

India and China: Changing Patterns of Comparative Advantage?

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1. Introduction

During the 1950s, India and China, like many other developing countries, chose the import substitution strategy for industrial development. The strategy involved insulation from the world economy and industrialization under the aegis of state enterprises. Subsequently, there has been a paradigm shift – from import substitution to outward orientation – in many of the developing countries, including India and China. China started the trade liberalization process in a major way in 1978. India's liberalization initiatives during the 1980s focussed primarily on internal deregulation rather than on trade liberalisation. The most pronounced overhaul of India's trade policy regime occurred during the early 1990s in response to a severe balance of payment crisis.

The rationale behind trade liberalization suggests that greater competition would induce the production units to improve productivity, which is instrumental for accelerating the overall economic growth. Since firms respond to the world market signals, the commodity structure of the country's trade would undergo changes in accordance with the changing patterns of specialization. The conventional wisdom, based on the Heckscher-Ohlin-Samualson (H-O-S) model, is that trade liberalization would induce reallocation of productive resources from the import competing industries to those industries where the country has comparative advantages. Therefore, while both exports and imports are expected to grow faster, trade liberalization invariably involves some adjustment costs as some of the domestic industries may go out of business.

Does the evidence from India and China support the conventional wisdom? It is well known that the export performance of China since the 1980s has been spectacular and that India's performance, in comparison, leaves much to be desired. Between 1980 and 2004, China's share in the world exports steadily increased from less than 1% to more than 6%, while India's share increased from 0.4% to only 0.8%. Export expansion under trade liberalization is an offshoot of resource reallocation on the basis of comparative advantage. In other words, rapid export expansion need not materialize if certain rigidities and bottlenecks stand in the way of resource reallocation, whatever may be the extent of trade liberalization. A question that arises in this context is: Has the process of resource reallocation been smoother in China compared to India, which enabled the former to specialize according to comparative advantage and to achieve export success? The nature and extent of resource reallocation would be reflected in the changing structure of a country's trade flows.

Patterns of specialization can change not only due to the one-time static allocation effects but also due to the long term dynamic effects of trade liberalization (Baldwin, 1992). Accumulation of productive factors, such as human and physical capital, that characterizes economic development, can bring about a dynamic process of changing comparative advantage. For

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example, the road to export success of the Newly Industrialized Countries (NICs) of Asia started with labor-intensive and low technology manufactures. However, as investments in the physical and human capital rose and as labor costs increased with the accumulation of skills, relatively more sophisticated manufacturing activity expanded in these countries at the expense of labor-intensive manufactures.

The present paper attempts a comparative analysis of the changing patterns of exports and specialization in India and China since 1980. Drawing upon the Chinese experience, the study throws some light on what needs to be done for accelerating India's exports. The analysis shows that the fear of "Chinese invasion" of India's export markets is only a popular myth. On a more general level, the analysis provides some insights into the patterns of resource reallocation under trade liberalization and its implications for the cost of adjustments. The analysis excludes the service sector exports and uses data on merchandise exports at the 3-digit level of SITC during the period 1980-2003. The data are taken from the various issues of the *Handbook of Statistics* brought out by UNCTAD.

The rest of the paper is structured as follows. A brief overview of trade policy changes in India and China is provided in Section II. The impact of the policy changes on aggregate exports in both the countries is briefly discussed in Section III. The changing patterns of exports and comparative advantages in the two countries are analyzed in Section IV. Some concluding remarks and implications of the findings for policy are provided in Section V.

2. Trade Policy Reforms

Prior to the reforms, both India and China followed a relatively autarkic trade policy accompanied by a battery of trade and exchange controls, cutting the link between domestic and world relative prices (Lal, 1995). China had a non-market command economy while India always had a large private sector and functioning markets (though subjected to state controls). Exchange rate was overvalued in both the countries, creating a bias against exports. In China, foreign trade activities were monopolized by a handful of centrally controlled Foreign Trade Corporations. In India, since foreign trade was largely in the hands of the private sector, an elaborate system of exchange controls and allocation was instituted to ensure that the foreign exchange earned by exporters was used to import only those commodities that conformed to the priorities set in the five year plans (Srinivasan, 1990).

2.1. Reforms in China

A major element of China's trade reform was the decentralization of foreign trade rights by allowing a hundreds of thousands of trading firms to participate in trade activities. Reforms involved also the creation of special economic zones and active promotion of foreign direct investments (FDI) in joint ventures². Imports of intermediate inputs for use in the production of exports and capital goods for use in joint ventures were completely liberalized. Price reforms have been undertaken, to a certain extent, to reduce the distortions in the allocation of resources. Labor market of the pre-reform China was characterized by direct allocation of jobs and

² See Lardy (1992, 2002) for a comprehensive description of China's reform process.

administrative control of wages. But, China has gradually liberalized the labor market, particularly in the non-state sector, providing greater flexibility in the labor market³.

Price based trade policy instruments (such as tariffs) were unimportant during the pre-reform period in China since the planning system was based on quantity decision rather than behavioral responses to prices. As part of the reforms, however, quantitative restrictions (QRs) were replaced by high tariffs and subsequently the rates of tariffs were progressively brought down. Table 1 shows that the average (unweighted) import tariff rate was about 50% in 1982 (higher than the developing country average of about 33%), which was brought down to about 12% by 2002 (lower than the developing country average of about 14%), the major cut being done after the mid 1990s. Processing trade and foreign investments enjoyed major tariff exemptions. Lardy (2002: pp.9) summarizes that “by the late 1990s quotas and licensing requirements limited imports for only 4 percent of all tariff lines, and trading rights were widely available for all but a handful of commodities that accounted for only 11 percent of China’s total imports”. Furthermore, after fourteen years of arduous negotiations, China became a member of the WTO in 2001.

