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International trade and production net-  
works: Comparisons of China and greater  
China versus India and South Asia



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## International trade and production networks: Comparisons of China and greater China versus India and South Asia

### Abstract

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# 1 Introduction

China and India are two of the most important emerging countries in the world. In 2011 China was the largest economy in Asia and India ranked third, based on market/official exchange rates. In connection with the ongoing global economic slowdown, both India and China are expected to experience slower growth rates. Nonetheless, compared with the developed economies in North America, Europe and elsewhere, both of these Asian giants will still grow at relatively robust rates.

China overtook Germany as the world's largest exporter in 2010 (CIA Factbook 2012)<sup>1</sup>, with a total of US\$2,370 billion in manufacturing trade, which reflected a 26% increase from 1990. A substantial share of China's trade is in parts and components, actually having increased from 22.2% in 2000 to 28.4% in 2010. In contrast, India's share of parts and components in its total exports was only 12.4% in 2010, after declining from 17.5% in 2000. This contrast partly reflects the fact that India's participation in world exports of *all goods* increased substantially between 2000 and 2010 (from US\$ 42,358 million to US\$ 220,408 million). But the absolute value of India's exports of parts and components in 2010 amounted to only US\$ 27,433 million. This is significantly smaller than the US\$ 448,300 million of parts and components that China exported to the world in 2010. Indeed, China's exports of parts and components in 2010 amounted to almost *15 times* those of India. This simple contrast in absolute magnitudes is just a first look in this paper at the comparative features of the production networks of India and China. We next examine in greater detail some specific characteristics of China's trade in parts and components.

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<sup>1</sup> Source: "<https://www.cia.gov/library/publications/the-world-factbook/geos//ch.html>"

## 2 Chinese trade in parts and components

As shown in Figure 1, a large portion of Chinese parts and components trade in 1990 was with other economies in East Asia and the Pacific. While East Asia and the Pacific remained the primary origin of China's imports of parts and components, accounting for more than 80% of the trade share, the sector's importance to China as an export destination gradually diminished between 1990 and 2010. In 2010, about 45% of Chinese exports of parts and components went to East Asia and the Pacific, 22% to EU 27 and Central Asia, and 16% to NAFTA. As such, the asymmetric geographic distribution of Chinese parts and components exports and imports reveals the following *three* features. First, China relies heavily on parts and components imports from East Asia and the Pacific. Second, East Asia and the Pacific, North America and Europe are all major export destinations for China. Third, cross-border business activities among China and East Asian (and Pacific) economies have led to the formation of a deep and extensive production-sharing network in East Asia.<sup>2</sup> This last result has been confirmed by many earlier studies (see e.g. Ng 2003, Aminian, Fung and Ng 2009, Dean, Fung and Wang 2011, Kimura and Obashi 2011, etc.). However, it is useful to find updated, continuing confirmation of this important empirical result. In addition, a relatively new trend is that China has increasingly become the center of the network — it is the largest parts and components importer in the region, and it exports a substantial amount of finished manufacturing goods to countries outside the region (Aminian, Fung and Ng 2009, Mohommad et al., 2011). One could argue that the Asian production network has become increasingly *Sino-centric*.

Amid the continuous expansion of Chinese parts and components trade with the region and the world, the past decade has witnessed a pronounced increase in parts and components trade between China and South Korea (see Figure 2). In 2010, South Korea accounted for 16.2% of

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<sup>2</sup> In this analysis, East Asia includes China, Hong Kong, Macau, Taiwan, Japan, Korea, Mongolia, Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

China's imports of parts and components, i.e. just under the 16.5% trade share of Greater China (Hong Kong, Macau and Taiwan). As such, South Korea became the single largest parts and components exporter to China in 2010. From Figure 2, it is clear Greater China's importance to China, as regards both imports and exports, has diminished substantially over time. China's trade in parts and components is no longer just a Mainland China-Hong Kong-Macau-Taiwan production network. Instead it is now a pan-East and Southeast Asian network, including Japan, South Korea and increasingly ASEAN (Association of Southeast Asian Nations) countries.

