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Trade expansion of China and India: Threat or opportunity

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Research Paper No. 2008/08

Trade Expansion of China and India

Threat or Opportunity

Mahvash Saeed Qureshi¹ and Guanghua Wan²

February 2008

Abstract

By exploring the export performances and specialization patterns of China and India, we assess their trade competitiveness and complementarity vis-à-vis each other as well as with the rest of the world. Our analysis indicates that (i) India faces tough competition from China in the third markets especially in clothing, textile and leather products; (ii) there is a moderate potential for expanding trade between the two countries; (iii) China poses a challenge for the East Asian economies, the US, and most of the European countries especially in medium-technology industries; (iv) India appears to be a competitor mainly for its neighbouring South Asian countries; and (v) complementarity exists between the imports of China and India, and the exports of the US, some European states and East Asian countries, especially Japan, Korea, Malaysia, Singapore and Thailand, implying opportunities for trade expansion; and finally (vi) the export structure of China is changing with the exports of skill intensive and high-technology products increasing and those of labour-intensive products decreasing gradually. This suggests that challenges created by China in traditional labour-intensive products might reduce in the long run.

Keywords: international trade, export competition, China, India

JEL classification: F00, F02, F13

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Acronyms

CC	coefficient of conformity
CGE	computable general equilibrium
CS	coefficient of specialization
SITC	standard international trade classification
TCI	trade complementarity index

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1 Introduction

In recent years China and India have experienced unprecedented economic development. During the last decade, China's economy grew on average at 10 per cent per annum and India's at 6 per cent per annum. China's share in world trade increased from a meagre 1 per cent in early 1990s to 6 per cent in 2004 and that of India from 0.5 per cent to 1 per cent during the same period. Although the share of China and India in global output and trade still lags behind their combined share of world population, this is expected to reverse in the future (Wilson and Purushothaman 2003; Ahya et al. 2004). By 2003, China became the sixth largest economy in the world at market exchange rate, the fourth largest global trader and the major recipient of foreign direct investment (Blazquez-Lidoy, Rodriguez and Santiso 2004).

The ever increasing significance of the two most populous economies in the world has caused concerns about their growth and trade prospects and implications for other countries.¹ According to IMF (2004), China's rising shares in world output and trade are already having significant repercussions for countries all over the world. Eichengreen, Rhee and Tong (2004) show that Chinese exports crowd out exports of other Asian economies. This is especially true for consumer goods produced by less-developed Asian countries, but not necessarily for capital goods produced by the more advanced Asian economies. Also, they find that China's income elasticity of import demand is the highest for capital goods. Hence, the advanced Asian countries specializing in capital goods benefit from China's rapid boom.

Lall and Albaladejo (2004) examine China's competitive threat to East Asia and conclude that China is a tough competitor in low-technology products. However, with imports outpacing exports, China also acts as an engine for export growth for its neighbours. Blazquez-Lidoy, Rodriguez and Santiso (2004) argue that China does not pose challenges for most Latin American countries, with Mexico as a notable exception. Banco Bilbao Vizcaya Argentaria (BBVA) (2003, 2004) supports these findings and shows that China's dominance as a global trade player entails adverse consequences for Mexico but presents opportunities for other Latin American countries. Jenkins and Edwards (2005) assess the impact of China and India's economic growth and trade integration on Sub-Saharan Africa. They find that competition from China and India is not a serious concern for most countries in the region. However, Lesotho is threatened by the growing exports of textiles and garments from both countries. In addition, they observe that India poses much less of a competitive threat in third markets than China.

In this paper, we extend the current literature by exploring systematic changes in China and India's trade structure and analysing the impacts of their trade expansion on each

¹ In the context of trade, three types of direct impacts are identified: (i) the complementarity effect—the growth of exports to China and India from the rest of the world due to an increase in demand in China and India; (ii) the competitiveness effect—increased competition from China and India for exports in the third markets, and (iii) the domestic competitive effect—increased competition with China and India in the domestic markets (Jenkins and Edwards 2005). In addition, a number of indirect effects are also possible, for example, the increased imports of China and India may have a multiplier effect and lead to growth in the demand for imports in the economies exporting to China and India. Ianchovichina and Martin (2003) and IMF (2004) estimate that the economic and technological spillovers from China and India may benefit the regional neighbours and trading partners in the long run, thereby promoting global economic growth.

other as well as on their major trading partners. Unlike earlier studies, our research is not confined to one particular region but offers a comprehensive assessment of the trade challenges posed by China and India on a global scale. In addition to competition, we assess trade complementarity to gauge the potential of increasing exports from other countries to meet the rising demands of China and India. To do so, we use the most recent available data on commodity trade at the three and four digit Standard International Trade Classification (SITC) level. This complements earlier studies which use aggregated data and rely on computable general equilibrium (CGE) models. These studies have been criticized due to the high level of aggregation of sectors and countries and the various assumptions implicit in the calibration of key parameters.² Finally, we examine the various impacts in terms of low-, medium- and high-technology industries, employing the technological classification of exports proposed by Lall and Weiss (2004).

The rest of the paper is organized as follows. Section 2 presents an overview of the economic performance of China and India in recent years. Section 3 looks at their revealed comparative advantage and examines the changes in their trade structure in the last decade. Section 4 investigates the potential trade competition and complementarity between China and India. Section 5 assesses the challenges and opportunities posed by China and India to the rest of the world in third markets. Section 6 summarizes the main findings and concludes.

2 China and India: the new Asian tigers

China's GDP per capita is now 2.2 times higher than India's (in PPP terms) although per capita GDP in both countries was at comparable levels until the early 1990s. India's performance has improved noticeably in the last few years and it has outperformed most of the other countries in its income group. The good macroeconomic performance of both countries is expected to continue and real GDP is expected to grow over 10 per cent in China and over 8 per cent in India in the short and medium terms (IMF 2007a).

Economic liberalization reforms undertaken by both countries may have played an important role in triggering the high growth rates. This is because openness to trade provides access to imported inputs, new technology and larger markets and spurs growth (Harrison 1996; Frankel and Romer 1999). In recent years, international trade has grown manifold in China and India. China's trade to GDP ratio increased from 32 per cent in 1990 to 49 per cent in 2000 and further rose to 70 per cent in 2005. India's trade liberalization has been more modest. Its trade to GDP ratio was close to 16 per cent in 1990, increasing to 29 per cent in 2000 and 44 per cent in 2005.

The external balance position of India remained negative throughout the 1990s. This is in contrast to China, which has maintained a largely positive external balance since the early 1990s.³ The average annual growth rates of China's and India's exports of goods

² See Gilbert and Wahl (2000) and Morrison (2001) for a review of CGE based studies on the impact of China's trade on other countries. See Shafaeddin (2003, 2004) for a detailed discussion on the shortcomings of the CGE approach in the context of China's trade liberalization.

³ The average external balance of good and services as a percentage of GDP was 3 and -1.2 per cent for China and India, respectively, during 1990-2005.

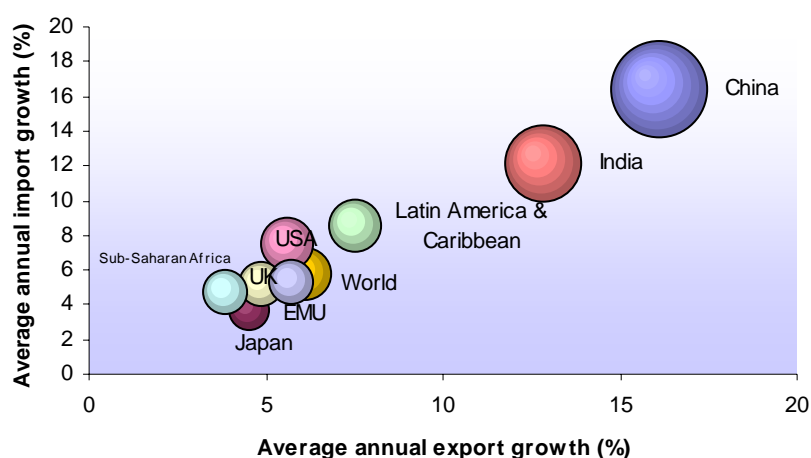
and services were about 12 per cent in 1990-99, but jumped to 24 per cent and 17 per cent, respectively, in 2000-05. China's imports increased on average at 16 per cent per annum in 1990-2005 while India's imports increased at 13 per cent per annum. If the recent trend in exports is taken as an indicator of competitiveness, the overwhelming increase in the trade activity of both countries must have non-trivial consequences for the rest of the world (see Figure 1).