Table 1:
Average Import Tariff Rate (unweighted)

Year	India	China	Developing country average
1981	74.3	N.A	28.7
1982	N.A	49.5	32.6
1986	100	38.1	28.4
1990	81.8	40.3	25.9
1994	47.8	36.3	20.2
1998	30	17.5	16.2
2002	33	12.3	13.6

Source: *Handbook of Statistics*, UNCTAD

2.2. Reforms in India

The balance of payment crisis in 1966 led to some liberalisation attempts in India including the devaluation of rupee, elimination of export subsidies and reduction of import duties. This liberalisation episode, however, was short lived and by 1968 there was a relapse into a tighter regime. As the balance of payment situation became comfortable in the late 1970s, the government initiated some doses of import liberalisation. Since the mid 1980s a number of liberalisation measures were adopted, which included some deregulation of industrial controls, softening of restrictions on monopolies, liberalisation of capital goods imports with a view of technological up gradation and modernisation of industry, some shifts from QRs to tariffs, greater subsidies for exports and a policy of active exchange rate depreciation. For the first time, a long-term (three-year) import-export policy (1985-88) was adopted, in order to impart certain measure of stability to the policy framework.

³ See Meng (2000) and Brooks and Tao (2003) for a discussion on China’s labor market reforms.

It is important to note that the policy reforms during the 1980s have focussed much more on domestic industrial liberalisation rather than on foreign trade liberalisation. Very little was done to open up Indian industry to foreign competition. As Joshi and Little (1994: pp. 71) pointed out, “the import liberalisation related mainly to inputs and components and thus increased the effective protection of final products”. Average protection levels remained both high and widely differentiated and imports of consumer goods were banned (except those goods, which were considered to be essential). India's trade regime was considered as one of the most restrictive in the world, due to its very complex nature and the wide number of tools used as policy instruments.

The reforms became far more comprehensive and systemic after a severe balance of payment crisis in 1991. Significant progresses have been made in dismantling the system of industrial licensing, price controls and trade and exchange controls. Trade reforms have been largely guided by the commitments made by the government to the World Trade Organisation (WTO). The QRs on the import of capital goods and intermediates were completely removed in 1992. Whereas, the imports of manufactured consumer goods were banned for a long period of time, with the exception of a few items that could be imported under Special Import Licenses (SIL). Some progress towards the liberalisation of consumer goods imports occurred in 1995 when certain items were allowed to import under Open General License (OGL) while the limit of items that could be imported under SIL scheme was broadened. Eventually, the major initiative towards the removal of QRs on the imports of consumer goods started in the late 1990s.

Removal of QRs was accompanied by a gradual lowering of customs duties in the manufacturing industries. The average import tariff rate (unweighted) in India was as high as 100% in 1986, which was brought down to 33% by 2002 (Table 1). It is important to note that despite the significant progress in reducing the import tariffs, India's average tariff rate, at least till 2002, remained as one of the highest in the world. In the recent Union Budgets, however, the government has announced further reduction of tariffs and has set the goal of aligning India's tariff structure to those of ASEAN countries.

Apart from trade liberalisation, the system of industrial licensing has been completely abolished (except for a small list of industries on strategic and environmental considerations) and the controls over investment and expansion by large industrial houses have been eliminated. Further, FDI has been encouraged in all manufacturing industries (except in industries of strategic and environmental concerns) and the approval process has been made simple and transparent. The list of industries reserved for the public sector has been reduced considerably, while the policy of reserving some items for the small-scale sector continues. The requirement for government clearance of industrial location has been discontinued with some exceptions. The policy encouraged disinvestment of government holdings in the equity share capital of Public Sector Enterprises (PSEs).

It is important to note that though the policy changes have gone a long way towards easing the entry barriers, the multiple barriers to exit for non-viable sick production units still remain in India due to the rigid labour and bankruptcy laws. Exit barriers create difficulties in the inter-industry movement of resources.

3. Growth of Exports

The broad trends in the values of India's exports and imports for the period 1950-2004 can be seen from Figure 1. It is clear that both exports and imports were almost stagnant in India during the first two decades or so. During this period, India failed to take advantage of opportunities offered by the growing world trade. This is evident from the fact that when the world exports grew at the rate of 7.5% per annum during 1950-70, exports from India grew at a much lower rate of 2.5% (Table 2). During the 1970s, India's exports grew at the rate of 17% per annum, which was quite impressive compared to her performance in the past. However, it must be noted that world exports during this period grew even faster at the rate of 20% per annum. It is striking that India's exports has been growing faster than the world exports since the 1980s. The patterns of China's export growth vis-à-vis world export growth is more or less similar, but it must be noted that the rate of growth of China's exports has always been higher than that of India's and that the gap started widening since the 1980s. Import growth generally kept pace with export growth in both the countries, though China often runs a small amount of trade surplus.

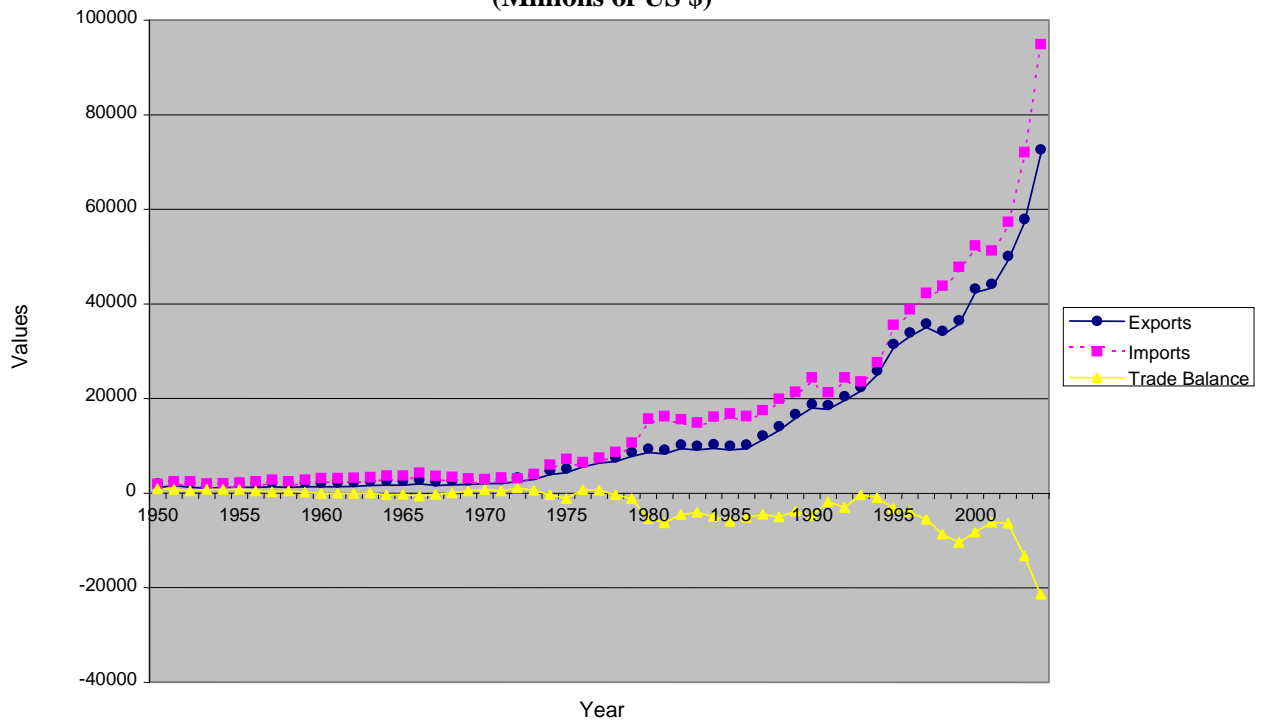
India's share of the world exports steadily declined from 1.9% in 1950 to as low as 0.4% by 1980 (Figure 2). The situation in China is not different either: between 1950 and 1959, China's share in world exports registered an increase from about 0.9% to 2.7%, but then steadily declined reaching as low as 0.7% by 1977. China's share of world exports, however, has been increasing dramatically since the late 1970s and crossed 6% by 2004 while India's share increased marginally from 0.4% in 1980 to 0.5% in 1990 and to 0.8% by 2004. The share of exports in China's GDP was 35% in 2004 while it was 11% for India.