Figure 3 depicts China's manufactures, selective important sectors (chemicals, machinery and transport, textile and clothing, etc.) as well as parts and components trade with East Asia and the rest-of-world. Although China's manufacturing exports continued to grow over time, East Asia has not since 2000 been its primary export destination. China has since 2000 exported more manufactured products, i.e. manufactures and parts and components, to the rest-of-world than East Asia. In terms of export share, the textiles & clothing sector has gradually lost ground to other sectors in Figure 3, in China's trade with both East Asia and the rest-of-world. One interesting development is the substantial amount of exports of machinery and transport by China to the rest of the world. This may reflect a new trend in Chinese exports: some types of capital goods and their parts are increasingly exported by China to markets outside of East Asia. Focusing on parts and components alone, again we can see the intra-Asian nature of Chinese exports. China's intra-Asian exports of parts and components have increased over time and in 2010 were more prominent than all manufactures as well as all the other sectors. Next we turn our attention to South Asia and India and their relationships with China.

### 3 Indian and South Asian trade in parts and components

India exports much less of manufactured products than does China. In 2010, India's trade in such products amounted to US\$296 billion. The geographical distribution of its parts and components trade, as presented in Figure 4, contrasts sharply with that of China. Whereas, in such trade, China focuses largely on its neighboring economies in East Asia and the Pacific, India relies heavily on these economies for *imports* only. For Indian *exports* of parts and components, the major destinations are the EU and NAFTA countries. Indian manufacturing products trade with other South Asian countries (Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan, and Sri Lanka) accounted for less than 1% of its total parts and components trade in 2010. The much stronger ties in terms of components trade between East Asia and the Pacific and China than those between India and South Asia again highlight the much more highly developed production network in East and Southeast Asia as compared to South Asia.

Meanwhile, South Asia does serve as a burgeoning export market for China (see Figure 1). The telecommunication equipment (SITC 764) and the textile yarn, fabrics & made-up materials (SITC 65) are the two largest sectors in China's exports to India whereas, in the reverse trade-flow, textile yarn, fabrics & made-up materials (SITC 65) ranked first during the study period (these flows are not shown in the figures). Compared to China's expanding manufacturing sector, India's manufacturing export share with South Asian countries and the rest of the world both declined during the study period. However, India's Ores & Metals and Mineral Fuels sectors gained export share over the period, particularly with the rest of the world.

Figure 5 presents a size comparison of the Chinese and Indian exporting / importing production networks between 1990 and 2010. In particular, we highlight four historically important production networks: textile and clothing network (Total T & C network), automobile network



(Total auto network), information and communication technology network (Total ICT network) and the furniture network (Total furniture network).

Our data show that textiles & clothing and ICT are China's two largest exporting sectors and that the ICT network dominates China's manufacturing imports. With a smaller manufacturing industry, India's largest exporting sector is textiles & clothing whereas its largest importing sector is ICT. Overall, in parts and components trade, China exports and imports mostly electronics-related intermediate goods, while India increasingly exports inputs and materials related to the textile and clothing network and imports ICT-related parts.

To extend our comparisons of China and India as well as the two regions of Greater China and South Asia, we further calculate various relevant revealed comparative advantage (RCA) indices. These calculations can be useful for showing the differences in the production sharing of China and India and other economies in the two respective countries and the two regions. The Revealed Comparative Advantage (RCA) index is computed as  $RCA_{ij} = (x_{ij} / X_{it}) / (x_{wj} / X_{wt})$ , where  $x_{ij}$  and  $x_{wj}$  are the product value of  $j$  exported or imported by country  $i$  and the world;  $X_{it}$  and  $X_{wt}$  are total exports or imports of country  $i$  and the world. If the value of RCA index exceeds unity, the country is said to have comparative advantage in the production or assembly operations of product  $j$ , and vice versa. The outcomes are summarized in Table 1.