Relative to India, China is much more integrated with the world economy and its share in global exports is nearly six times that of India. China's exports to industrial countries as a percentage of its total exports increased from 35 per cent in 1990 to 52 per cent in 2006 whereas the share of exports to developing countries decreased correspondingly. Interestingly, its imports from the developing countries increased during the same time period, suggesting that China is becoming a world factory for re-exports. India has experienced the opposite trend and its exports to industrial countries dropped from 55 per cent in 1990 to 44 per cent in 2006 while the share of exports to developing countries has increased.

In 2006, the main export markets for China were the United States (21 per cent of total exports), Hong Kong (10 per cent), and Europe (6 per cent). India's leading export destinations were the US (17 per cent), the Middle East (15 per cent) and China (8 per cent). Table 1 presents the shares of China and India in the total imports of the US, Europe and Japan, the three big international markets. The rise in the share of imports from China is remarkable in the three regions. The share of imports from India increased slightly in the United States but declined in both Europe and Japan. The significant rise in China in the big markets has strengthened the fears of many developing and emerging countries that China is gaining dominance in the international markets at their expense and is directly responsible for crowding out their exports.

The main reason behind China's growing share in the global markets lies in its lower production costs due to an abundant labour force. Blazquez-Lidoy, Rodriguez and Santiso (2004) report that the average wage is three to four times lower in China than in

Figure 1
Average annual export, import and GDP growth, 1990-2005



Note: The size of the bubble represents the average annual GDP growth (%).

Source: Authors' calculations based on World Bank (2006).

Latin America. However, labour cost is not the whole story as China has higher labour costs than India. For example, in 2002, the typical monthly wage of a manufacturing worker in China was US\$110.80 while it was only US\$23.80 in India (Kalish 2006). Thus, other forces must be at work, including better infrastructure, flexible labour markets, and a favourable investment climate (Ahya et al. 2004). A high savings rate and fast capital accumulation explain a large proportion of China's growth (IMF 2004). Another factor, possibly helping China's exports, is an undervalued exchange rate. Advanced countries, especially the US, are increasingly demanding a revaluation of China's exchange rate to contain their trade balances.

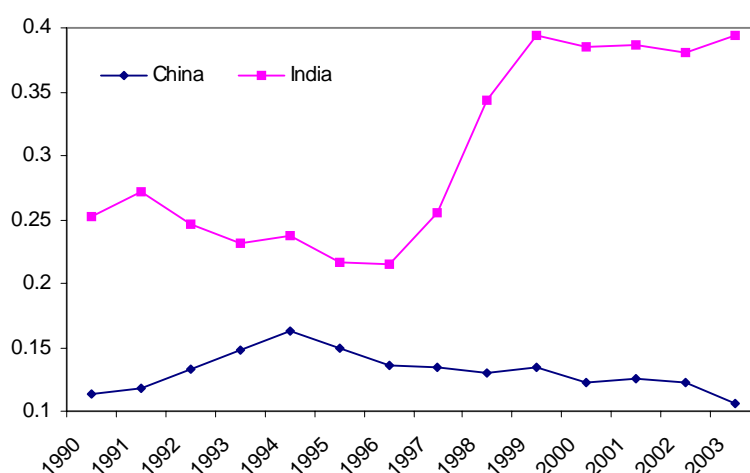
In India, growth has been gradual and mainly driven by the private sector, which has seized the opportunities offered by the developed countries in the form of IT outsourcing. Its trade activity which remained subdued in the last decade has picked up in recent years, but the country has mainly relied on the exports of services for its foreign exchange earnings (Figure 2). Although China is the major recipient of foreign investment at present, India has a well-developed institutional framework in place, which includes property rights protection, a democratic political set-up, and the presence of various market regulators. Various surveys suggest that India has better corporate standards than China, which explains why the rate of return on assets has been higher and stocks performance better in India (Mund, Brandt and Hansankul 2005).

Table 1
Share of imports from China and India in total imports, 1980-2005 (%)

	China			India			Japan		
	US	Europe	Japan	US	Europe	Japan	US	Europe	Japan
1980-84	0.8	1.0	3.8	0.6	1.5	0.8	15.4	3.3	...
1985-89	1.8	2.1	5.0	0.7	1.7	1.0	20.6	3.5	...
1990-94	4.7	2.0	7.4	0.7	1.2	1.0	18.1	3.1	...
1995-99	7.3	1.6	12.3	0.9	0.7	0.8	14.2	2.1	...
2000-06	12.3	4.0	18.8	1.0	0.5	0.6	9.7	2.3	...

Source: Authors' calculations based on IMF (2007b).

Figure 2
Exports of services to goods ratio



Source: World Bank (2006).

Like China, India enjoys the advantage of a large labour force and relatively low production costs. It possesses immense potential to increase its global market share.⁴ Wilson and Purushothaman (2003) predict that if macroeconomic stability prevails, then high investment rates, a large labour force, and steady convergence would lead China to become the world's largest economy by 2041 and its per capita income would be about US\$ 30,000 by 2050. India's growth rate could remain above 5 per cent throughout the next fifty years, outstripping Japan's GDP by 2032 and achieving income per capita that is thirty-five times its current level, although still significantly lower than China's in 2050. Both countries are expected to become the driving force in global trade, with their exports rising from a combined 12 per cent of world exports to 20 per cent by 2010 and 30 per cent by 2030 (Ahya et al. 2004).

3 Trade structure of China and India

To assess the potential impacts of the increasing international trade of China and India on each other as well as on the rest of the world, it is useful to examine their exporting structures as well as the changes in their export composition. For this purpose and other analyses, we use 1995-2005 data for merchandise trade from the United Nations COMTRADE database.⁵ Our dataset covers 260 and 613 product categories at the three and four-digit standard international trade classification (SITC) levels, respectively.

Table 2 shows the top ten exporting sectors of China and India. For China, sectors with the highest shares of exports in 2005 were statistical and official machines, telecommunication and electronic equipment, clothing, footwear, furniture, and toys. These sectors constituted 43 per cent of total Chinese exports whereas their share was 30 per cent in 1995. The evolution of the statistical, telecommunications, office, and consumer electronic equipment sectors is particularly impressive. Their combined share in total goods exports was about 6 per cent in 1995, rising to 13 per cent in 2000 and 25 per cent in 2005. During the same period, the share of labour-intensive products such as clothing and footwear has decreased. This suggests that the Chinese export structure has changed towards medium to high-technology and capital-intensive products.

The top ten exporting sectors of India constituted about 40 per cent of total exports of goods in 2005. Precious stones such as diamonds remain the leading export sector and constitute 13 per cent of total merchandise exports. The sectors which recorded a noticeable increase in their shares were iron ore and concentrates, and jewellery. Clearly, India's leading exporting sectors have a high labour intensity and low capital intensity.

China now has the highest share in world exports of clothing, leather, textiles and information technology (IT) and consumer electronic products (Table 3). It is also a

⁴ China and India account for 23 per cent and 17 per cent of the global working age population. By 2010, China and India would add a further 56 and 83 million to the global labour supply. The contribution of the US and Europe would be only 13 million and 0.1 million, respectively, whereas the working population of Japan would decrease by about 3 million (Ahya et al. 2004).

⁵ Ideally, trade profiles should be examined at a more disaggregated level. However, data unavailability prevents us from undertaking such analysis.

leading exporter of electrical and non-electrical machinery, and basic manufactures. India ranks among the top ten exporters of clothing, leather and textile products. However, its share in world exports of machinery and other manufactures is very low.

