# UNITED STATES
# INTERNATIONAL TRADE COMMISSION

# Measuring value added trade and its potential implications for policy development

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# Why is value added trade work important for policy development?

- Most fundamentally it helps make rapidly developing global supply chains more transparent.
  - Countries are more interconnected than most would guess.
- Bilateral trade data can be, but is not always, misleading.
- Policy development should be aware of these complicated chains.
- Understanding which policies encourage or discourage may be important for economic development – and some evidence points to behind the border policies as being important.
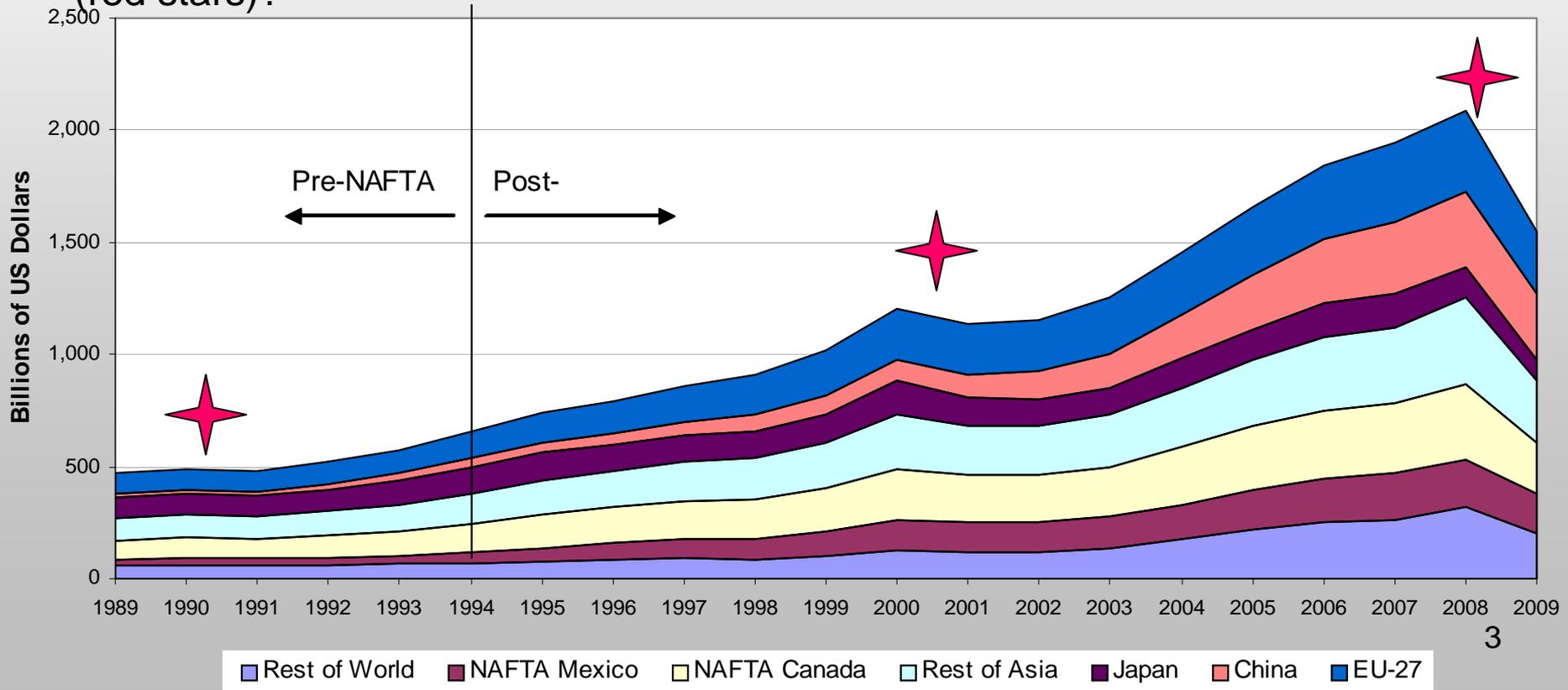- Some insights from our experience in the US.

Repeated requests from some of our customers – help explain fast growing imports from China and the bilateral trade deficit with China:

A traditional presentation of U.S. non oil imports from the World, 1989-2009
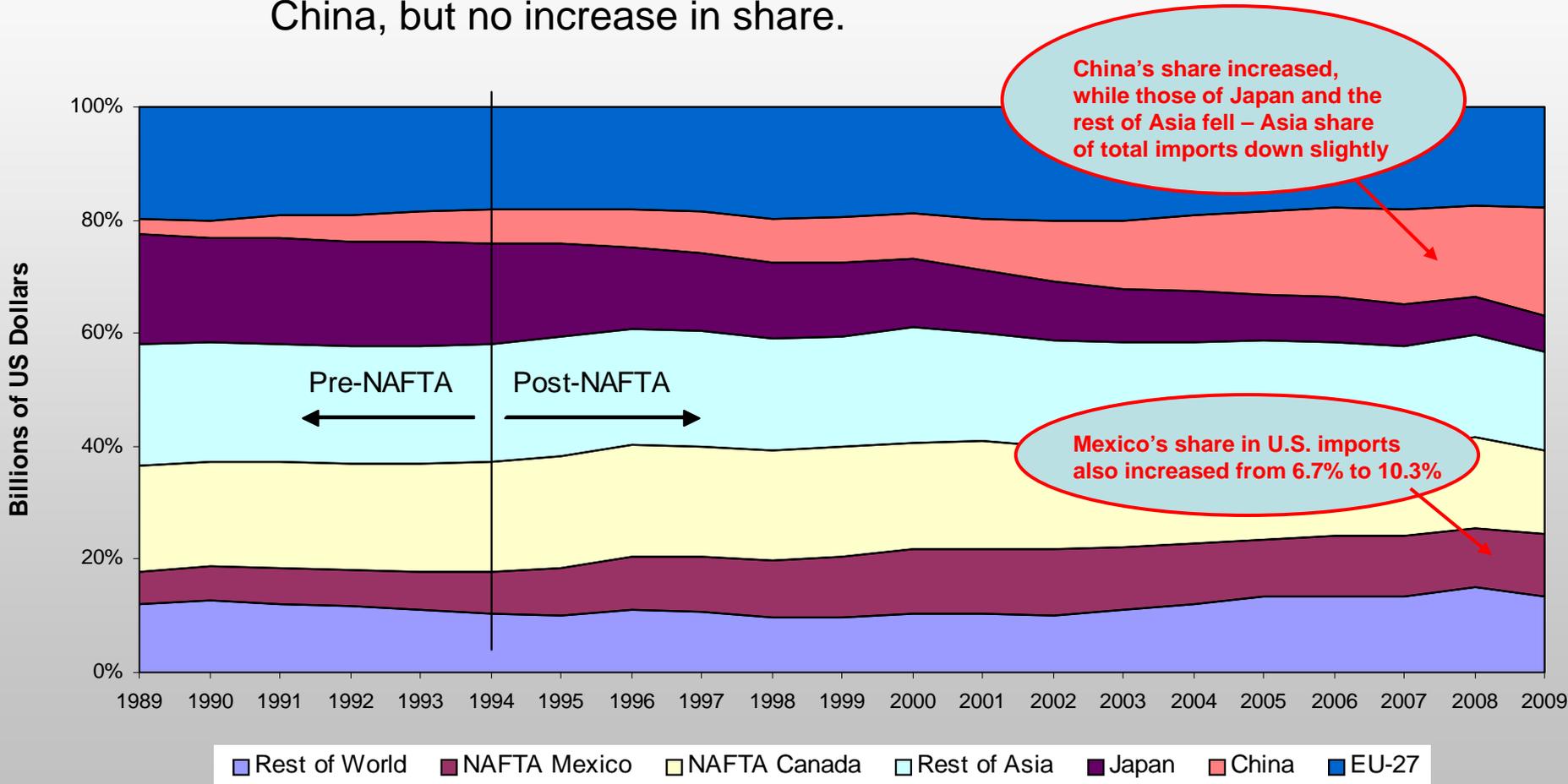
Fast growth, changing composition - role of macro environment – recessions (red stars)?



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Legend: Rest of World, NAFTA Mexico, NAFTA Canada, Rest of Asia, Japan, China, EU-27

What we initially pointed out to customer inquiries starting in 2002 – Shift in Asia largely from Japan, other Asia, to China, but no increase in share.



China's share increased, while those of Japan and the rest of Asia fell – Asia share of total imports down slightly

Mexico's share in U.S. imports also increased from 6.7% to 10.3%

Pre-NAFTA    Post-NAFTA

Legend: Rest of World | NAFTA Mexico | NAFTA Canada | Rest of Asia | Japan | China | EU-27

U.S. non oil imports from the World, 1989-2009

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# Traditional data was not convincing…

- Case studies (IPOD, Barbie Doll) also were not effective.
- There was a growing literature examining trade flows (Authokorala) laying clear tracks of intermediate goods flow, vertical specialization (HIY), but also papers discussing rising sophistication of Chinese trade (Rodrik, Schott).
- We focused on the VS literature, which tied in nicely with some joint research we were doing with researchers in China on non competing imports in the China IO data.
- From this work we new it was important to split China's processing trade sector from its normal trade sector.
- We set out to do the following.

# We used detailed trade data from China customs to help break IO table into separate normal and processing technologies.

Figure 4.: **Input-output table with separate production account for processing trade from (KWW 2008)**

| | | | Intermediate use | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Production for domestic use & normal exports | Production of processing exports | Final use (C+I+G+E) | Gross Output or Imports |
| | | DIM | 1,2,…, N | 1,2,…, N | 1 | 1 |
| Domestic Intermediate Inputs | Production for domestic use & normal exports (D) | 1 · · · N | $Z^{DD}$ | $Z^{DP}$ | $Y^D - E^P$ | $X - E^P$ |
| | Processing Exports (P) | 1 · · · · N | 0 | 0 | $E^P$ | $E^P$ |
| Intermediate Inputs from Imports | | 1 · · · · N | $Z^{MD}$ | $Z^{MP}$ | $Y^M$ | $M$ |
| Value-added | | 1 | $V^D$ | $V^P$ | | |
| Gross output | | 1 | $X - E^P$ | $E^P$ | | |

Estimates of China's VA in exports from KWW 2010. Provides hard evidence of role of supply chains in shifting trade.