Table 2:
Average Annual Growth Rates of Exports (Millions of US dollars)

Period	India	China	World
1950-70	2.49	6.29	7.48
1970-80	17.25	20.04	20.42
1980-90	7.29	12.78	5.99
1992-04	9.74	15.38	6.33

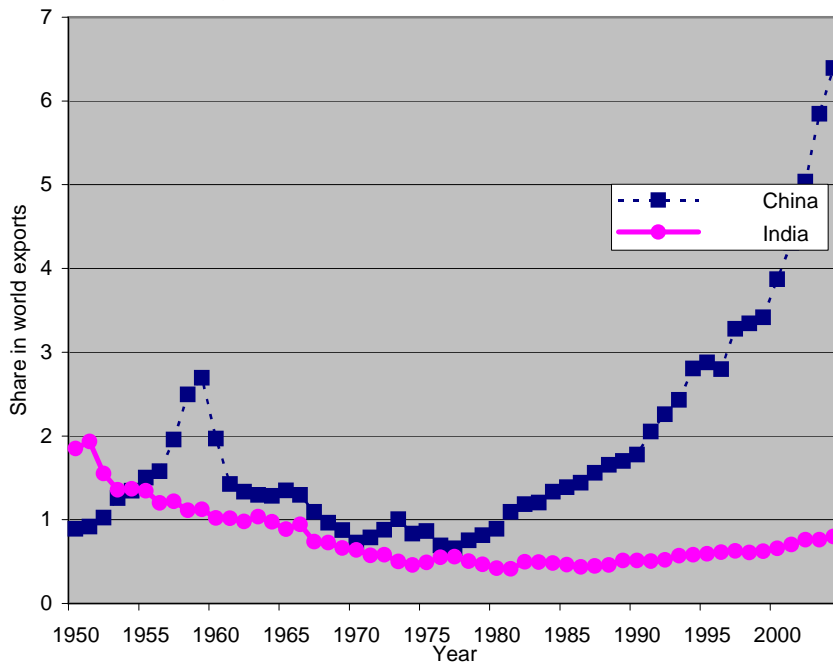
Source: Author's estimation using data from *Handbook of Statistics*, UNCTAD

Figure 1: Trends in India's Exports, Imports, and Trade Balance (Millions of US \$)



Source: Plotted using data from the *Handbook of Statistics*, UNCTAD

Figure 2: Comparative Export Performance, 1950-2004



Source: Same as for Figure 1

Several factors might have contributed to the export success of China such as a favorable exchange rate, low wages, availability of labor, large domestic market, huge volume FDI inflows etc. But, India does not lag much behind China with respect to these factors, except for FDI inflows⁴. A significant volume of China's FDI inflows represent "round tripping" of capital. Wei (2005) reported that even after adjusting for this and other definitional problems, the gap in the volume of FDI into China and India remained very high. According to the World Investment Report 2003 (UNCTAD, 2003), FDI has contributed to the rapid growth of China's merchandise exports at an annual rate of 15% between 1989 and 2001. In 1989, foreign affiliates accounted for less than 9% of total Chinese exports, but by 2002 they provided 50%⁵. China seems to be a fitting example to illuminate Feenstra's (1998: pp.31) description that "the rising integration of world markets has brought with it a disintegration of the production process, in which manufacturing or service activities done abroad are combined with those performed at home". This phenomenon of breaking the production chain into many small links, each of the links being located where comparative advantage is the greatest, has been described also as "kaleidoscope comparative advantage" or "slicing the value chain".

In contrast, FDI has been much less important in driving India's export growth except in information technology. FDI accounted for only 3% of India's exports in early 1990s and even today, it is estimated to account for only less than 10% of India's manufacturing exports⁶. Most of the FDI flows to India have been domestic market seeking in nature, and goes to services, electronic and computer industries. In sum, while the multinationals mostly engage in the export activities in China, they target the domestic markets in India (Wei, 2005). Why does it happen so?

The theory of multinational investment explains the circumstances under which FDI can be market seeking in nature (also known as "horizontal FDI") as opposed to export promoting (also known as "vertical FDI")⁷. Horizontal FDI refers to the situation where the multinational performs essentially the same range of production activities in both its plants located in their home and the host country. Theory suggest that, in the presence of positive trade costs (tariffs plus transport costs), multinational enterprises tend to undertake FDI of the "horizontal type" when their home and the host country are very similar with respect to incomes and factor prices⁸. A firm has incentive to undertake horizontal FDI in the foreign country, if the saving on trade costs exceeds the fixed costs involved in setting up the new plant. Vertical FDI represents the international fragmentation of production process by multinationals, locating each stage of production in the country where it can be done at the least cost. The bulk of the FDI flows to the

⁴ Apart from the domestic economic policies, geopolitical elements may also be crucial in understanding China's export success: while the Multi Fibre Agreement stunted India's textile exports, liberal quotas were offered to China (after the Soviet occupation of Afghanistan in 1979) and other US allies in East Asia.