Table 2
Leading exporting sectors of China and India, 2005 (%)

SITC code	Product group	1995	2000	2001	2002	2003	2004	2005
China								
7143	Statistical machines cards or tapes	1.56	4.45	4.96	6.23	9.45	10.17	10.10
7249	Telecommunications equipment, n. e. s.	2.15	4.10	4.91	5.13	5.52	6.78	7.65
8411	Clothing of text fabric, not knitted crocheted	9.11	7.07	6.72	5.96	5.37	4.53	4.30
8414	Clothing/accessories, knitted or crocheted	4.84	5.52	5.20	5.00	4.84	4.47	4.19
7149	Office machines, n. e. s.	1.09	2.37	3.19	4.26	4.41	4.23	3.89
8911	Phonographs, tape & other sound recorders etc.	1.26	2.07	2.49	3.09	3.30	3.40	3.30
7293	Thermionic valves and tubes, transistors, etc.	0.88	2.17	1.87	2.25	2.39	2.75	2.70
8510	Footwear	4.24	3.83	3.67	3.31	2.88	2.48	2.44
8210	Furniture	1.19	1.86	1.92	2.07	2.09	2.15	2.21
8942	Children' s toys, indoor games, etc.	3.32	3.20	2.90	3.11	2.59	2.07	2.05
	Total	29.64	36.64	37.83	40.41	42.83	43.04	42.83
India								
6672	Diamonds (not industrial, not set or strung)	14.69	14.48	14.17	14.76	13.77	14.05	12.68
8411	Clothing of text fabric, not knitted crocheted	8.18	8.27	7.08	6.25	5.43	4.66	5.51
2813	Iron ore & concentrates ex roasted iron pyrites	1.64	0.84	1.02	1.73	1.87	4.20	4.15
8971	Gold silver plat. etc jewellery ex watchcases	1.58	2.25	2.78	2.81	3.34	4.10	3.80
8414	Clothing and accessories, knitted or crocheted	3.12	4.24	4.53	4.81	4.58	3.48	3.62
5417	Medicaments	1.87	2.03	2.32	2.58	2.51	2.51	2.53
6569	Made up articles of textile materials, nes	1.71	2.38	2.34	2.23	2.31	2.16	2.24
5129	Other organic chemicals	0.37	1.03	1.12	1.23	1.64	1.63	1.85
0422	Rice (glazed/ polished, not further prepared)	4.36	1.51	1.58	2.42	1.50	2.02	1.53
6748	Other coated iron or steel plates etc under 3 mm	0.23	0.58	0.55	1.05	0.45	1.72	1.42
	Total	37.74	37.59	37.49	39.87	37.38	40.54	39.33

Note: n. e. s. = Not elsewhere specified.

Source: Authors' calculations based on UN COMTRADE database.

Table 3
Competitiveness in exports: world market share and rank, 2005

	China		India	
	Share (%)	World rank	Share (%)	World rank
Basic manufactures	8.50	2 (131)	1.32	25 (131)
Chemicals	3.60	11 (131)	1.11	18 (131)
Clothing	28.41	1 (115)	3.55	5 (115)
Electronic components	9.53	4 (106)	0.27	33 (106)
Fresh food	3.95	8 (177)	2.18	14 (177)
IT & consumer electronics	22.84	1 (81)	0.08	40 (81)
Leather products	24.49	1 (93)	2.33	10 (93)
Minerals	1.38	22 (52)	1.85	17 (152)
Miscellaneous manufacturing	12.41	2 (130)	0.87	25 (130)
Non-electronic machinery	4.61	7 (116)	0.44	28 (116)
Processed food	3.47	8 (153)	0.75	27 (153)
Textiles	20.79	1 (118)	4.28	7 (118)
Transport equipment	2.50	12 (110)	0.37	27 (110)
Wood products	3.98	7 (120)	0.19	50 (120)

Note: Values in parentheses refer to the number of exporting countries ranked in the sector.

Source: UN COMTRADE database.

Table A1 in the Appendix presents the leading importing sectors of China and India. In China, the combined share of the top ten sectors was 47 per cent in 2005 and in India it was 53 per cent. Interestingly, we observe substantial overlaps between the leading export and import sectors of China, implying significant intra-industry trade. Clearly, China has turned into a regional production centre and manufacturing point for re-exports (Blazquez-Lidoy, Rodriguez and Santiso 2004).

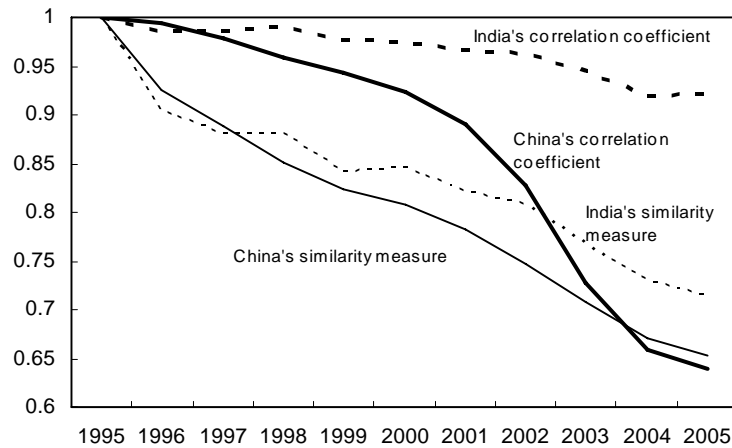
To assess structural changes in the exports of China and India, we compute the Pearson's correlation coefficient (r) between sectoral export shares in $t = 1995$ with those in $(t+1), (t+1), \dots, (t+9)$. Values of r closer to zero indicate greater structural change whereas r values closer to one indicate the opposite. However, r tends to be influenced by outliers in the data and is an inappropriate measure for skewed distributions. Hence, we also measure similarity (S) in terms of 'distance' using the Bray-Curtis (BC) measure as follows:

$$S = 1 - BC = 1 - \frac{\sum_j |x_{j(t+k)} - x_{jt}|}{\sum_j (x_{j(t+k)} + x_{jt})}, \quad (1)$$

where x_j is the export share of sector j , t is the initial year (=1995) and $k = 1, 2, \dots, 9$. BC is a bounded measure ($0 \leq BC \leq 1$) which is suitable for asymmetric distributions and is less sensitive to proportional sub-classification of sectors (Tajoli and De Benedictis 2006).

Figure 3, plotting r and S estimates, reveals three important trends. First, the export structures of both countries have changed, particularly in the past decade, as indicated by the decreasing values of r and S . Second, the structural change is more substantial in China. China's r and S decreased from 1 to about 0.6 whereas India's r and S decreased to 0.9 and 0.7, respectively. Third, the pace of change and movement away from initial specialization in China seem to have gained momentum since 2000—the slopes of the curves becoming much steeper as from 2000. This may reflect the fact that China accelerated structural change around 2001 when China joined the World Trade Organization.

