies and towards developing countries

Developing-country share in network exports :

1992/3	25.3%
2006/7	41.0%

- Faster growth of network exports from East Asia

East Asian share in network exports

	East Asia (EA)	Developing EA
1992/3	32.2%	13.8%
2006/7	40.3%	30.9%

- A much higher share of network products in manufacturing trade (and a much higher share of parts and components within network products) in East Asia compared, to all other regions in the world.
- Greater dependence of ASEAN countries on parts and component trade compared to the rest of East Asia (But, Indonesia appears to be an outlier in the ASEAN context. Why?)
- Emergence of China as the premier final assembly centre in the region; a rapid increase in parts and component imports by China from the rest of East Asia.

Figure 2: Share of Parts and Components in China's Manufacturing Trade with East Asian Countries, 1992-2007 (%)



South Asia is (still?) a minor player in global production sharing (This really matters in explaining South Asia's poor export performance and lacklustre record in reaping gains from export-led industrialisation)

Share in total world manufacturing trade: about 1%

Share of parts and components in India's total manufacturing exports: 10.4%

Parts and component exports from India in total world exports: 0.4%

Why?

What explains East Asia's 'especial' role in network trade?

- (1) Relatively low wages in latecomers to export-oriented industrialization in East Asia and significant wage differentials among countries in the region (China's hourly production wage is just 3% of that of USA!)
- (2) Favourable business climate (trade and investment policy regimes, infrastructure provision etc.) that has contributed to lower cost of maintaining 'services links' within production networks
- (3) 'First-comer' advantages: the tendency of MNEs to become embodied in host countries over time

- (4) 'Market thickness' and 'agglomeration' benefits: success breeds success
- (5) The emergence of China as the premier low-cost assembly centre that has boosted components production/assembly in other countries in the region

Policy Implications

(1) Opens up new opportunities for export-led industrialisation through participation in a finer international division of labour

A country need not set up a motor vehicle plant to benefit from the growth of world demand for automobiles; it is enough to be competitive in the production of a single auto part.

A challenge to the *fallacy of composition* argument against export-led industrialization.

But, a country's success in joining global production networks does not depend on the availability of labour and relatively low wages alone. A whole range of factors impacting on the overall investment environment including infrastructure and other trade-related logistics, political stability and policy certainty are important.

(Stories of Motorola and Harris Corporation in Sri Lanka)

(2) Complementary between trade and FDI policies

As discussed, MNE participation is vital, particularly at the initial stage

China vs. India

(3) Revenue implications of import tariffs in the presence of global production sharing

Global production sharing makes a strong case for greater uniformity in tariff rates

A cascading tariff structure opens up room for tariff evasion by importers (with or without the involvement of customs officials)

(4) Implications for the use of linkage/value added criteria in industry policy

Policy interventions aimed at promoting domestic value added can be counter productive (Can runs counter to the objective of employment generation/poverty reduction through export-oriented growth)

Per unit value added/linkage is a misleading indicator of gains from engaging in global production networks

The pertinent criteria are:

‘The volume factor’: ability to producer for a vast global market

Labour intensity of production (employment generation is the key to poverty alleviation.)

5. Implications for the debate on global trade imbalances

- * Measurement of bilateral trade imbalances
- * Efficacy of exchange rate policy

Measurement of bilateral trade imbalances



Conventional trade records (measured in gross value) could depict a distorted picture of bilateral trade imbalances given the possibility of shifting trade among countries within production networks.