**Table 3 Shares of domestic and foreign value added in total exports (%)**

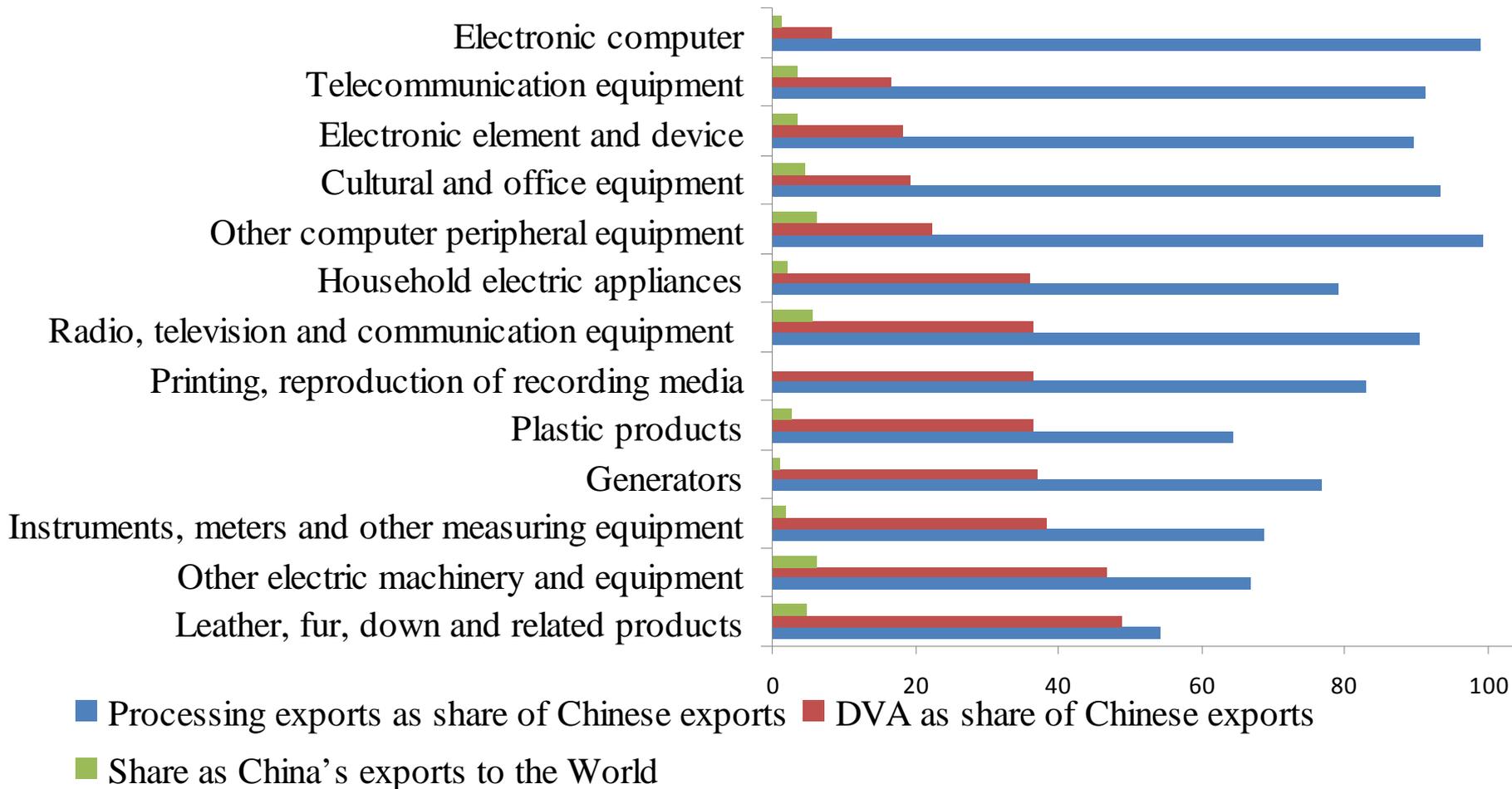| | The HIY Method | | | The KWW Method | | |
|---|---|---|---|---|---|---|
| | 1997 | 2002 | 2007 | 1997 | 2002 | 2007 |
| **All Merchandise** | | | | | | |
| Total Foreign value-added | 17.6 | 25.1 | 28.7 | 46.0 | 46.1 | 39.4 |
| *Direct foreign value-added* | *8.9* | *14.7* | *13.7* | *44.4* | *42.5* | *31.6* |
| Total Domestic Value-added | 82.4 | 74.9 | 71.3 | 54.0 | 53.9 | 60.6 |
| *Direct domestic value-added* | *29.4* | *26.0* | *20.3* | *22.2* | *19.7* | *17.1* |
| **Manufacturing Goods Only** | | | | | | |
| Total Foreign value-added | 19.0 | 26.4 | 27.1 | 50.0 | 48.7 | 40.3 |
| *Direct foreign value-added* | *9.7* | *15.6* | *16.3* | *48.3* | *45.1* | *32.4* |
| Total Domestic Value-added | 81.1 | 73.6 | 72.9 | 50.0 | 51.3 | 59.7 |
| *Direct domestic value-added* | *27.5* | *24.6* | *24.6* | *19.6* | *18.1* | *16.5* |

Source: Authors' estimates based on China's 1997, 2002 and 2007 Benchmark input–output table published by Bureau of National Statistics and Official China trade statistics from China Customs.

Note: The HIY method refers to estimates from using the approach in Hummels, Ishii, and Yi (2001). The KWW method refers to estimates from using the approach developed in this paper that takes into account special features of processing exports.