⁵ As a large part of reported FDI inflows to China consists of the return flow of capital placed abroad by the State Owned Enterprises, the contribution of foreign-owned firms to China's exports could be overestimated. The extent of overestimation may not be much, if such "reverse investments" are more domestic market oriented compared to the true FDI.

⁶ The contribution of FDI in India's exports had been insignificant before the 1990s as well .See Chandra (1994) for a discussion.

⁷ See, for example, Markusen (1995).

⁸ Developed countries not only account for the overwhelming proportion of outward FDI, but they are also the major recipients of FDI. There is a great deal of two-way FDI flows between pairs of developed countries, even at the industry level. Much of the FDI flows among the developed countries are horizontal in nature (Markusen, 1995).

East Asian developing countries are vertical in nature. According to the theory, multinational enterprises tend to conduct FDI of the “vertical type” when there is a huge gap in factor prices between their home and the host country, and when the trade costs among them are not large. Vertical FDI were initially concentrated in South Korea, Taiwan, Hong Kong, and Singapore. After the mid 1980s, as wage levels in these countries (in relation to labor productivity) began to rise, FDI shifted to China and other Asian countries.

India, however, has been sailing against the wind. Much of the FDI flows into India have been horizontal in nature rather than vertical, which is evident from the fact that the affiliates of multinationals contribute very little to India’s exports. It is not difficult to see the reasons why India obtains more of horizontal rather than vertical FDI while the opposite is true for China. For one thing, there has been a powerful incentive for multinationals to undertake tariff jumping horizontal investment in India as the tariff levels has been quite high in India compared to other countries, despite its reduction since the early 1990s. At the same time, high trade costs due to tariffs make India an unattractive destination for vertical investments. Trade costs are relatively high in India not only due to the high tariffs but also due to the inadequate physical infrastructure in the country compared to China. Further, the well-known rigidities in the organized labor market hobble India’s labor-intensive manufacturing activities and discourage vertical FDI into the country⁹.

4. Structure of Exports and Changing Comparative Advantages

4.1 Composition of Exports

Table 3 shows the composition of exports by commodity groups for both India and China since the 1980s. It is evident that the share of manufactured goods has been steadily increasing, at the cost of other commodity groups, in both the countries. Manufactured goods accounted for about 90% of China’s and 75% of India’s exports during 2000-03. In the case of China, much of this can be attributed to machinery and transport equipments, the share of which in total exports increased from 7% to 38% between 1980-84 and 2000-03. Manufactured products constitute the major part not only of the export baskets but also of the import baskets in both the countries. Overall, the structure of imports appears to be relatively persistent compared to the structure of exports.

Shifts in the commodity composition of exports according to factor intensity are shown in Table 4¹⁰. Overall, a noticeable shift can be seen in both the countries away from agricultural and mineral resource-intensive goods towards other goods. Between 1980-84 and 2000-03, the combined share of agricultural and mineral resource-intensive goods declined from 58% to 35%

⁹ These aspects may explain why China holds a major advantage over India in the manufacturing businesses that rely on basic infrastructure such as roads, ports, and power. But, India tends to have an edge over China when it comes to the businesses whose dependence on physical infrastructure is relatively less such as the knowledge based service sector where intangible assets matters more. Further, the service sector generally falls outside the purview labor market regulations.

¹⁰ We follow Horne (1996) who adopts a scheme devised by Krause to categorize the 3-digit SITC items according to factor intensity. Products at the 3-digit level are divided into five groups according to their intensities in five factors: agricultural resources, mineral resources, unskilled labor, technology and human capital. There are 239 items at the 3-digit level of SITC. These were classified according to their factor intensity, except 5 items, which could not be grouped in any of the categories.

in India and from 35% to 12% in China. In both the countries, the share of unskilled labor-intensive goods showed a steady increase till the mid 1990s and then showed some decline particularly during 2000-03. Human capital and technology-intensive goods have increased their shares since the 1990s in both the countries. Between 1985-89 and 2000-03, the combined share of human capital and technology-intensive goods in India increased from 20% to 36%. These goods together constituted the largest share of China's exports (52%) by 2000-03.

Table 3:
Structure of Exports by Commodity Groups (% of the total averages)

Commodity Group	India				
	1980-84	1985-89	1990-94	1995-99	2000-03
All food items	26.4 (9.0)	20.5 (7.1)	16.4 (3.8)	17.3 (5.8)	12.4 (5.2)
Agricultural raw materials	3.7 (2.9)	2.6 (3.9)	2.2 (3.7)	1.8 (3.3)	1.2 (3.2)
Fuels	9.5 (30.8)	3.6 (19.5)	2.5 (27.6)	1.0 (25.1)	5.1 (31.7)
Ores and metals	5.9 (6.0)	6.4 (7.5)	4.8 (6.7)	3.1 (6.0)	3.7 (4.5)
Manufactured goods	54.2 (51.1)	65.6 (58.1)	72.8 (50.7)	74.9 (48.9)	75.5 (46.5)
<i>Chemicals</i>	4.0 (9.8)	4.6 (10.0)	6.71 (11.1)	7.64 (10.4)	8.63 (7.4)
<i>Metal Products</i>	2.4 (1.4)	1.6 (0.8)	2.1 (0.7)	2.1 (0.8)	2.7 (0.8)
<i>Iron and Steel</i>	0.8 (7.1)	0.9 (6.7)	2.5 (3.8)	3.1 (3.0)	3.9 (1.6)
<i>Machinery & Transport Equipments</i>	7.0 (19.5)	6.9 (22.2)	7.2 (16.8)	7.5 (17.5)	8.7 (17.7)
<i>Textile & Textile products</i>	20.2 (1.1)	22.9 (0.9)	26.0 (0.9)	26.3 (1.0)	23.1 (1.4)
<i>Other Manufactures</i>	19.9 (12.2)	28.7 (17.4)	28.4 (17.5)	28.2 (16.3)	28.5 (17.6)
Others	0.27 (0.3)	1.24 (3.9)	1.72 (7.6)	2.0 (11.0)	2.14 (9.0)
	China				
All food items	18.2 (8.0)	14.8 (6.8)	11.4 (5.4)	7.2 (5.4)	5.0 (3.7)
Agricultural raw materials	6.2 (9.1)	5.8 (6.4)	2.6 (4.7)	1.5 (4.7)	0.9 (4.1)
Fuels	6.9 (0.9)	13.5 (1.4)	5.7 (3.9)	3.3 (5.3)	2.9 (7.6)
Ores and metals	3.8 (5.0)	2.9 (3.1)	1.8 (3.6)	2.0 (4.8)	1.7 (5.7)
Manufactured goods	64.3 (76.2)	60.2 (81.6)	77.7 (81.8)	85.8 (79.2)	89.3 (78.4)
<i>Chemicals</i>	9.7 (11.1)	5.0 (6.9)	4.6 (7.1)	4.7 (6.2)	3.8 (6.1)
<i>Metal Products</i>	4.8 (2.3)	2.0 (1.3)	2.6 (1.1)	3.2 (1.3)	3.4 (1.0)
<i>Iron and Steel</i>	2.3 (9.0)	1.1 (11.9)	1.8 (6.8)	2.5 (4.7)	1.4 (4.6)
<i>Machinery & Transport Equipments</i>	6.9 (30.1)	9.1 (39.3)	17.4 (41.5)	25.2 (39.9)	37.6 (44.6)
<i>Textile & Textile products</i>	20.7 (6.2)	27.8 (7.9)	27.2 (9.6)	22.5 (8.9)	18.1 (5.2)
<i>Other Manufactures</i>	19.9 (17.5)	15.2 (14.2)	24.1 (15.7)	27.8 (18.3)	25.0 (16.9)
Others	0.7 (0.8)	2.9 (0.7)	0.8 (0.6)	0.2 (0.7)	0.2 (0.6)