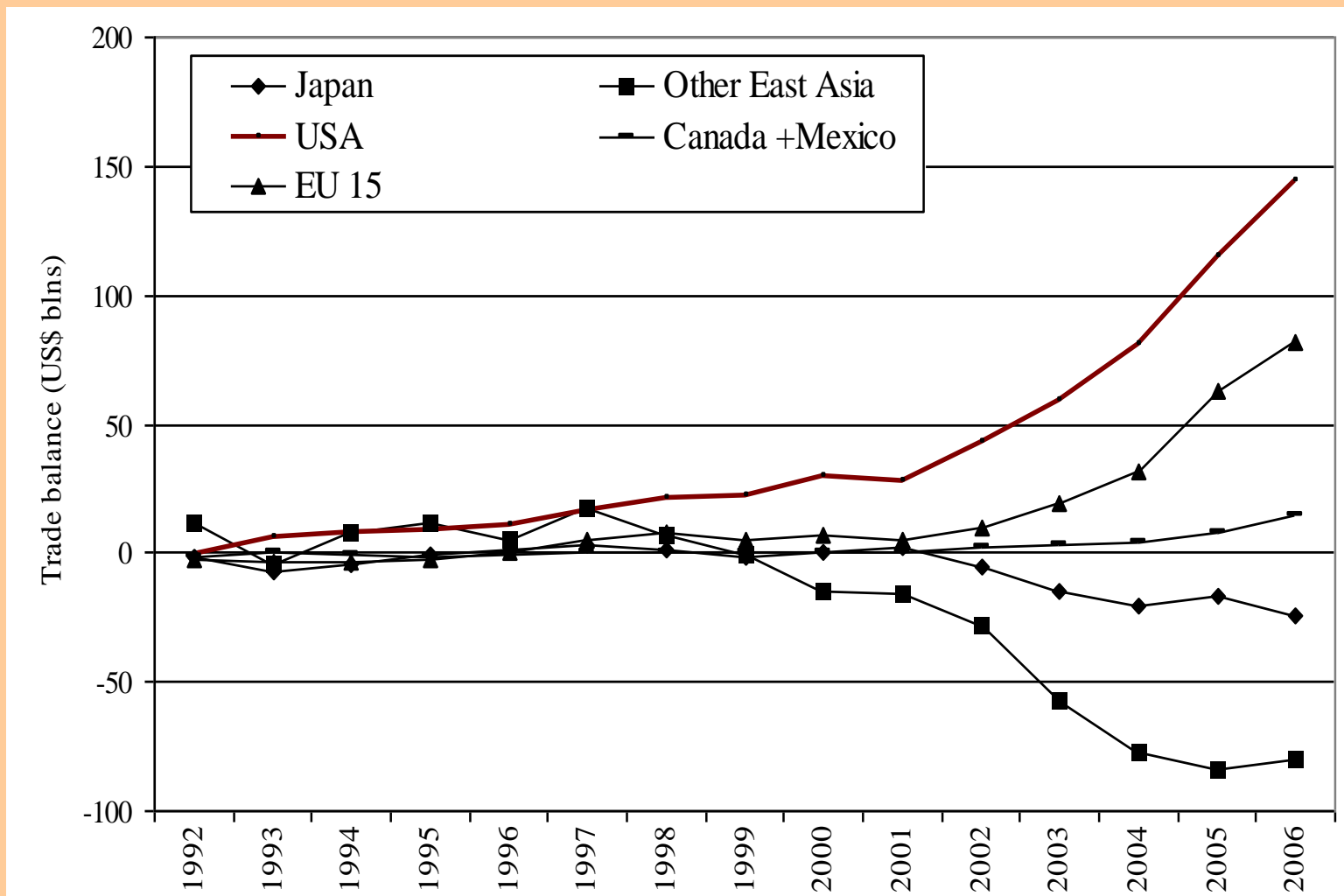
US – China trade imbalance reflects to a significant extent shifting final assembly activities from Japan, Korea, Taiwan and Southeast Asian to China.

Widening of the US trade deficit with China has been accompanied by a narrowing of US's trade deficits with Japan, Korea, Taiwan and China. (Athukorala P. and N. Yamashita (2009), Global production sharing and Sino-US trade relations', *China & World Economy*, 17(1), 39-56)

“Made in China’ tells us little about global trade”

Pascal Lamy, Director-General of WTO
Financial Times, 24, January 2011

Figure 2: China's Bilateral Trade Balances (US\$ billions), 1992-2007



Efficacy of exchange rate policy



Global production sharing weakens the link between price and volume of parts and component trade

- Within production networks, production units located in different countries specialise in specific tasks which are not directly substitutable for tasks undertaken elsewhere
- Inter-country price/cost differentials are only one consideration in production location/procurement decisions of firms within production networks (importance of sunk fixed cost and the related 'service-link' costs)
- Production sharing weakens the link between domestic cost of production and export competitiveness
- Changes in exchange rates affect imports and exports differently at different stages of the production process in a given country

Price elasticity of import demand in the USA

	Total	P&C	Final
Total manufacturing (SITC 5 to 8)	-1.48	-0.86	-2.84
Machinery and transport equipment (SITC 7)	-1.07	-0.72	-3.04
ICT products (SITC 75 + 76 + 772 + 776)	-0.71	-0.53	-3.30
Electrical goods (SITC 77 – 772 – 776)	-0.81	-0.43	-3.42

Conclusion

- Trade based on global production sharing is expanding much faster than conventional product-based trade.
- The degree and intensity of participation of East Asian economies in global production sharing is much greater compared to countries in other parts of the world
- So far South Asian countries have remained a small player in global production network. This really matters in explaining South Asia's poor export performance and lacklustre record in reaping gains from export-led industrialisation
- This findings cast doubt on the reliability/validity of the conventional approach to trade flow modeling policy making which treat parts and components and finals goods as a unified, homogeneous product