Figure 3
Self-similarity dynamics of China and India, 1995-2005



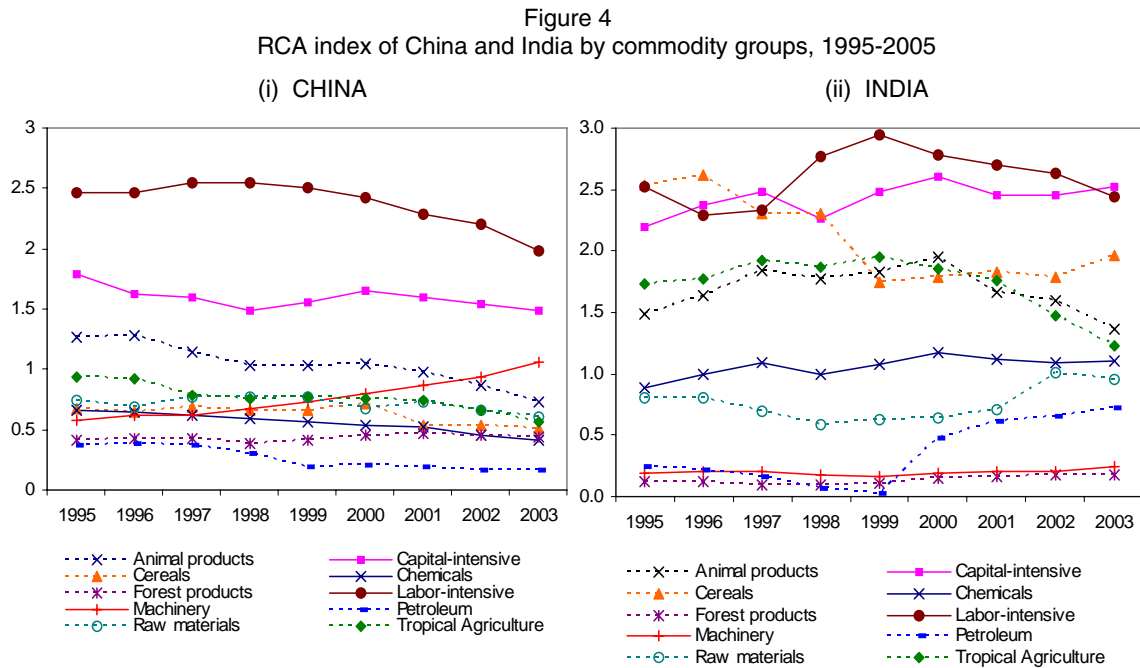
Source: Authors' calculations

To further explore the dynamics of specialization in China and India, we calculate the Balassa index of revealed comparative advantage (*RCA*) for the ten industrial clusters classified by Leamer (1984, 1995).⁶ The index is defined as:

$$RCA_{ij} = \frac{(x_{ij} / X_i)}{(x_{wj} / X_w)}, \quad (2)$$

where x_{ij} and x_{wj} denote the export of product j from country i and the total export of product j for the whole world, and X_i and X_w refer to the total exports of country i and the world total exports. This index compares the share of a sector in a country's total export with the share of the same sector in world's total exports. A value of *RCA* greater than unity indicates that the country specializes in a product j whereas a value of less than unity implies that the country has a revealed comparative disadvantage in product j .

Figure 4 shows that China's *RCA*s in labour-intensive products, and to a less extent in capital-intensive products and chemicals, have decreased over time. However, the *RCA* of machinery, which includes all types of electric, non-electric machinery and transport equipment, has increased. Interestingly, the *RCA*s for labour-intensive products have decreased in recent years in India as well. However, India's *RCA*s for raw materials, chemicals and capital-intensive products have increased.⁷



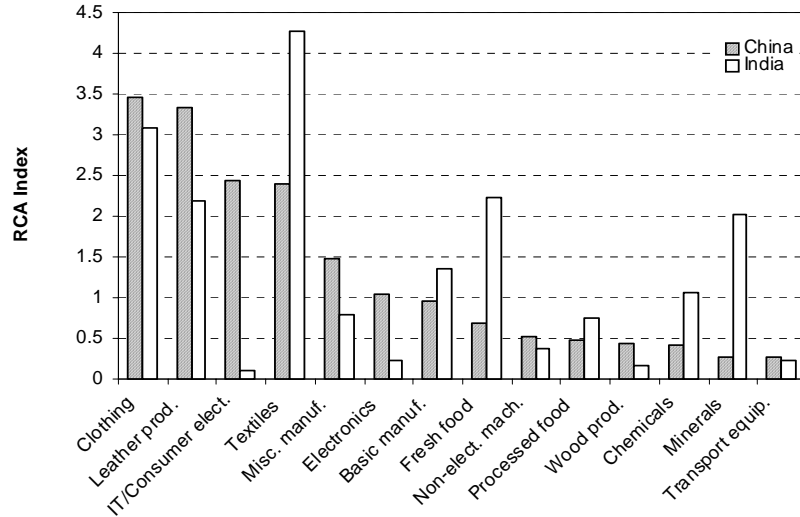
Source: Authors' computations based on UN COMTRADE database.

⁶ The clusters are aggregates of over 2,200 products traded internationally. Table A1 in the Appendix presents the components of the clusters based on SITC codes.

⁷ At the three digit SITC level, China and India had a *RCA* of greater than 1 in 89 and 84 sectors, respectively.

Figure 5 presents the *RCA* estimates compiled by UNCTAD. China has high *RCA* indices for a diverse range of sectors including clothing, leather and leather products, IT and consumer electronics, textiles, miscellaneous manufactures and electronic machinery. In fact, China ranks among the top twenty countries in the world in terms of *RCA* indices for these sectors (see www.intracen.org). India however has a revealed comparative advantage in textiles, clothing, fresh food, leather, minerals and basic manufactures. Thus, based on *RCA*, both countries appear to be strong competitors in the clothing, textiles and leather sectors.

Figure 5
The RCA index for China and India, 2003



Source: UN COMTRADE database.

4 Trade competition and complementarity

To assess the trade challenges posed by China and India to each other as well as to the rest of the world, we construct two well-known indices: the coefficient of specialization (*CS*) and the coefficient of conformity (*CC*), defined as follows:

$$CS = 1 - \frac{1}{2} \sum_n |a_{ni} - a_{nj}|, \quad (3)$$

$$CC = \frac{\sum_n a_{ni} a_{nj}}{\sqrt{\sum_n (a_{ni})^2 \sum_n (a_{nj})^2}}, \quad (4)$$

where a_{ni} and a_{nj} represent the share of good n in the total exports of countries i and j . If both countries (i, j) have the same exporting structure, then the indices are equal to 1, indicating intense competition. However, when both countries have totally dissimilar exporting structures, then both the indices are equal to 0, which indicates absence of competition.

To assess the potential for expanding trade between two countries, we construct the trade complementarity index (*TCI*). *TCI* shows how well the export-import structures of

two countries match and is defined as follows:

$$TCI_{ij} = 1 - \sum_n \left(\frac{|m_{ni} - a_{nj}|}{2} \right), \quad (5)$$

where m_{ni} is the share of good n in total imports of country i . The index is zero when no goods exported by one country are imported by the other and 1 when the export and import shares are a perfect match.

The above indices are compiled using the merchandise trade data for the major trade players in Africa, Asia, Latin America, North America, and western Europe. Together, these countries account for about 90 per cent of world trade in goods. Since disaggregated trade data are not available for many countries, the sample covers 52 countries when three-digit trade data are used but only 44 countries at the four-digit level.⁸

4.1 Trade competition and complementarity: China and India

We first calculate CS and CC between China and India using data at both three- and four- digit levels. The results for the two indices do not differ much and reveal a high degree of competition between Chinese and Indian exports (see Table 4). However, the extent of competition seems to have weakened over time. This could be because China is increasingly specializing in IT and consumer electronics whereas India still specializes in textile and leather products.

The obtained estimates for the TCI between China's exports and India's imports are reported in the third column of Table 6 whereas those between China's imports and

Table 4
Trade competition between China and India, 1995-2005

	Three-digit		Four-digit		Three-digit		Four-digit	
	CS	CC	CS	CC	TCI (China)	TCI (India)	TCI (China)	TCI (India)
1995	0.48	0.40	0.46	0.46	0.32	0.29	0.27	0.27
1996	0.46	0.41	0.44	0.48	0.34	0.27	0.28	0.25
1997	0.45	0.39	0.43	0.46	0.34	0.29	0.28	0.28
1998	0.44	0.35	0.42	0.44	0.29	0.27	0.25	0.27
1999	0.44	0.31	0.42	0.39	0.30	0.26	0.26	0.26
2000	0.45	0.34	0.43	0.43	0.32	0.28	0.29	0.27
2001	0.45	0.32	0.43	0.40	0.33	0.30	0.29	0.28
2002	0.43	0.27	0.41	0.34	0.33	0.30	0.30	0.29
2003	0.43	0.25	0.41	0.30	0.34	0.31	0.31	0.31
2004	0.40	0.19	0.39	0.23	0.35	0.31	0.33	0.31
2005	0.39	0.20	0.39	0.25	0.35	0.31	0.33	0.32
Average	0.44	0.32	0.42	0.38	0.34	0.29	0.30	0.28

Source: Authors' calculations.