Note: Values in parentheses are import shares

Source: Same as for Table 2

The share of technology-intensive goods in total exports need not necessarily reveal comparative technological capability (Chandra, 1999). For a significant part of these exports, especially for China, may represent re-exports after making some domestic value addition and it may also be an outcome of the relocation of production into China by the firms from industrial countries. At the same time, it is also true that a number of domestic firms have emerged in China in

technology-intensive sectors like consumer electronics, home appliances, computers and telecom with significant presence in the global markets. By contrast, most technology-intensive exports from India come from domestic firms¹¹.

Table 4:
Composition of Exports according to Factor Intensity (% of the total, averages)

Classification of commodities	1980-84	1985-89	1990-94	1995-99	2000-03
	India				
Agricultural resource-intensive	35.26	28.80	21.68	21.07	15.75
Mineral resource-intensive	23.09	23.98	21.35	19.26	19.13
Unskilled labor-intensive	22.00	25.64	31.06	30.98	27.25
Human capital-intensive	10.53	8.22	12.08	13.23	15.47
Technology-intensive	8.86	12.13	12.12	13.46	20.72
	China				
Agricultural resource-intensive	25.80	21.05	14.99	9.86	7.14
Mineral resource-intensive	9.64	14.50	7.84	6.14	4.62
Unskilled labor-intensive	31.95	38.46	44.36	42.62	35.87
Human capital-intensive	13.33	10.02	14.81	16.85	20.02
Technology-intensive	18.59	13.08	17.18	24.38	32.13

Source: Same as for Table 2

4.2. Changing Patterns of Comparative Advantage and Competitiveness

The commodity pattern of comparative advantage is a central concept in international trade theory. However, the empirical measurement of comparative advantage is difficult because the concept is defined in terms of relative autarkic prices, which are not observable in post-trade equilibria. Thus, if the concept of comparative advantage is to be used empirically, it must be measured indirectly using post-trade events. The index of 'revealed comparative advantage' (RCA) formulated by Balassa (1965) has been widely used to assess the patterns of comparative advantage. The RCA index can be defined as:

$$RCA_{ij} = \frac{X_{ij} / \sum_i X_{ij}}{\sum_j X_{ij} / \sum_i \sum_j X_{ij}}$$

The numerator represents the percentage share of a given sector (or product) in national exports – X_{ij} is exports of sector (or product) i from country j . The denominator represents the percentage share of a given sector (or product) in total world exports. The RCA index, thus, contains a comparison of national export structure (the numerator) with the world export structure (the denominator). When RCA equals 1 for a given sector (or product) in a given country, the percentage share of that sector (or product) is identical with the world average. Where RCA is above 1 the country is said to have a comparative advantage (and specialized) in that sector (or product) and vice versa where RCA is below 1.

¹¹ Therefore, a more detailed data is required to understand the comparative domestic technological capabilities of the two countries. An analysis of this issue is beyond the scope of the present paper.

The H-O-S model explains the patterns of comparative advantage in terms of relative factor endowments and factor intensities. Therefore, it is appropriate to compute the RCA index after classifying the products (SITC 3-digit items), according to their factor intensity. The RCA values at the aggregate level (values in parentheses, Table 5) mask important heterogeneities at the product level. Therefore, we look at the number of products within each group where the value of the RCA is greater than 1 and this is shown as percentage shares in Table 5. It is clear that every group contains certain number of products where the RCA value is greater than 1, which is true for both India and China¹². Nevertheless, the comparative advantage of both India and China lies primarily in unskilled labor-intensive goods, which is truly in accordance with their relative factor endowments. As expected, the comparative advantage of both the countries is the least in technology-intensive goods. However, a gradual gain of comparative advantage in human capital and technology-intensive goods can be seen for both the countries. Compared to India, China holds a comparative advantage in a larger number of unskilled labor and technology-intensive products. In the case of other groups, the pattern has become more or less similar for India and China by 2000-03.

The dynamic process of climbing up the ladder of comparative advantage – from unskilled labor-intensive to human capital and technology-intensive goods - seems to be occurring at a slower pace in both the countries compared to the NICs. This, however, is not surprising for countries of as huge size as that of India and China: a much longer period of sustained high economic growth would be necessary for significantly altering the factor endowment conditions of large countries that have plenty of surplus labor. The evolving patterns of comparative advantage in India and China are consistent with the static as well as the dynamic versions of the H-O-S hypothesis.