As suggested by Table 1, China leads in exported parts and components items with RCA index numbers greater than one (38) in 2010, so that 50.7% of China's parts and components exports have an RCA index number greater than one. This is in contrast to India, which has only 10 such exported items, which comprise 13.3% of its exports of parts and components. Similar comparisons emerge if we take Greater China as a whole and compare it to South Asia. On the import side, the RCA index numbers are much closer for China and India: 28.0% of China's imports of parts and components have RCA index numbers greater than one, while India is not far behind, with 21.3%. For Greater China and South Asia, the index numbers are 34.7% and 22.7%,

respectively. Loosely speaking, we can interpret these calculations and contrasts to mean that in 2010, China and Greater China had comparative advantage in the *production* operations in their trade of parts and components, while India and South Asia have comparative advantage in their *assembly* operations.

## 4 Conclusion

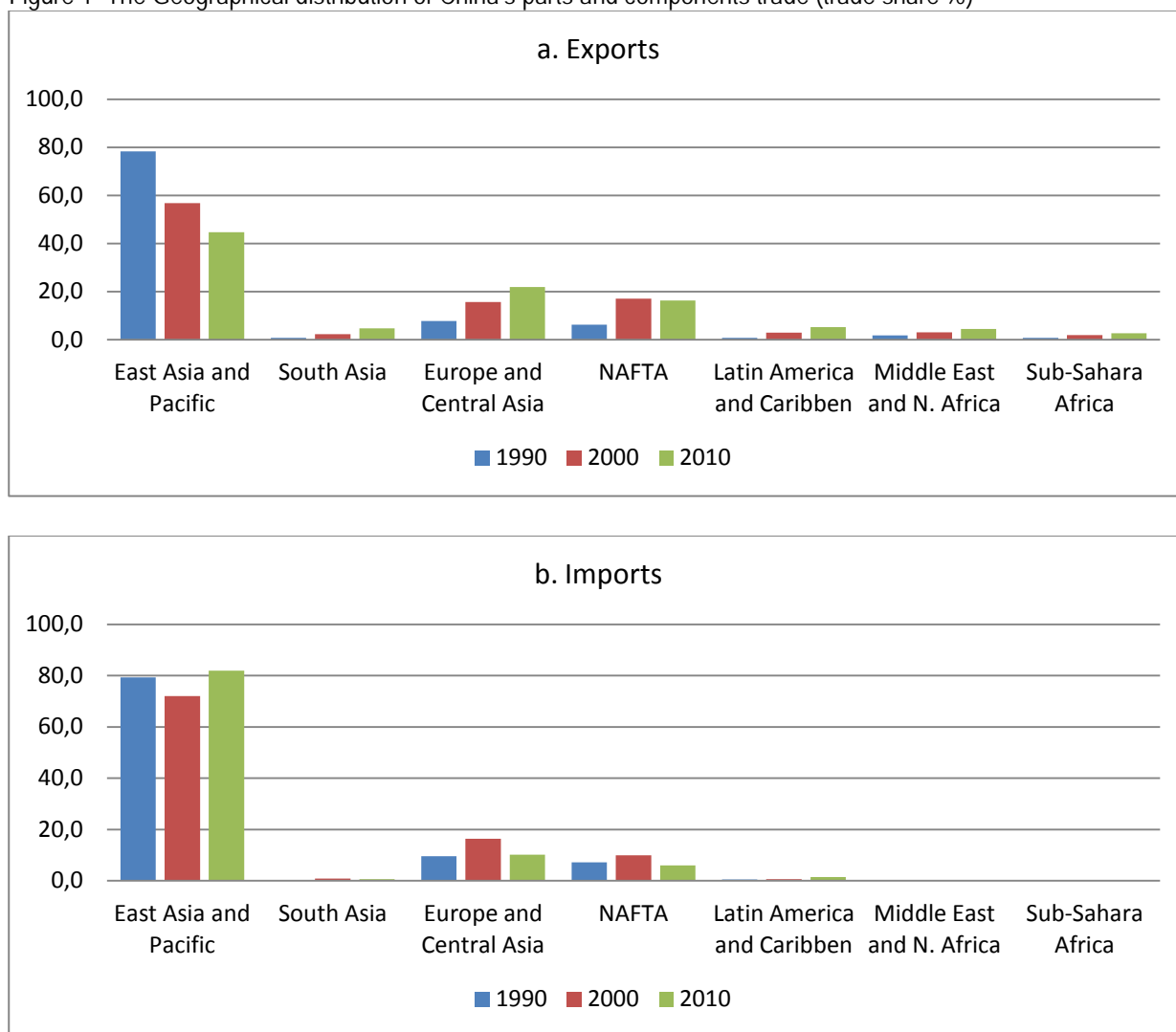
In this article, we reviewed the characteristics of production sharing in China, Greater China (Hong Kong, Macau and Taiwan), India and South Asia (Afghanistan, Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka). We showed that, between 1990 and 2010, India did less trading in manufactured products as well as in parts and components than did China. Total trade in manufactured products and parts and components declined in the case of India but increased for China. As suggested by the RCA index numbers in Table 1, China's comparative advantage lies in production operations rather than assembly, whereas for India the situation is the reverse.