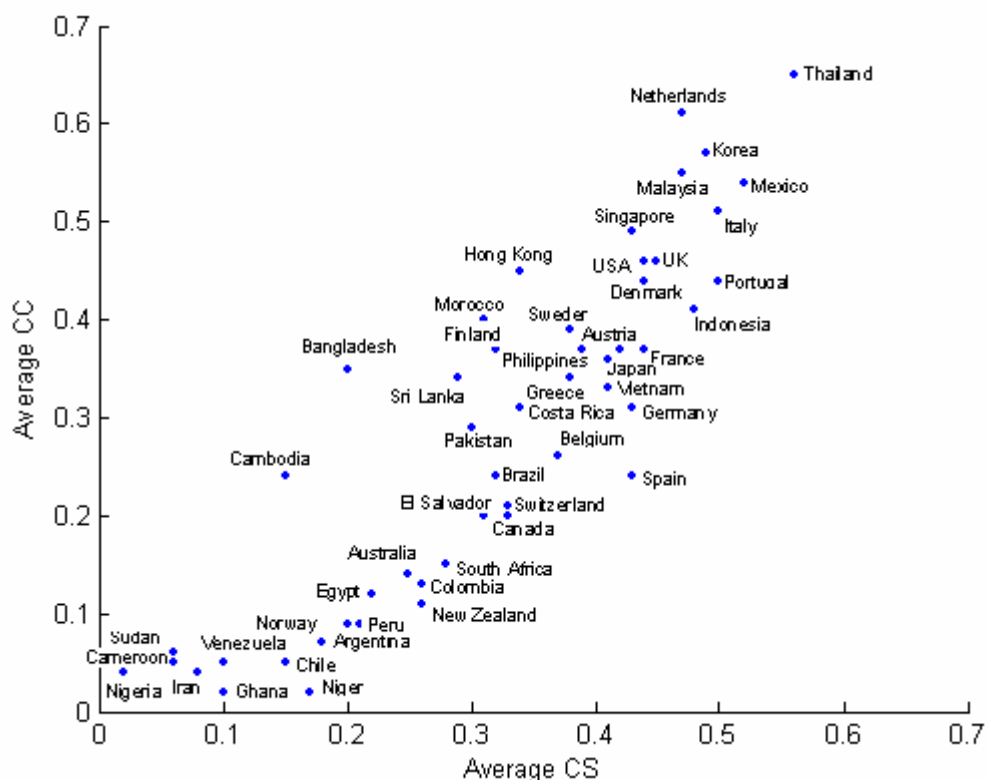
⁸ In general, trade indices are sensitive to aggregation bias and highly aggregated commodity groups yield higher values of the indices (Kellman and Schroder 1983).

India's exports are presented in the last column. It is noted that the trade complementarity between the two countries has increased over time. Clearly, a moderate potential exists for both economies to expand the exchange of goods.⁹ India has a higher *TCI*, implying more opportunities for India to increase imports from China. For example, China is a leading exporter of telecommunications and computer equipment and India has a high share of imports of these products. Thus, India can enhance its imports of these items from China. Meanwhile, India possesses comparative advantages in a few resource-based industries such as aluminium, steel, agricultural commodities and paper that can be exported to China (Ahya et al. 2004).

4.2 Trade competition and complementarity: China and India with the rest of the world

We repeat the above exercise and compute the *CS* and *CC* of China and India with the other countries in the sample. The average value of the indices over 1995-2005 using three-digit data are presented in Figures 6 and 7. The estimates obtained from the four-digit data do not differ significantly from these estimates, and are presented in Table A3 in the Appendix.

Figure 6
Export competition between China and other countries, 1995-2005*

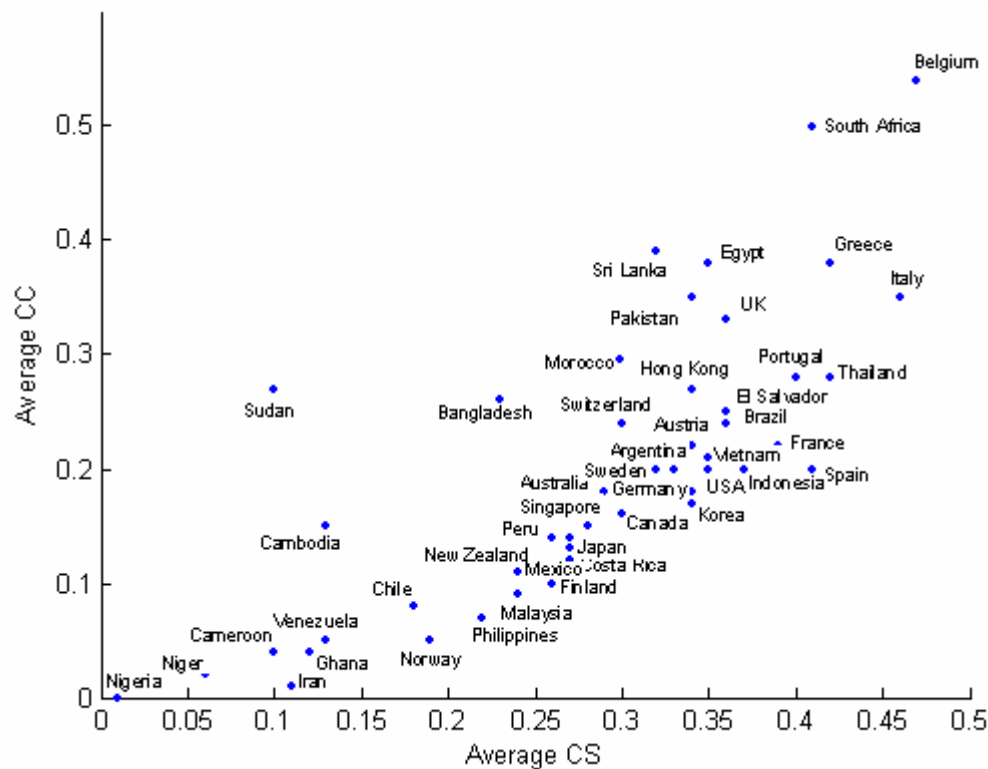


Note: * Export indices computed at the three-digit level; Reported values are period averages.

Source: Authors' calculations.

⁹ Already, trade activity between China and India appears to have gained momentum and in the last decade alone, their bilateral trade increased from US\$1 billion to US\$14 billion.

Figure 7
Export Competition between India and other countries, 1995-2005*



Note: * Export indices computed at the three-digit level; Reported values are period averages.
Source: Authors' calculations.

For China, the results reveal a high degree of competition with other East Asian countries such as Hong Kong, Indonesia, Japan, Korea, Malaysia, Thailand and Vietnam. Among the Latin American countries, China is a tough competitor for Mexico whereas other Latin American countries including Argentina, Brazil, Chile, Colombia, Peru and Venezuela, are less likely to be affected. This is because the latter export commodities which are not exported but imported by China, for example, soybeans, iron ore, steel, soy oil and wood (Blazquez-Lidoy, Rodriguez and Santiso 2004). Among the industrial countries, Austria, Denmark, France, Germany, Italy, Netherlands, Portugal, Spain, UK, and the US are the countries that face challenges from China's expanding trade activity. However, in general, the African countries, especially those in Sub-Saharan Africa, are not affected.

India appears to be a strong competitor for the European countries, for example, Belgium, Greece, Italy, and UK, and for other South Asian countries, including Bangladesh, Pakistan and Sri Lanka. Most of the East Asian and Latin American countries face moderate competition from Indian exports whereas the African countries face no significant threat.