Table 5:
Patterns of Comparative Advantage according to Factor Intensity

Factor intensity classification	Total No. of Products	Shares of the total No. with RCA greater than 1				
		India				
		1980-84	1985-89	1990-94	1995-99	2000-03
Agricultural resource-intensive	70	28.6 (2.0)	24.3 (1.9)	25.7 (1.6)	34.3 (1.8)	35.7 (1.6)
Mineral resource-intensive	29	13.8 (1.3)	24.1 (1.9)	27.6 (1.9)	24.1 (1.9)	27.6 (1.7)
Unskilled labor-intensive	29	37.9 (2.1)	41.4 (2.2)	55.2 (2.4)	58.6 (2.5)	58.6 (2.3)
Human capital-intensive	42	28.6 (0.5)	26.2 (0.4)	33.3 (0.5)	33.3 (0.6)	42.9 (0.7)
Technology-intensive	64	7.8 (0.3)	7.8 (0.4)	7.8 (0.3)	10.9 (0.4)	18.8 (0.5)
		China				
		1980-84	1985-89	1990-94	1995-99	2000-03
Agricultural resource-intensive	70	57.1	42.9	45.7	35.7	31.4

¹² We are not giving a detailed list naming the particular products where RCA is greater than 1. Interested readers are referred to Batra and Khan (2005) who provide a list of the particular items where the RCA values are greater than 1 for both India and China. While they use a more disaggregated data, the period of the analysis is limited to 2000-03.

Mineral resource-intensive	29	(1.5) 34.5 (0.6)	(1.4) 34.5 (1.0)	(1.1) 37.9 (0.7)	(0.8) 34.5 (0.6)	(0.7) 34.5 (0.4)
Unskilled labor-intensive	29	82.8 (3.1)	72.4 (3.2)	82.8 (3.5)	86.2 (3.4)	86.2 (3.0)
Human capital-intensive	42	45.2 (0.6)	23.8 (0.5)	38.1 (0.6)	40.5 (0.7)	40.5 (0.9)
Technology-intensive	64	25.0 (0.6)	12.5 (0.4)	20.3 (0.50)	25.0 (0.6)	31.3 (0.8)

Note: Values in parentheses are the RCA index computed by aggregating the export values at the 3-digit level for each group. Averages of the exports values for the given periods are used.

Source: Same as for Table 2.

Table 6: Patterns of Comparative Advantage According to Commodity Groups

Commodity Group	Total No. of Products	Shares of the total No. with RCA greater than 1									
		India					China				
		1980-84	1985-89	1990-94	1995-99	2000-03	1980-84	1985-89	1990-94	1995-99	2000-03
All food items	44	29.5 (2.2)	25.0 (1.9)	27.3 (1.7)	38.6 (2.0)	40.9 (1.8)	63.6 (1.5)	43.2 (1.4)	47.7 (1.2)	34.1 (0.8)	29.5 (0.7)
Agricultural raw materials	20	25.0 (0.9)	20.0 (0.7)	20.0 (0.8)	25.0 (0.8)	25.0 (0.7)	40.0 (1.5)	45.0 (1.5)	40.0 (0.9)	35.0 (0.7)	25.0 (0.5)
Fuels	7	0.0 (0.6)	14.3 (0.4)	0.0 (0.3)	0.0 (0.1)	28.6 (0.5)	14.3 (0.5)	57.1 (1.2)	42.9 (0.6)	57.1 (0.4)	42.9 (0.3)
Ores and metals	20	15.0 (1.2)	25.0 (1.6)	25.0 (1.4)	20.0 (1.0)	25.0 (1.4)	30.0 (0.8)	30.0 (0.8)	35.0 (0.6)	30.0 (0.7)	30.0 (0.6)
Manufactured goods of which,	142	21.8 (0.9)	21.8 (1.0)	28.2 (1.0)	30.3 (1.0)	35.2 (1.0)	46.5 (1.1)	28.9 (0.9)	40.1 (1.1)	43.0 (1.1)	47.2 (1.2)
<i>Chemicals</i>	18	27.8 (0.7)	27.8 (0.8)	44.4 (1.2)	44.4 (1.3)	55.6 (1.3)	83.3 (1.6)	33.3 (0.8)	33.3 (0.8)	27.8 (0.8)	22.2 (0.6)
<i>Metal Products</i>	8	37.5 (1.1)	25.0 (0.8)	37.5 (1.0)	50.0 (1.0)	50.0 (1.3)	75.0 (2.1)	50.0 (1.0)	75.0 (1.3)	87.5 (1.5)	87.5 (1.6)
<i>Iron and Steel</i>	9	0.0 (0.2)	22.2 (0.3)	44.4 (0.9)	55.6 (1.2)	77.8 (1.7)	22.2 (0.6)	22.2 (0.3)	44.4 (0.6)	33.3 (0.9)	22.2 (0.6)
<i>Machinery & Transport Equipments</i>	45	8.9 (0.3)	4.4 (0.2)	2.2 (0.2)	2.2 (0.2)	4.4 (0.2)	6.7 (0.3)	6.7 (0.3)	17.8 (0.5)	26.7 (0.6)	33.3 (0.9)
<i>Textile & Textile products</i>	15	66.7 (3.9)	66.7 (3.8)	86.7 (4.0)	86.7 (4.2)	86.7 (4.2)	93.3 (4.1)	93.3 (4.6)	93.3 (4.2)	93.3 (3.6)	93.3 (3.2)
<i>Other Manufactures</i>	47	19.1 (1.3)	21.3 (1.7)	23.4 (1.6)	25.5 (1.5)	29.8 (1.6)	55.3 (1.3)	25.5 (0.9)	40.4 (1.4)	42.6 (1.5)	53.2 (1.4)

Note: Values in parentheses are the RCA index computed by aggregating the export values at the 3-digit level for each group. Averages of the exports values for the given periods are used.

Source: Same as for Table 2.

Patterns of comparative advantage by commodity groups are shown in Table 6. Again, it is clear that every group contains certain number of products where the RCA value is greater than 1. Since the 1990s, India has been gaining comparative advantage in a number of products within the groups of Food items, Chemicals, Iron & Steel, Textiles and Other Manufactures. China continues to hold her high comparative advantage in Textiles while improving her position in Machinery & Transport Equipments and Other Manufactures. China, however, has lost her comparative advantage in certain products within the groups of Food items and Chemicals.

By definition, each country has a comparative advantage in some products, depending upon the opportunity cost of producing various products in different countries. But, comparative advantage is not the same thing as international competitiveness or competitive advantage (see Krugman, 1996). The notion of comparative advantage has little significance from a macroeconomic perspective: it is not meaningful to say that China has a comparative advantage over India in the aggregate. However, it is meaningful to talk about international competitiveness both on the macro and micro levels¹³.