In paper with Justino De La Cruz we find VA in Mexico's exports to US even lower than China's, providing solid insights on the NAFTA integrated market.
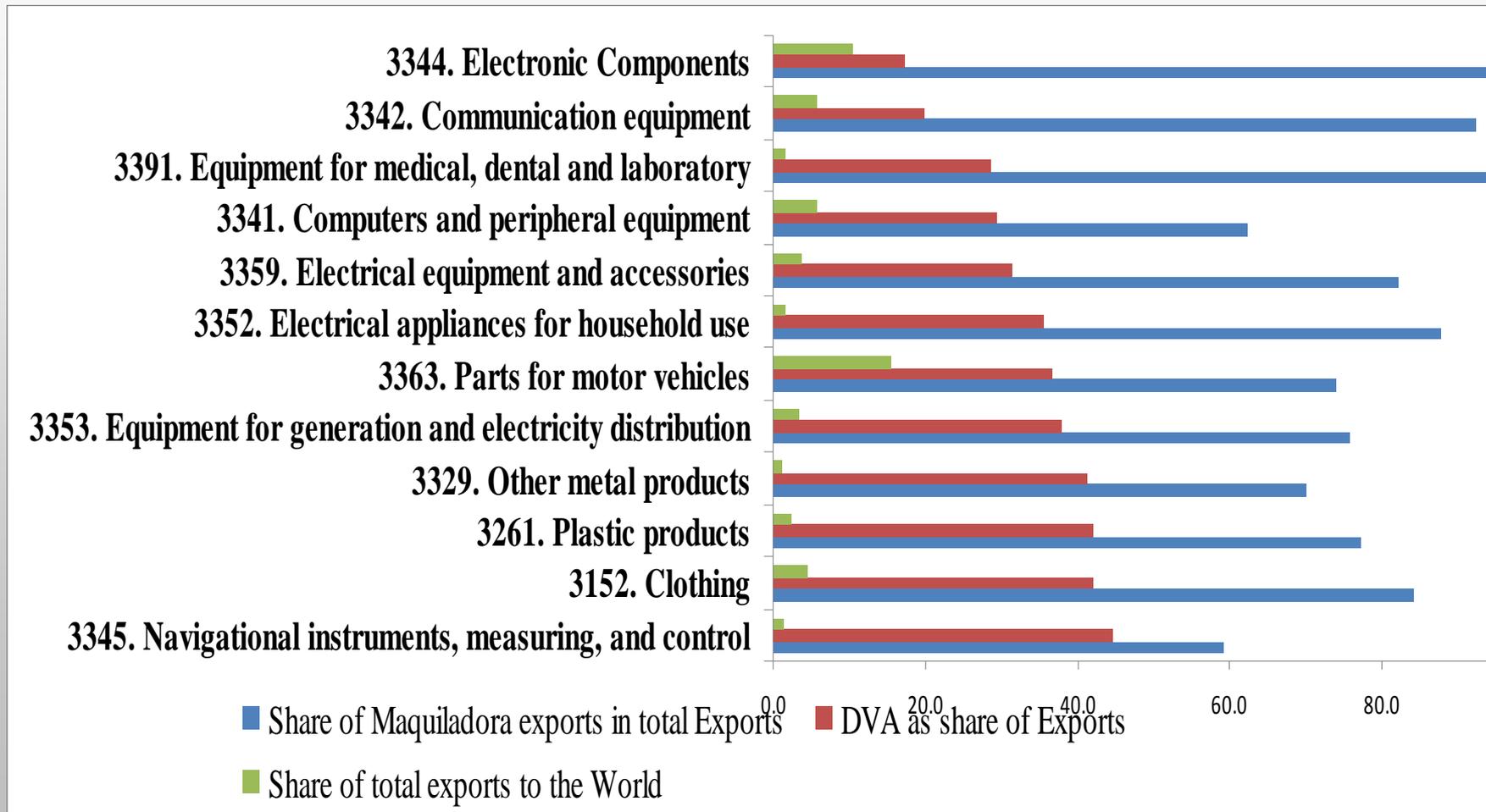
# Export product categories with Low DVA in China
## in percent, 2002



Legend:
- Processing exports as share of Chinese exports (blue)
- DVA as share of Chinese exports (red)
- Share as China's exports to the World (green)

Product categories (top to bottom):
- Electronic computer
- Telecommunication equipment
- Electronic element and device
- Cultural and office equipment
- Other computer peripheral equipment
- Household electric appliances
- Radio, television and communication equipment
- Printing, reproduction of recording media
- Plastic products
- Generators
- Instruments, meters and other measuring equipment
- Other electric machinery and equipment
- Leather, fur, down and related products

X-axis: 0, 20, 40, 60, 80, 100

Export product categories with Low DVA in Mexico in percent, 2003

# Bilateral work led to global effort.

- A number of efforts were being undertaken on global databases, including Johnson and Noguera, Daudin et al, and a regional effort by WTO and IDE-JETRO.

- Our effort focused on using a widely available database, GTAP, and tying our measure to traditional trade statistics.