As far as trade complementarity is concerned, Table 5 reports the average *TCI* of China and India with other countries computed based on the three-digit level data.¹⁰ Among

¹⁰ *TCI* estimates using the four-digit data are reported in Table A3 in the Appendix.

the East Asian countries, China has the highest *TCI* for Malaysia, Singapore, South Korea and Thailand. Among the industrial economies it has the highest *TCI* for Germany, UK and the US. In general, the trade complementarity between China and the South Asian countries (excluding India) and the African countries is quite low, whereas it is moderate for some of the Latin American countries. Latin American countries, particularly Argentina, Brazil, Chile, Colombia and Peru, have a comparative advantage in fresh and processed food sectors, minerals, and wood products. Since China has a low *RCA* in these products, potential gains from trade expansion may be achieved in these sectors.

India has relatively high trade complementarity with the European, East Asian and North American countries, and the lowest with the African countries and its neighbouring countries in South Asia. The *TCI* of India with Latin American countries ranges between 0.23 and 0.43, indicating a reasonable potential for trade expansion.

In terms of the technological classification of products proposed by Lall and Weiss (2004), we notice that China has a high *RCA* in industries belonging to different

Table 5
Trade complementarity of China and India with rest of the world, 1995-2005

CHINA				INDIA			
Country	TCI	Country	TCI	Country	TCI	Country	TCI
Argentina	0.32	Korea	0.55	Argentina	0.32	Korea	0.33
Australia	0.35	Malaysia	0.48	Australia	0.37	Malaysia	0.34
Austria	0.47	Mexico	0.43	Austria	0.31	Mexico	0.36
Bangladesh	0.10	Morocco	0.20	Bangladesh	0.05	Morocco	0.17
Belgium	0.45	Netherlands	0.48	Belgium	0.40	Netherlands	0.38
Brazil	0.39	New Zealand	0.26	Brazil	0.32	New Zealand	0.22
Cambodia	0.04	Niger	0.07	Cambodia	0.03	Niger	0.05
Cameroon	0.12	Nigeria	0.05	Cameroon	0.33	Nigeria	0.27
Canada	0.43	Norway	0.27	Canada	0.37	Norway	0.47
Chile	0.18	Pakistan	0.15	Chile	0.17	Pakistan	0.10
Colombia	0.24	Peru	0.18	Colombia	0.43	Peru	0.23
Costa Rica	0.22	Philippines	0.33	Costa Rica	0.17	Philippines	0.19
Denmark	0.41	Portugal	0.38	Denmark	0.34	Portugal	0.27
Egypt	0.21	Singapore	0.47	Egypt	0.24	Singapore	0.33
El Salvador	0.22	South Africa	0.35	El Salvador	0.16	South Africa	0.37
Finland	0.42	Spain	0.41	Finland	0.30	Spain	0.34
France	0.49	Sri Lanka	0.14	France	0.36	Sri Lanka	0.16
Germany	0.53	Sudan	0.08	Germany	0.36	Sudan	0.13
Ghana	0.09	Sweden	0.46	Ghana	0.16	Sweden	0.32
Greece	0.33	Switzerland	0.43	Greece	0.28	Switzerland	0.28
Hong Kong	0.39	Thailand	0.46	Hong Kong	0.22	Thailand	0.30
Indonesia	0.37	UK	0.53	Indonesia	0.39	UK	0.43
Iran	0.12	USA	0.56	Iran	0.34	USA	0.39
Italy	0.47	Venezuela	0.17	Italy	0.33	Venezuela	0.36
Japan	0.55	Vietnam	0.22	Japan	0.34	Vietnam	0.37

Note: TCI computed using three digit level SITC data; Reported values are period averages.

Source: Authors' calculations

technology categories (low, medium and high) but not in resource based manufactures.¹¹ In contrast, India has a *RCA* in resource based and low-technology industries. China's main competitors, Hong Kong, Mexico and Thailand, have a *RCA* in broadly the same industries as China, whereas Japan, UK and USA specialize mainly in the medium- and high-technology products and have a high world market share in these categories (see Table A4 in the Appendix).

Countries specializing in medium- to high-technology products may explore opportunities of expanding bilateral trade with India and those in resource based industries stand to benefit by the increasing demand of such products in China. For example, the growing economic activity in China and India is good news for oil exporting countries.¹² In addition, as is evident from Table A2 in the Appendix, China's leading imports also comprise medium- and high-technology products. Thus, countries like Japan, Hong Kong, Singapore, and the US may gain by exporting their products to China.

An interesting observation is that trade competition and complementarity of China and India vis-à-vis each other as well as with the rest of the world exhibit a changing pattern. For example, according to *CS* and *CC*, competition between China and India has decreased gradually over the past ten years. The same has occurred between China and some OECD countries including Australia, Norway and Switzerland. On the contrary, competition has increased between China and Japan or Singapore. For other countries such as the United States and United Kingdom, competition from China increased till late 1990s but has decreased in recent years.

4.3 Competition in the third markets

So far in our analysis we assumed that every country competes with others in the global market, and not in any specific third market. In reality, however, demand and supply patterns vary across different markets or countries/regions. Thus, it is important to analyse competition and complementarity in important third markets. To conduct this analysis, we consider three large markets that constitute some 50 per cent of the global trade: the US, European Union (EU) and Japan, and examine trade competition and complementarity from China and India faced by other countries in these markets.

The estimated indices confirm that variations exist in the intensity of competition across the three markets.¹³ For example, the *CS* between China and India for exports to the US, EU, and Japan is 0.26, 0.30 and 0.20, respectively, suggesting that they are most competitive to each other in the European market. It is interesting to see that China's

¹¹ A potential limitation of the *RCA* Index is that it does not indicate whether the country in question has an advantage in the production or in the assembly operations of an item. Hence, some of the items grouped under the high-technology intensive category may be assembly plants involving final stages of the production process, which are in fact labour-intensive (Shafaeddin 2004).

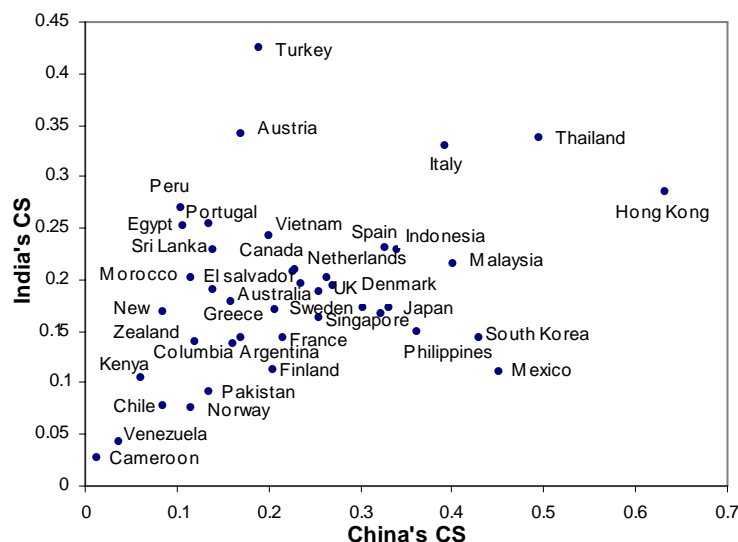
¹² For example, China accounted for almost 40 per cent of the entire growth in the world demand for oil during 2000-03, becoming the second biggest consumer of oil (just behind the US) (CERA 2004).

¹³ This holds for both data at three digit level as well as four digit level. For brevity reasons, we report the results for four digit data only. The three digit computations are available from the authors on request.

leading competitors in the three markets are Hong Kong, Malaysia, South Korea and Thailand (see Figures 8, 9 and 10). These countries appear to compete strongly in clothing, electronic, statistical and office machinery, and telecommunication and electronic equipment as they have a high share of these products in their total exports to Japan. In the US market, and to a lesser extent in the EU, Mexico faces tough competition from China. The product categories in which both countries compete include automotive parts, clothing, and telecommunication and electric equipment.