China is highly integrated with East and Southeast Asia and has increasingly become the center of an East and Southeast Asian production sharing network. While we do not find a similar relationship for India and South Asia, South Asia and India clearly became important export destinations for China. In terms of sectors, the major parts and components exports by China are ICT and textile and clothing items, while India exports mostly textile and clothing components. Currently, India and South Asia are importing increasing shares of their parts and components from East Asia and the Pacific economies. Overall, these results suggest that the production network is much more developed in China and in East and Southeast Asia than in India and South Asia. In the future, as deeper networks develop in India and South Asia, it is conceivable that the Asian production network can become truly pan-Asian---comprising China, East and Southeast Asia, India, South Asia and even Central Asia.

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Figure 1 The Geographical distribution of China's parts and components trade (trade share %)



Note: The classifications of country groups are defined as follow:

East Asia and Pacific includes China, Hong Kong, Macau, Taiwan, Japan, Korea Rep., Mongolia, Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

Greater China (3) = Hong Kong, Macau, and Taiwan.

ASEAN (10) = Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

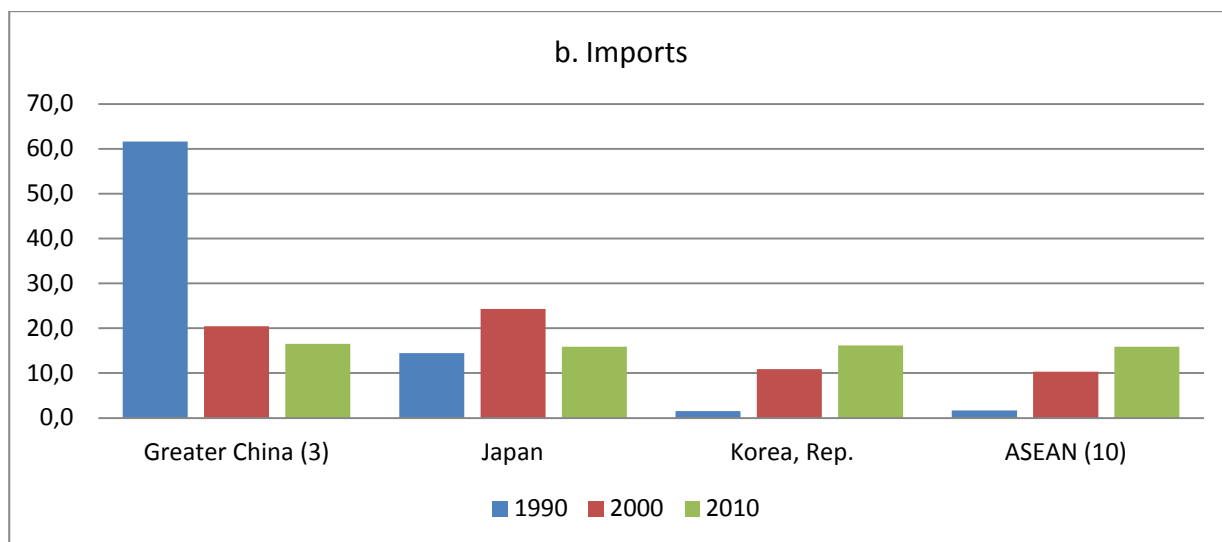
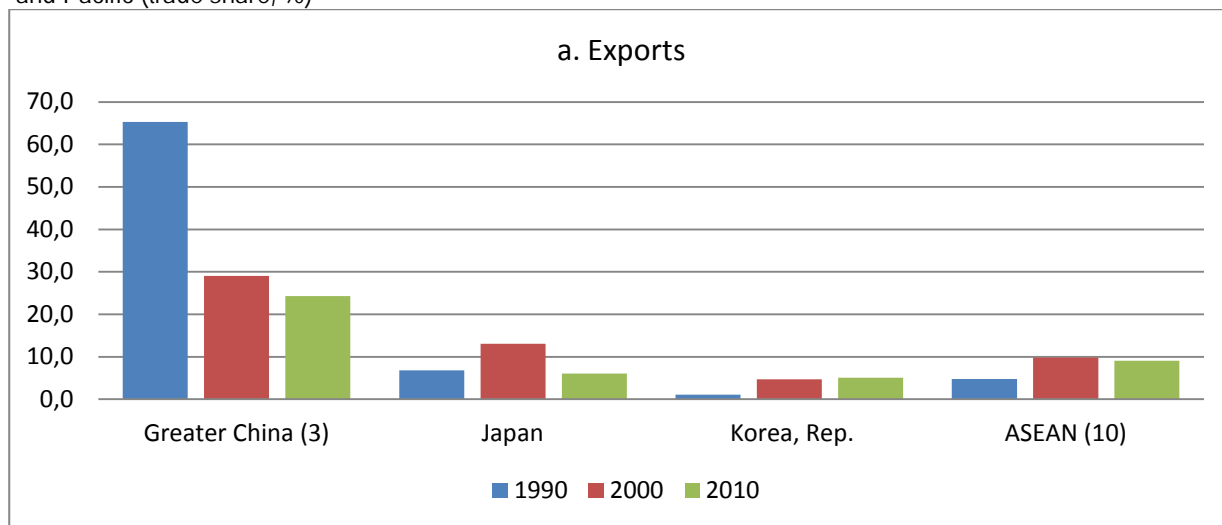
European Union (27) = EU 25 members plus Bulgaria and Romania.