Share of a country in world exports (in aggregate or product level) is one of the widely used indicators of international competitiveness. Table 7 shows the changes in the shares of India and China in the world exports by commodity groups. China has been improving its share remarkably since the 1980s in a number of commodity groups, while India's share has been increasing consistently since the 1990s. Throughout the period, India lags much behind China in almost all the commodity groups including those commodities where India has a higher RCA than China. During 2000-03, there were as many as 118 products (out of 234) where India had a higher RCA value than China, but the former had a higher market share in just 28 products¹⁴. The bottom line is that a mere existence of comparative advantage does not automatically translate into high market shares if there are certain impediments in the country in fully exploiting its comparative advantage.

Table 7:
Share of India and China in World Exports by Commodity Groups (% , averages)

Commodity Group	India				
	1980-84	1985-89	1990-94	1995-99	2000-03
All food items	0.98	0.97	0.97	1.29	1.36
Agricultural raw materials	0.40	0.35	0.44	0.52	0.52
Fuels	0.32	0.17	0.15	0.08	0.41
Ores and metals	0.55	0.80	0.82	0.65	1.08
Manufactured goods	0.40	0.48	0.56	0.63	0.79
<i>Chemicals</i>	0.29	0.39	0.66	0.81	1.01
<i>Metal Products</i>	0.48	0.38	0.55	0.62	1.02
<i>Iron and Steel</i>	0.09	0.13	0.48	0.74	1.33

¹³ See Krugman (1994, 1996) who argues that competitiveness is 'a dangerous obsession' since it may lead to policy choices that are not clearly in the national interest - for example, protectionism when foreign goods 'threaten' local producers.

¹⁴ It is illogical to hold that the huge gap in the market share simply reflects the bigger size of China's economy compared to India's. The logic of international specialization is that individual countries are no longer constrained by the size of their domestic markets. It is indeed possible to identify many products where the relatively smaller countries hold a higher market share compared to the big countries.

<i>Machinery & Transport Equipments</i>	0.11	0.10	0.11	0.12	0.17
<i>Textile & Textile products</i>	1.76	1.89	2.23	2.69	3.22
<i>Other Manufactures</i>	0.60	0.84	0.87	0.98	1.26
Total	0.45	0.50	0.56	0.63	0.78
	China				
All food items	1.73	2.28	2.75	2.71	3.39
Agricultural raw materials	1.70	2.48	2.17	2.13	2.32
Fuels	0.63	1.95	1.38	1.41	1.38
Ores and metals	0.90	1.19	1.30	2.14	3.00
Manufactured goods	1.23	1.40	2.46	3.66	5.78
<i>Chemicals</i>	1.82	1.32	1.82	2.50	2.72
<i>Metal Products</i>	2.44	1.59	2.87	4.73	7.93
<i>Iron and Steel</i>	0.64	0.50	1.34	2.94	2.95
<i>Machinery & Transport Equipments</i>	0.29	0.44	1.08	2.02	4.57
<i>Textile & Textile products</i>	4.72	7.35	9.53	11.61	15.58
<i>Other Manufactures</i>	1.53	1.41	3.07	4.87	6.77
Total	1.16	1.60	2.29	3.21	4.86

Source: Same as for Table 2.

Notwithstanding the differential performance of India and China, the trade statistics at the 3-digit level suggests that exports (and imports) of the large majority of the products have expanded from both the countries, not just of those where the RCA values are greater than 1 (Table 8). How is it possible for a country to continuously expand its exports of a product even as the RCA value suggests that the country does not have a comparative advantage in that product? The explanation is very simple: even at a highly disaggregated level, the RCA index masks important heterogeneities within the product. In other words, countries tend to specialize in different types of a given product, indicating the significance of intra-industry reallocation of resources under trade liberalization. Clearly, trade liberalization is not causing a polarization wherein certain industries are forced to vanish while certain other industries gain prominence¹⁵. This, however, does not mean that inter-industry movement of resources is not occurring at all, but certainly not to the extent of industries going out of business. A large majority of the domestic industries and firms in both India and China are able to survive and compete through specialization in narrow product lines, bringing in its train some allocative efficiency gains.

Table 8:
Expansion of Trade by Products from 1980-84 to 2000-03
(Total No. of Products = 239) (US \$, averages)

Indicator	India	China
No. of products where value of exports increased	223 (93.3)	210 (87.9)
No. of products where value of exports fell to zero	1 (0.4)	3 (1.3)
No. of products where market share of exports increased	196 (82.0)	193 (80.8)
No. of products where value of imports increased	187 (78.2)	214 (89.5)

Note: Values in parentheses are the shares of the total no. of products (=239)

¹⁵ In the case of India, there is only one product for which the export value declined to zero during 2000-03 from a positive value. Interestingly, this is SITC 911 (Mail Not Classified by Kind), where trade liberalization has nothing to do. In the case of China, the number of such products is three; one among them again is SITC 911. Others are: SITC 286 (Uranium, thorium ores) and SITC 675 (Iron, steel hoop, strip).

In what follows, the extent of structural changes in India and China are examined on the basis of Spearman Rank Correlation Coefficients, computed using the 3-digit level data on exports (Table 9). Though some changes (between 1980-84 and 2000-03) in the structure of exports and comparative advantage can be observed in both the countries, the values of the correlations by no means indicate that the changes are substantial. Nevertheless, it is clear that China's exports and comparative advantage had undergone a greater degree of structural change compared to India's.