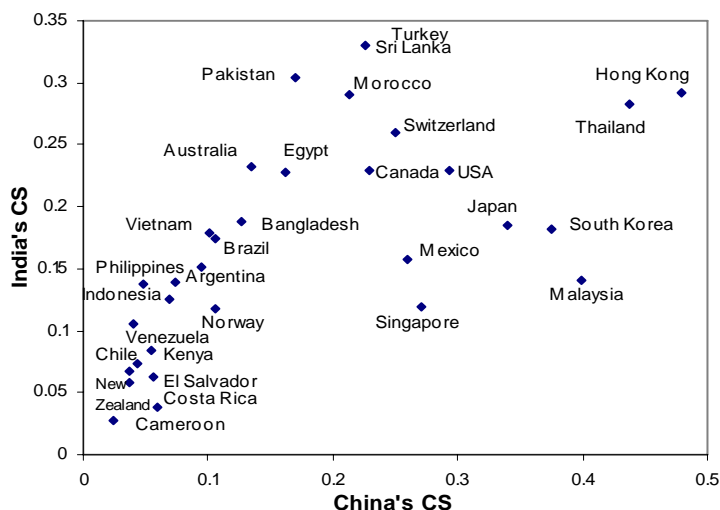
For India, the leading competitor is Turkey in the US and the EU, while Sri Lanka, Morocco and Pakistan are its other major competitors, especially in the EU and Japanese markets. India competes with these countries mainly in clothing, jewellery, and textile made up articles. Overall, Latin American countries, except Mexico, face stronger competition from India vis-à-vis China in the three markets. These countries compete in raw materials, leather, footwear and textile sectors.

Figure 8
China and India's export competition in the US, 1995-2005



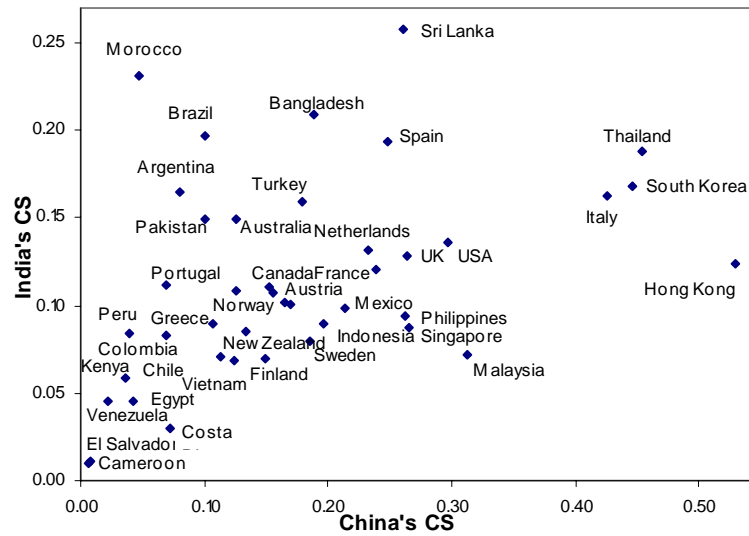
Note: Export indices computed at the three-digit level. Reported values are period averages.
Source: Authors' calculations.

Figure 9
China and India's export competition in the EU, 1995-2005



Note and sources: See Figure 8.

Figure 10
China and India's export competition in Japan, 1995-2005



Note and sources: See Figure 8.

5 Conclusion and policy implications

This paper focuses on the trade potential of China and India and assesses the impacts of their export growth on each other as well as on their major trade partners. The analysis reveals that the export structure of China is changing with the export shares of skill intensive and medium to high-technology products increasing and those of labour-intensive products decreasing. These corroborate well with China's decreasing comparative advantages in its traditional export sectors such as travel goods, footwear and apparel. Thus, the threat posed by China in labour-intensive products may reduce in the long run, thereby benefiting less-developed countries that are presently finding it hard to compete with China. These findings, however, must be interpreted with caution as they could attribute to the relocation of the labour-intensive production stages of high-technology products from industrial countries. Unavailability of highly disaggregated trade data prevents us from further exploring this issue.

More specifically, China poses a tough challenge to India in low-technology industries, and to the EU, US and East Asia in medium- to high-technology industries. China's competition with Latin American countries is moderate with the notable exception of Mexico, which has comparative advantage in product groups similar to China. China's growing share in the US market appears to erode Mexico's trade prospects. African countries are little affected by China's trade expansion.

India specializes in low-technology products and is a strong competitor for its neighbouring South Asian countries, who have a less diversified export base and enjoy comparative advantages in low-technology products. Some European countries and the US may also be affected by the increasing presence of India in global markets whereas the Latin American and African countries are least affected.

Despite the challenges posed by China and India to each other, we find moderate complementarity in their export-import structures. This indicates a potential for further trade expansion between the two countries. Moderate to high complementarity also

exists between the imports of China and the exports of the East Asian countries, especially Japan, Korea, Malaysia, Singapore and Thailand, the US, UK and Germany. These countries are expected to benefit from China's growth if the complementarity in the trade structures can be enhanced and if they are able to further diversify their export bases. It is important to point out that trade competition and complementarity of China and India vis-à-vis each other as well as with the rest of the world have been changing over time.

It is noted that the above conclusions are suggestive and do not represent any causation. Moreover, our findings should be interpreted with caution as they do not take into account the following important effects that the growing trade of China and India may have on the global economy. First, a rapid increase in the demand for energy and raw materials may push up prices, increasing price volatility, affecting different countries in different ways, and in the end dampening global growth. Second, an increasing demand for commodities, especially from China, may deepen the specialization in primary commodities of Latin American and African countries, increasing their exposure to real shocks and limiting prospects for growth. Third, if the growth dynamics in emerging and developing countries continue to rely on China's growth, then a cooling down of Chinese economy might bring about a global slowdown. Finally, our analysis does not take into account trade in services which is becoming an increasingly important part of global commerce with China and India emerging as key players. Clearly, future research can extend our analysis and examine the extent of these effects on the global economy.

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Appendix

Appendix Table A1
Leading import sectors in China and India, 1995-2005 (%)

SITC code	Product group	1995	2000	2001	2002	2003	2004	2005
China								
7293	Thermionic valves and tubes, transistors, etc.	1.82	6.71	4.86	4.39	4.87	6.15	7.35
3310	Petroleum, crude & partly refined	0.06	0.46	0.65	1.60	3.16	4.25	4.75
8613	Binoculars, microscopes & other optical instruments	4.49	4.56	4.63	3.84	3.82	3.66	3.74
7249	Telecommunications equipment nes	4.55	4.54	4.54	4.08	3.39	3.27	3.26
5812	Products of polymerization & copolymerization	0.95	0.84	1.04	0.95	1.19	2.30	2.83
2813	Iron ore & concentrates ex roasted iron pyrites	1.46	2.45	2.62	2.71	2.71	2.71	2.82
7222	Apparatus for electrical circuits	0.81	2.04	2.08	2.31	2.81	2.62	2.78
7143	Statistical machines cards or tapes	1.17	2.59	2.95	3.34	3.00	2.64	2.55
7149	Office machines, nes	4.74	2.33	2.44	2.48	2.28	2.46	1.78
7198	Machinery and mechanical appliances, nes	3.00	9.55	9.85	12.09	12.92	13.50	14.68
	Total	23.05	36.07	35.66	37.78	40.16	43.57	46.56
India								
3310	Petroleum, crude & partly refined	10.76	32.03	27.97	28.70	26.95	27.74	29.23
6672	Diamonds, not industrial, not set or strung	6.41	10.44	9.84	10.68	10.05	9.75	6.72
7249	Telecommunications equipment nes	0.90	1.35	1.76	3.53	4.29	4.22	4.40
7341	Aircraft, heavier than air	0.68	0.33	0.26	1.13	1.09	1.21	3.23
3214	Coal /anthracite, bituminous/	2.51	1.96	2.06	1.84	1.56	2.13	2.53
3411	Gas, natural	0.42	0.45	0.36	0.55	0.77	1.46	1.71
7143	Statistical machines cards or tapes	0.61	1.58	1.27	1.45	1.58	1.55	1.57
7171	Textile machinery	2.19	0.63	0.62	0.73	0.73	0.78	1.19
2820	Iron & steel scrap	1.24	0.66	0.91	0.62	0.77	1.10	1.19
7149	Office machines, nes	0.58	1.59	1.46	1.27	1.25	1.19	1.08
	Total	26.29	51.03	46.51	50.50	49.04	51.13	52.85

Source: UN COMTRADE database.