NAFTA (3) = Canada, Mexico and United States.

Latin America and Caribbean (11) = Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

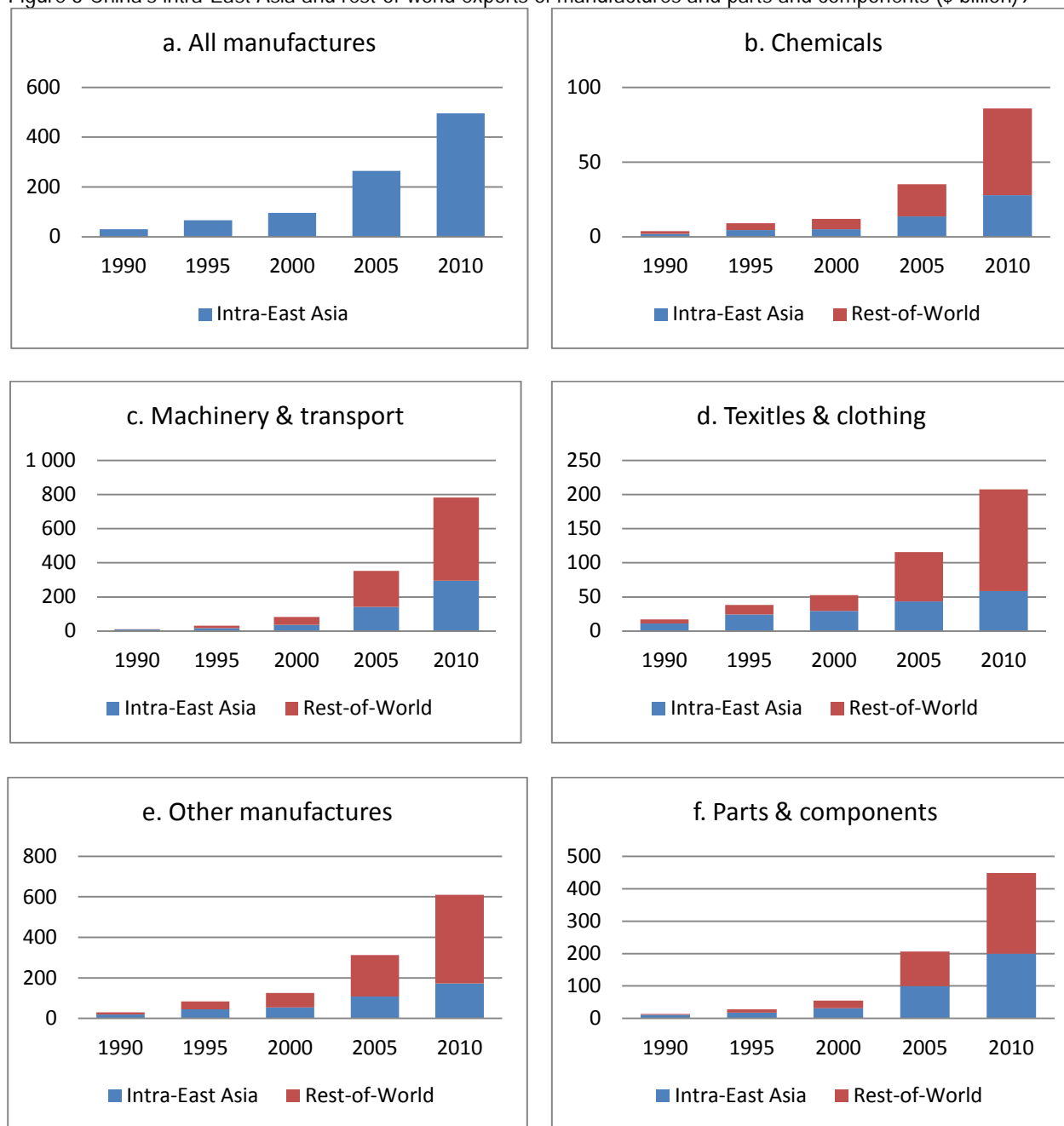
Source: UN COMTRADE statistics

Figure 2 Origins and destinations of China's exports and imports in parts and components in East Asia and Pacific (trade share, %)