**Figure 5. Decomposition of gross exports: concepts, from KPWW.**
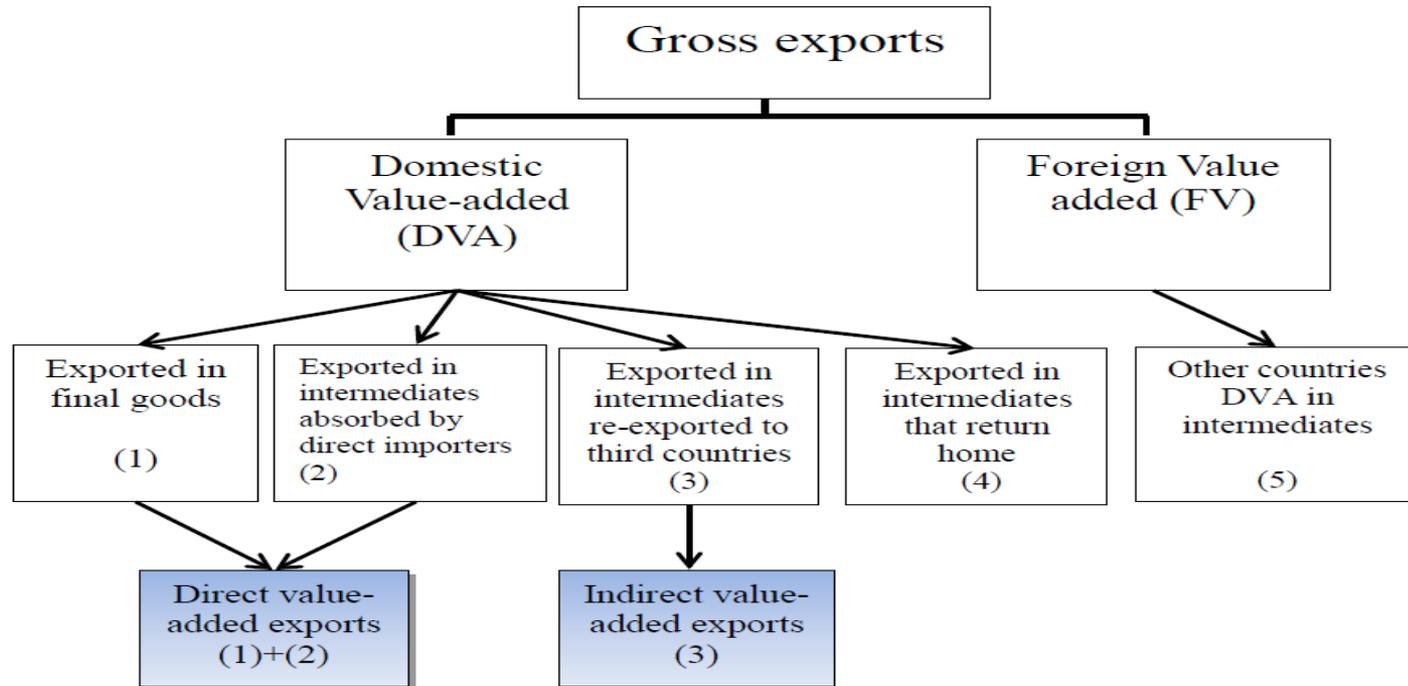


Note:

a.(4) are also labeled as VS1* by Daudin et al (2011).

b. (5) is labeled as VS, and (3) + (4) is labeled as VS1 by HIY (2001).

c. (4) and (5) involve value added that crosses national borders at least twice, and are the sources of multiple counting of value added in standard trade statistics.
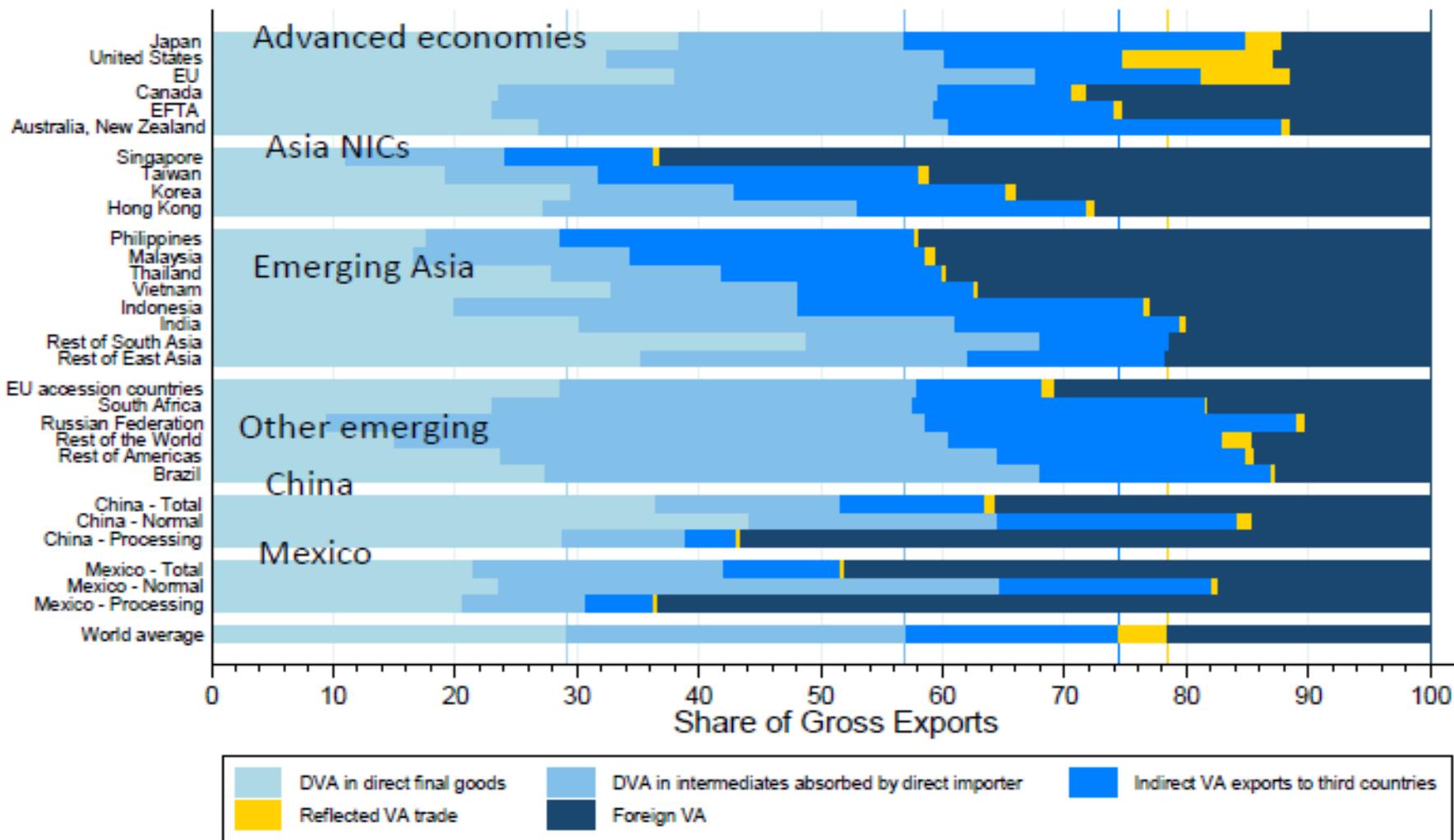
d. The share of domestic content in a country's exports equals (1) + (2)+(3)+(4)