Appendix Table A2
Leamer's industrial clusters

Clusters	SITC	Clusters	SITC
Petroleum		Labour intensive	
Petroleum and derivatives	33	Nonmetal minerals	66
		Furniture	82
		Travel goods and handbags	83
		Art apparel	84
		Footwear	85
		Miscellaneous manufactured articles	89
		Postal packaging, not classified	91
		Special transactions, not classified	93
		Coins (non-gold)	96
Raw materials		Capital intensive	
Crude fertilizers/minerals	27	Leather	61
Metalliferous ores	28	Rubber	62
Coal and coke	32	Textile yarn and fabric	65
Gas (natural/manufactured)	34	Iron and steel	67
Electrical current	35	Manufactured metal n. e. s.	69
Nonferrous metal	68	Sanitary fixtures and fittings	81
Forest products		Machinery	
Lumber, wood, and cork	24	Power generating	71
Pulp and waste paper	25	Specialized	72
Cork and wood manufacturers	63	Metalworking	73
Paper	64	General industrial	74
		Office and data processing	75
		Telecommunications and sound	76
		Electrical	77
		Road vehicles	78
		Other transportation vehicles	79
		Professional and scientific instruments	87
		Photographic apparatus	88
		Firearms and ammunition	95
Tropical agriculture		Chemical	
Vegetables	05	Organic	51
Sugar	06	Inorganic	52
Coffee	07	Dyeing and tanning	53
Beverages	11	Medical and pharmaceutical products	54
Crude rubber	23	Essences and perfumes	55
		Fertilizers	56
		Explosives and pyrotechnics	57
		Artificial resins and plastics	58
		Chemical materials n. e. s.	59
Animal products		Cereals, etc.	
Live animals	00	Cereals	04
Meat	01	Feeds	08
Dairy products	02	Miscellaneous	09
Fish	03	Tobacco	12
Hides and skins	21	Oil seeds	22
Crude animals and vegetables	29	Textile fibres	26
Processed animal and vegetable oils	43	Animal oil and fat	41
Animal products n. e. s.	94	Fixed vegetable oils	42

Notes: n. e. s. = Not elsewhere specified.

Source: Leamer (1995).

Appendix Table A3
Trade competition and complementarity of China and India, 1990-2005

	CS	CC	CS	CC	TCI (China)	TCI (India)
Argentina	0.20	0.09	0.25	0.12	0.29	0.29
Australia	0.23	0.13	0.25	0.13	0.32	0.32
Austria	0.38	0.31	0.32	0.25	0.44	0.33
Bangladesh	0.30	0.44	0.32	0.50	0.27	0.23
Brazil	0.22	0.15	0.25	0.18	0.28	0.23
Cameroon	0.05	0.06	0.06	0.03	0.11	0.29
Canada	0.30	0.16	0.25	0.12	0.40	0.37
Chile	0.13	0.03	0.14	0.04	0.14	0.13
Hong Kong	0.67	0.84	0.37	0.33	0.49	0.26
Colombia	0.23	0.15	0.24	0.10	0.22	0.34
Costa Rica	0.28	0.28	0.24	0.13	0.21	0.15
Denmark	0.40	0.40	0.31	0.23	0.38	0.34
Egypt	0.21	0.15	0.28	0.15	0.16	0.19
El Salvador	0.25	0.17	0.27	0.18	0.18	0.11
Finland	0.29	0.33	0.22	0.06	0.39	0.29
France	0.14	0.11	0.11	0.06	0.22	0.16
Greece	0.34	0.45	0.33	0.31	0.29	0.23
Indonesia	0.14	0.12	0.13	0.06	0.16	0.34
Italy	0.47	0.55	0.40	0.33	0.43	0.32
Japan	0.37	0.31	0.26	0.11	0.55	0.35
Kenya	0.26	0.21	0.24	0.11	0.26	0.17
Korea	0.45	0.45	0.30	0.12	0.54	0.30
Malaysia	0.40	0.44	0.22	0.07	0.47	0.31
Mexico	0.47	0.47	0.27	0.15	0.41	0.36
Morocco	0.29	0.49	0.27	0.37	0.16	0.12
Netherlands	0.42	0.53	0.32	0.16	0.46	0.35
New Zealand	0.05	0.05	0.05	0.01	0.10	0.22
Norway	0.18	0.09	0.15	0.03	0.24	0.43
Pakistan	0.27	0.40	0.33	0.42	0.12	0.07
Peru	0.20	0.15	0.20	0.12	0.16	0.13
Philippines	0.37	0.35	0.22	0.09	0.31	0.16
Portugal	0.18	0.09	0.18	0.08	0.28	0.43
Singapore	0.37	0.35	0.26	0.15	0.44	0.31
Spain	0.35	0.20	0.28	0.13	0.34	0.26
Sri Lanka	0.23	0.38	0.26	0.41	0.11	0.13
Sweden	0.33	0.31	0.27	0.15	0.42	0.33
Switzerland	0.30	0.20	0.28	0.24	0.39	0.30
Thailand	0.52	0.62	0.39	0.29	0.44	0.27
Turkey	0.43	0.59	0.43	0.42	0.26	0.20
United Kingdom	0.42	0.42	0.32	0.28	0.51	0.42
USA	0.41	0.41	0.31	0.19	0.55	0.39
Venezuela	0.10	0.06	0.10	0.01	0.16	0.32
Viet Nam	0.24	0.18	0.24	0.24	0.23	0.31

Note: CS, CC and TCI constructed using four-digit SITC data; Reported values are period averages.

Source: Authors' calculations.

Appendix Table A4
RCA index and world market share in different sectors, 2004

	Hong Kong	Japan	Mexico	Thailand	UK	USA
RCA index						
Basic manufactures	0.50	0.99	0.69	0.60	0.81	0.63
Chemicals	0.43	0.87	0.34	0.65	1.41	1.18
Clothing	3.01	0.00	1.29	1.56	0.43	0.23
Electronics	1.94	1.64	1.53	1.55	0.63	1.33
Fresh food	0.23	0.00	0.8	2.33	0.40	1.52
IT/Consumer elect.	2.33	1.2	1.75	2.11	1.01	0.92
Leather products	4.12	0.00	0	1.40	0.34	0.00
Minerals	0.17	0.00	1.06	0.36	1.08	0.35
Misc. manufactures	2.01	1.01	1.07	1.01	1.23	1.31
Non-elect. machinery	0.46	1.71	0.84	0.62	1.39	1.38
Processed food	0.19	0.00	0.56	1.71	1.14	0.75
Textiles	2.28	0.55	0.49	0.79	0.56	0.61
Transport equipment	0.08	2.03	1.34	0.37	1.07	1.22
Wood products	0.39	0.19	0.26	0.66	0.48	0.93
World market share (%)						
Basic manufacture	1.60		1.60	0.70	3.50	6.60
Chemicals	1.40	5.60	0.80	0.70	6.10	11.70
Clothing	9.60		3.00	1.80	1.80	2.30
Electronic items	6.20	10.50	3.60	1.80	2.70	13.10
Fresh food	0.70		1.90	2.70	1.70	15.00
IT/consumer elect.	7.40	7.70	4.10	2.40	4.40	9.10
Leather products	13.80	6.30		1.70	1.50	
Minerals	0.50		2.50	0.40	4.70	3.50
Misc. manufactures	6.40	6.50	2.50	1.20	5.30	12.90
Non-elect. machinery	1.50	11.00	2.00	0.70	6.00	13.60
Processed food	0.60		1.30	2.00	4.90	7.50
Textiles	7.30	3.60	1.20	0.90	2.40	6.00
Transport equipment	0.30	13.00	3.20	0.40	4.60	21.00
Wood products	1.20	1.20	0.60	0.80	2.10	9.20

Source: UN COMTRADE database.