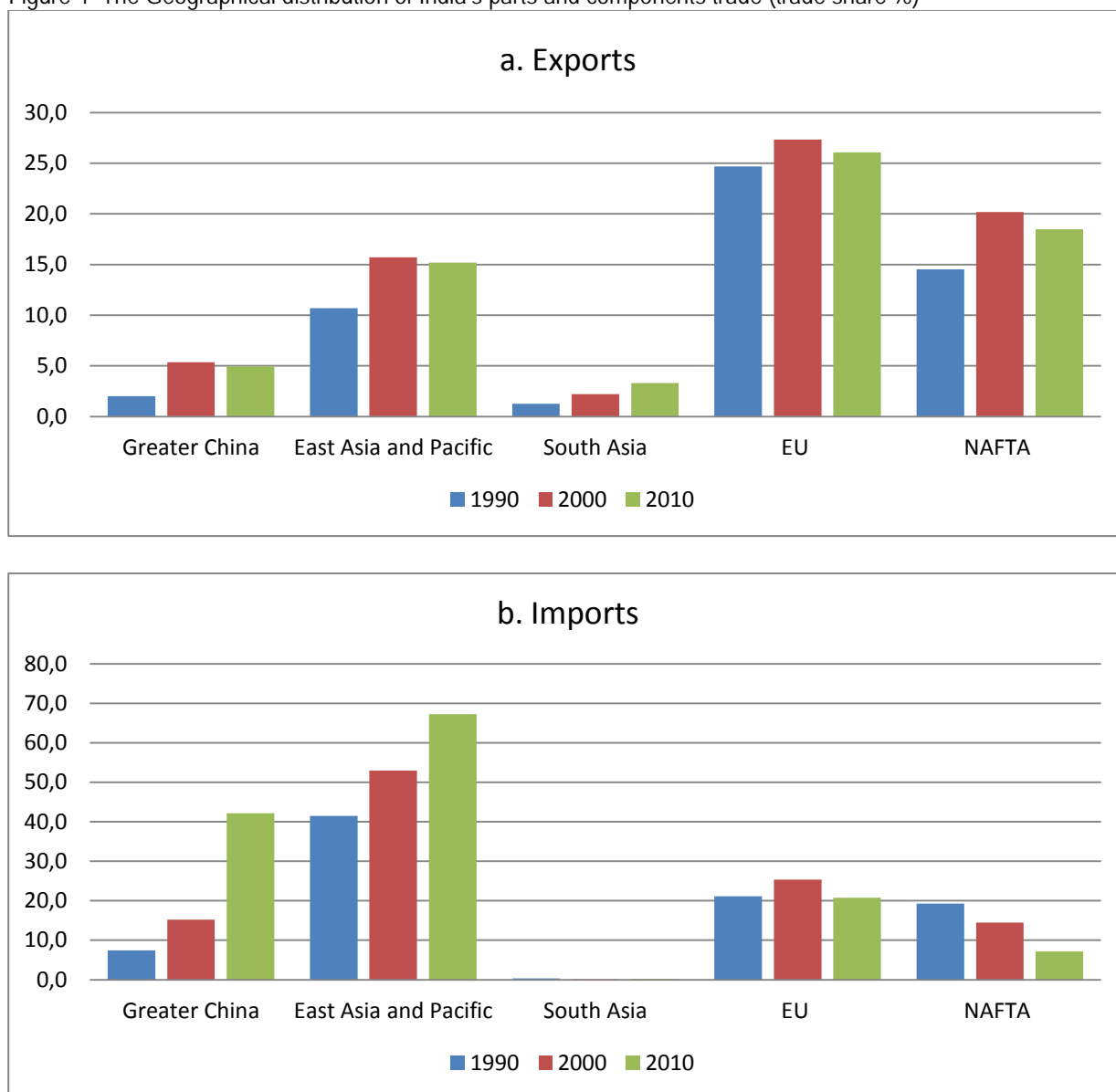
Source: UN COMTRADE statistics

Figure 3 China's intra-East Asia and rest-of-world exports of manufactures and parts and components (\$ billion)<sup>9</sup>



Notes: The classifications of product groups are defined in SITC revision 2 as all manufactures (5+6+7+8-68), chemicals (5), machinery & transport (7), textiles & clothing (65+84), and other manufactures (6+8+65-68-84). Parts & components items are defined as those products with official description of "Parts of ..." and other noble components in SITC revision 2, including textiles and garments (65+61), machinery & transport (7), metal manufacturing (69), and other miscellaneous manufactured goods (8). Source: UN COMTRADE statistics

Figure 4 The Geographical distribution of India's parts and components trade (trade share %)



Note: The classifications of country groups are defined as follow:

East Asia and Pacific includes China, Hong Kong, Macau, Taiwan, Japan, Korea Rep., Mongolia, Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

Greater China (3) = Hong Kong, Macau, and Taiwan.