Table 9:
Structural Changes of Exports and Comparative Advantage across Products,
Rank Correlation Coefficients^a

Description of the Correlated Variables ^b	Manufactured Goods	Other Goods
<u>Composition of Exports (share of the national exports)</u>		
Export composition of India during 1980-84 & 2000-03	0.60*	0.73*
Export composition of China during 1980-84 & 2000-03	0.53*	0.65*
<u>Values of RCA index</u>		
India's RCA during 1980-84 and 2000-03.	0.59*	0.69*
China's RCA during 1980-84 and 2000-03.	0.55*	0.47*
RCA during 1980-84 of India and China.	0.47*	0.48*
RCA during 2000-03 of India and China.	0.25*	0.30*
Point changes of RCA (between 1980-84 and 2000-03) of India and China	-0.09	0.13
<u>Shares in the World Exports</u>		
India's shares during 1980-84 & 2000-03	0.58*	0.70*
China's shares during 1980-84 & 2000-03	0.54*	0.48*
Shares during 1980-84 of India & China	0.47*	0.48*
Shares during 2000-03 of India & China	0.24*	0.31*
Point changes of the shares (between 1980-84 and 2000-03) of India & China	0.13	0.12

Note: ^a lower value of the correlation signifies greater extent of structural change; ^b the variables are the average values for the two periods; * significant at 1% level;

The correlations suggest that India and China have become more dissimilar to each other during 2000-03 compared to 1980-84 with respect to the patterns of comparative advantage and relative market shares of the various industries. This implies a greater division of labor in both the countries in the recent years compared to the past, which is expected in a more competitive and liberalized environment. The statistically insignificant correlation coefficients in the table indicate that China's gain of market share (or comparative advantage) in a given product does not necessarily mean India's lose of market share (or comparative advantage) in the same product and vice versa. The fear of "Chinese invasion" of India's export markets is only a popular myth: the two countries have been expanding their exports by specializing in different

product lines within each of the product categories. This is also evident from an increasing intra-industry trade in both the countries¹⁶.

5. Conclusion and Implication

India and China have been enjoying historically unprecedented average growth rate of GDP since the 1980s¹⁷. The sectoral composition of growth, however, is an important matter of concern: if the poor people do not own skills sought by the expanding and better paying sectors, the beneficial effect of growth on poverty reduction will be limited. This issue is more serious for India than China considering that the GDP growth in India has been largely driven by the service sector rather than the industrial sector. Whereas, China followed a conventional path in transiting from an agricultural economy to an industrial economy – a pattern observed in many developed countries¹⁸. While the industrial output now accounts for more than a half of the Chinese GDP, it accounts for only one-fourth of India's GDP. The onus to absorb the surplus labor engaged in India's agriculture rests primarily on the industrial sector as the knowledge based service sector has generally weaker linkage effects and employs mainly the educated urban youth¹⁹. It is well-known that exports of manufactured goods played an important role in China's industrialization process. In this context, the present study analyzed the emerging trends and patterns of merchandise exports in a comparative perspective.

India's share in the world exports has been increasing since the 1990s, yet contributes only 0.8% of total world exports by 2004. The export performance of China, in comparison, has been spectacular accounting for more than 6% of world exports in 2004. The analysis of export structure by commodity groups indicates a noticeable shift in the export baskets of both the countries away from agricultural and mineral resource-intensive goods towards manufactured goods. Within the manufacturing, both the countries continue to hold a comparative advantage in unskilled labor-intensive goods. At the same time, a gradual improvement of comparative advantage in human capital and technology-intensive goods was noticed in both the countries.

In a number of products, India does hold a higher RCA value than China, but her share in the world exports of these products are much lower than that of China. This is not surprising, as comparative advantage does not automatically translate into high market shares if there are certain impediments in the country in fully exploiting its comparative advantage. We also found that China's exports and comparative advantage had undergone a greater degree of structural

¹⁶ Intra-industry trade refers to the simultaneous occurrence of exports and imports within the same industry. We estimated the standard Grubel-Lloyd index to measure the extent of intra-industry trade in the total trade of both India and China since the 1980s. In order to save space, we do not discuss this issue in the present paper. See Veeramani (2002, 2004) for more details pertaining to India's intra-industry trade. Hu and Ma (1999) reported significant levels of intra-industry trade for China.

¹⁷ The average annual growth rates during 1980-2000 were around 6% and 10% respectively for India and China.

¹⁸ Various available estimates suggest that the proportion of people living below the poverty line has been declining in both India and China since the 1980s. These estimates further suggest that the extent of poverty reduction has been higher in China than in India (Srinivasan, 2004). While there exist certain concerns on the comparability of the poverty statistics, the differences in the sectoral composition of growth in the two countries reinforces the statistical finding that poverty reduction has been higher in China than in India.

¹⁹ While the share of agriculture in India's GDP is 22%, roughly 2/3rd of the labor forces are employed in agriculture.

change over the years compared to India's. These findings indicate that certain bottlenecks (such as, poor physical infrastructure) and policy induced rigidities in the factor markets (such as those in the organized labor market) stand in the way of resource reallocation process and export activities in India.

These constraints notwithstanding, we noticed that the exports (and imports) of the large majority of the products have expanded since the 1990s from India. A similar pattern was observed for China since the 1980s. We also noticed that China's gain of market share (or comparative advantage) in a given product does not necessarily mean India's lose of market share (or comparative advantage) in the same product and vice versa. The two countries have been expanding their exports by specializing in different product lines within each of the product categories. Overall, our findings indicate the growing significance of intra-industry specialization under trade liberalization in both the countries. The resource reallocation process under trade liberalization is not causing a polarization wherein certain industries are forced to vanish while certain other industries gain prominence. In a liberalized environment, a large majority of the domestic industries and firms are able to survive and compete through specialization in narrow product lines. The apprehension that import liberalization would lead to a large-scale demise of domestic industries (the fear of de-industrialization) is unwarranted²⁰. Further, greater intra-industry specialization would imply that trade liberalization entails a lower adjustment costs than what generally thought to be.

China has been quite successful in exploiting the opportunities that arise from the growing international fragmentation of production process in the manufacturing industries. India, so far, has failed to take the full advantage of such opportunities due to the bottlenecks and rigidities, indicated above, that stand in the way of resource reallocation both between and within the industries. Policy reforms are called for to make the process of resource reallocation smoother: labor market reforms, facilitation of investment in infrastructure and further reduction of trade barriers are particularly crucial. These policy changes are necessary also to induce the multinationals to conduct FDI of the "vertical type" and hence to augment the process of integrating the Indian industry with the fragmented structure of global production activities. Needless to say, the policy environment should be neutral for the domestic and foreign enterprises unlike in China where domestic private entrepreneurs have been discriminated against for various reasons, as elaborated in Huang (2002). It is important not to borrow the wrong aspects of the policies from China as much as it is important to borrow the right aspects.

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²⁰ For example, such apprehensions about the Indian industry can be seen in Nambiar et al (1999) and Chaudhuri (2002).

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