e. (1) + (2) is the VAX ratio for each country's exports to the world defined by Johnson andNoguera (2011).
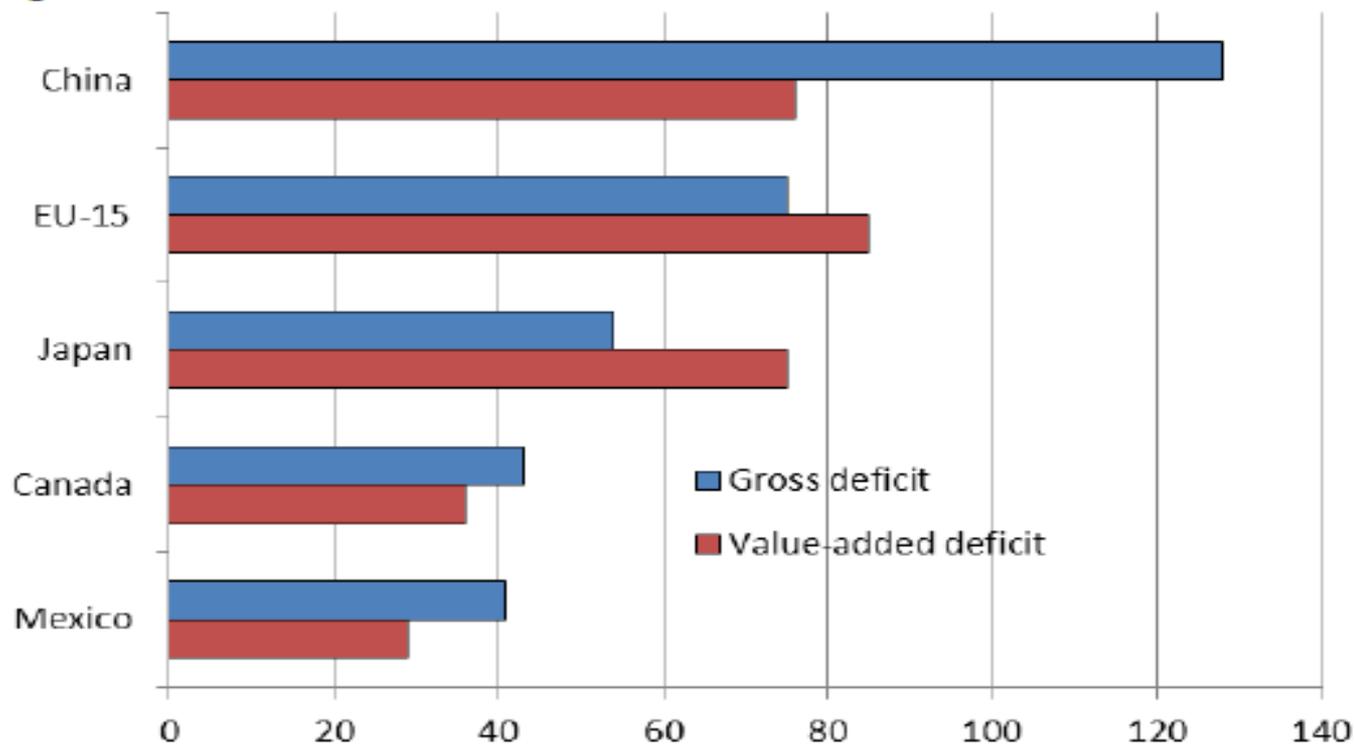
# Figure 6. Decomposition of Gross Exports, actual data, 2004, from KPWW

# Recalculating major US bilateral trade deficits for 2004



Figure 5. U.S. Bilateral Trade Deficits with Major Trading Partners, 2004 (billions of dollars)

Source: Commission estimates. From box 3.4 of the USITC study.