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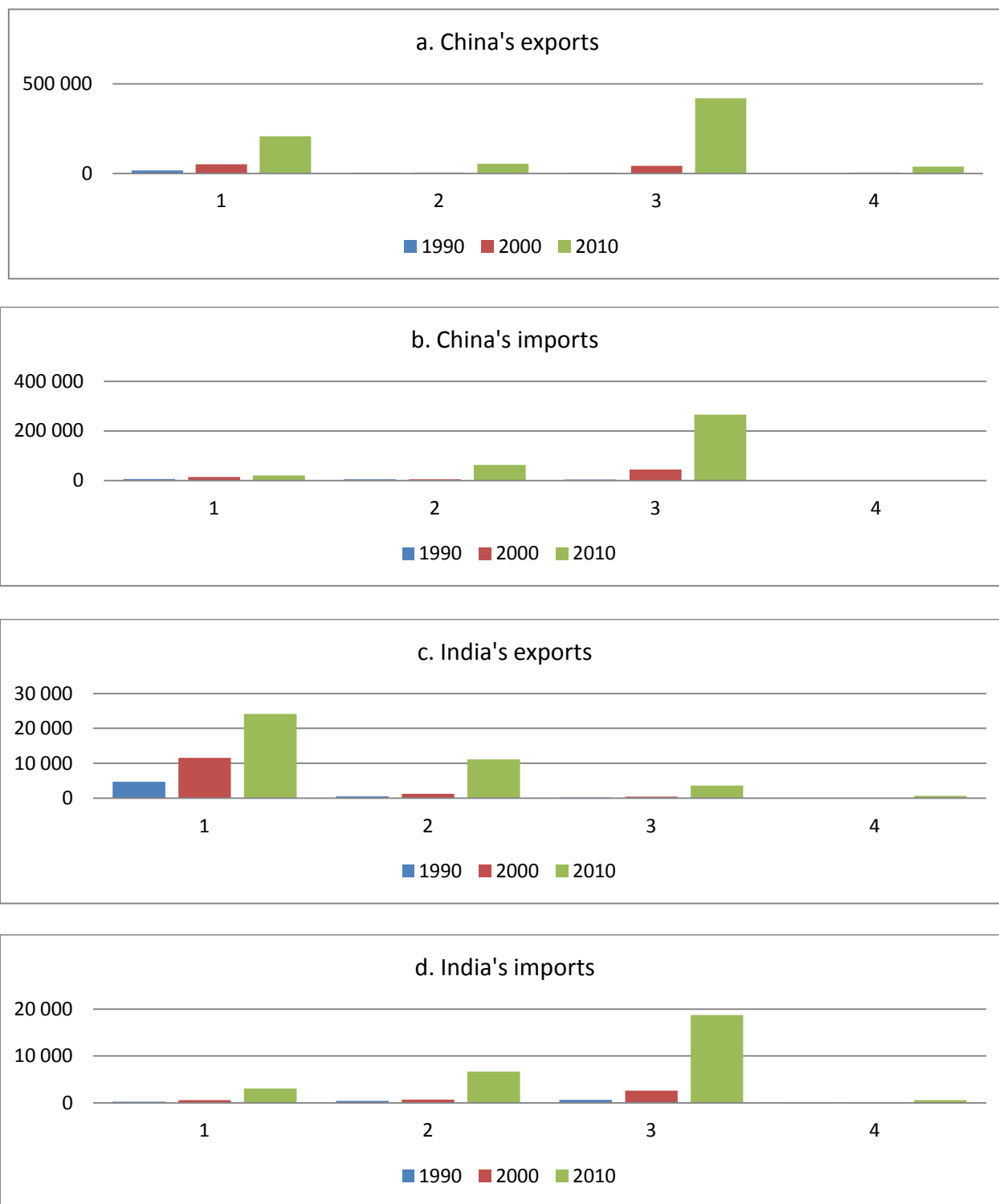
European Union (27) = EU 25 members plus Bulgaria and Romania.

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Latin America and Caribbean (11) = Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

Source: UN COMTRADE statistics

Figure 5 Comparisons of production network development in China and India (\$million)



Note: 1. Total T&C network, 2. Total auto network, 3. Total ICT network, 4. Total furniture network; all for bot final goods and parts



Table 1 Comparisons of comparative advantage (RCA) of parts & components trade in China and India in the regions, 2010

Region	Country /Group	Exports	-Production	Imports	- Assembly
		Operations		Operations	
		No. of P&C Products with RCA > 1	% of P&C Products with RCA > 1	No. of P&C Products with RCA > 1	% of P&C Products with RCA > 1
Greater China (3)	Total Greater China	38	50.7	26	34.7
	China	38	50.7	21	28.0
	Hong Kong	23	30.7	23	30.7
	Taiwan	26	34.7	16	21.3
South Asia (3)	Total South Asia (3)	10	13.3	17	22.7
	India	10	13.3	16	21.3
	Pakistan	4	5.3	10	13.3
	Sri Lanka	5	6.7	18	24.0

Note: the RCA index computations are based on total 75 products of parts and components in textiles, machinery, and other manufacturing goods in SITC rev. 2.

Source: UN COMTRADE statistics

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