**TABLE 4** U.S. imports and value-added shares in U.S. imports, 2004, by source

| Region | Total imports | Share of general imports | Share of value-added imports | Share of value added passing through a third country before entering the United States |
|---|---|---|---|---|
| | Millions of $ | Percent | | |
| Europe | 393,301 | 24.7 | 26.1 | 17.6 |
| Canada | 242,170 | 15.2 | 11.0 | 3.2 |
| Japan | 138,417 | 8.7 | 10.4 | 26.0 |
| United States | — | 0.0 | 8.3 | 100.0 |
| China | 176,879 | 11.1 | 7.7 | 14.8 |
| Mexico | 154,571 | 9.7 | 4.9 | 4.0 |
| Rest of Americas[a] | 76,183 | 4.8 | 4.7 | 13.2 |
| Developing East Asia | 79,250 | 5.0 | 4.5 | 32.4 |
| Taiwan, Singapore, Hong Kong | 73,066 | 4.6 | 4.3 | 36.7 |
| Korea | 51,707 | 3.3 | 3.3 | 31.8 |
| Brazil | 23,662 | 1.5 | 1.6 | 20.3 |
| Australia and New Zealand | 15,717 | 1.0 | 1.3 | 33.6 |
| Russia | 12,003 | 0.8 | 1.3 | 46.4 |
| India | 17,486 | 1.1 | 1.1 | 22.0 |
| South Asia | 9,557 | 0.6 | 0.5 | 10.2 |
| Rest of world | 120,320 | 7.6 | 8.5 | 23.5 |
| Total | 1,590,124 | 100.0 | 100.0 | 25.8[b] |

Source: Commission estimates. Table 3.2 in the USITC study.

[a]Including South American, Central American, and Caribbean countries other than Mexico and Brazil.
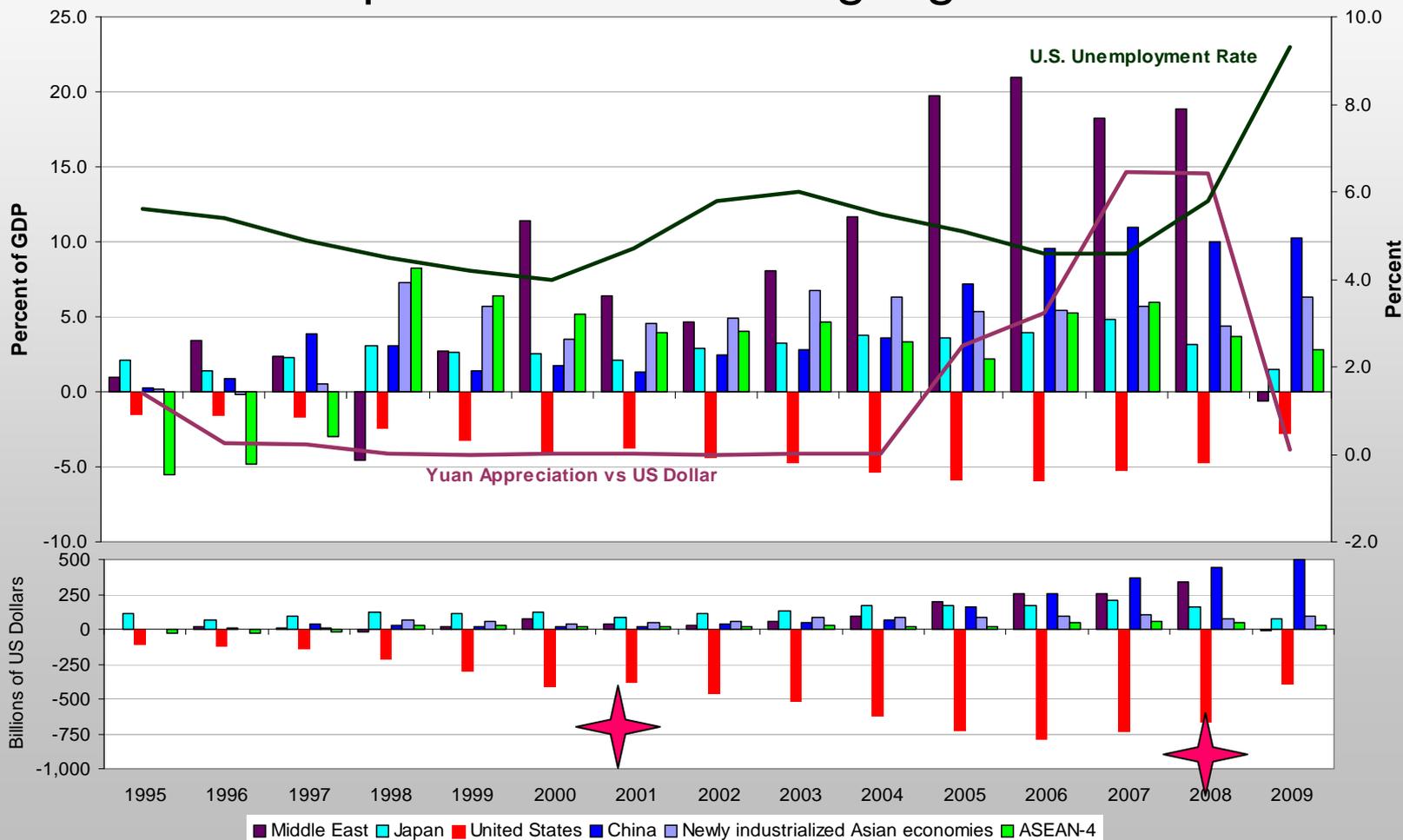[b]U.S. average, weighted by U.S. imports from all sources.

**Gross exports to GDP ratio is a misleading indicator of exports contribution to economic growth.**



Mexico – high ratio of exports to gdp, but mediocre Economic growth
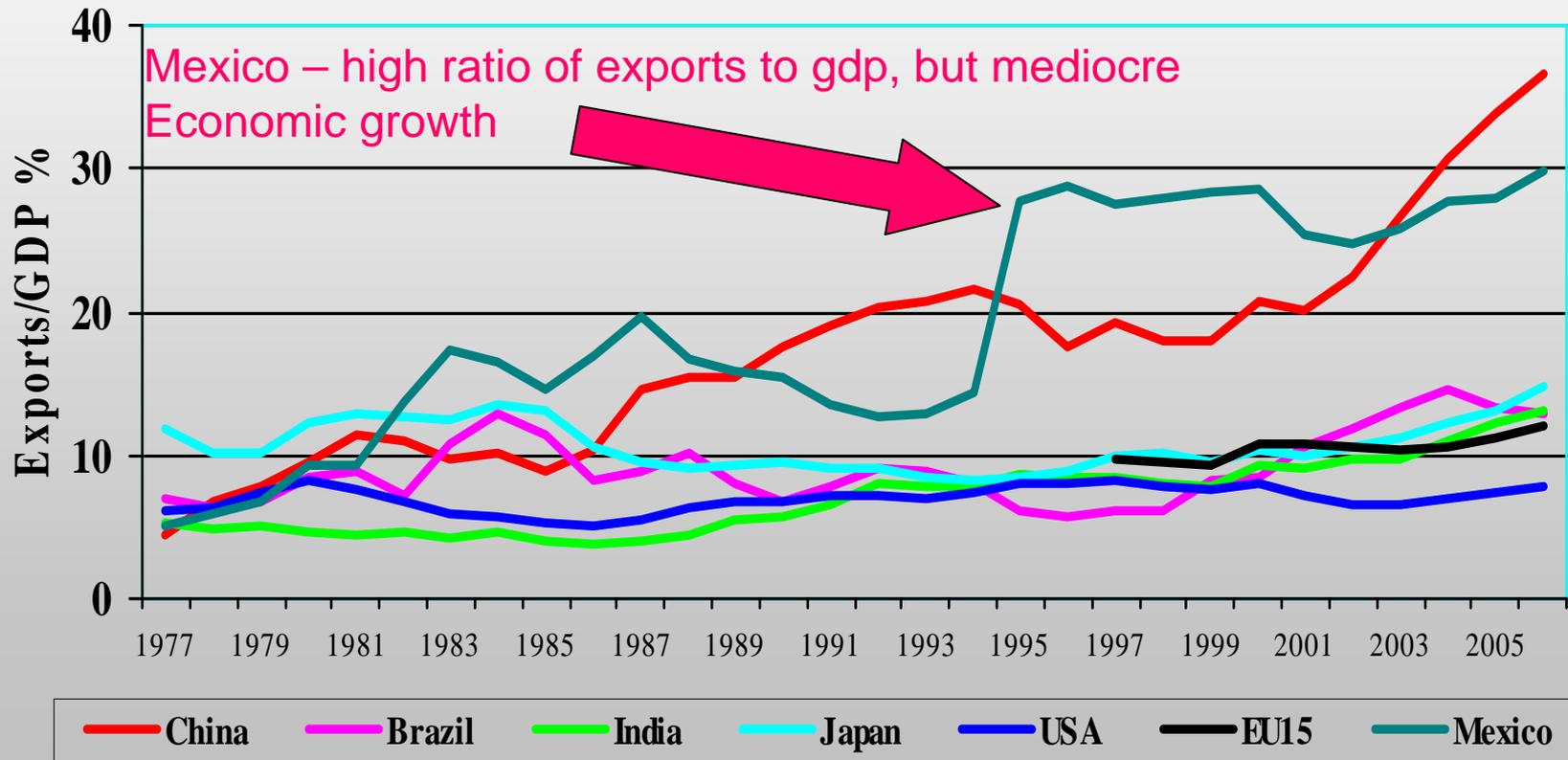
Export/GDP for large economies in the world 1977-2006

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# Macro Factors – Asia and Oil Exporters running big surpluses – US running big deficit



IMF World Economic Outlook Database, April 2009, IMF Exchange Rates, and USDOL

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# Some reasons why this matters for policy development

- It will help us better understand, among other things;
    - Trade's net contribution to economic growth.
    - Impact of exchange rate revaluation on trade flows.
    - Employment impacts of trade and value chains.
    - Better understand global effects/linkages of economic shocks, including natural disasters such as Japan's earthquake and tsunami.
    - Full range of interested parties in trade disputes – including unexpected third country interest, or downstream domestic concerns in Anti Dumping/Counter Veiling Duty cases.
    - Better understanding of true distribution of environmental impact/Green House Gas emissions resulting from trade.
    - Better estimates of the true sources of sophistication in a country's exports.
    - Real size/impact of tariffs and Non Tariff Measures on trade.
    - Better estimates of concepts from "revealed comparative advantage" to gravity models of trade.
    - Better understand and measure role of quality institutions and policy transparency/stability, implications for deep vs. shallow Regional Trade Agreements (RTAs).

# Some next steps

- Complete time series dimension for global value added data.

- Try to ensure data is produced on a regular basis as a complement to existing data.

- Begin to use VA trade data in empirical examinations of questions related to trade