4. Specialization Patterns under Trade Liberalization: Evidence from India and China

Choorikkadan Veeramani

India and China, like many developing countries, have rejected development strategies based on import substitution in favor of international openness. China started the trade liberalization process in earnest in 1978, while India introduced 'cautious liberalization' during the 1980s, focusing on internal deregulation rather than on trade liberalization. Until 1991 India's trade regime was considered one of the most restrictive in the world, due to its complexity and the wide number of tools used as policy instruments. The most pronounced overhaul of India's trade policy regime occurred during the early 1990s in response to a severe balance of payments crisis.

The domestic firms in India and China which had been operating under protective umbrellas were forced to respond to the competitive pressures from imports. Decision makers hoped that the policy changes would improve export competitiveness through efficient resource allocation, greater specialization, diffusion of international knowledge and heightened competition. The commodity structure of the country's trade is also expected to undergo changes. The conventional wisdom is that competition will induce a process of resource reallocation from the import-competing industries to those industries where the country has comparative advantages. It follows that a natural consequence of trade liberalization is the expansion of inter-industry trade – that is, exports increase in one set of industries, while imports increase in another. Further, trade liberalization invariably involves adjustment costs, as some domestic industries may go out of business.

However, many studies suggest that trade liberalization biases a country's trade expansion toward intra-industry trade rather than inter-industry trade. Intra-industry trade (IIT) refers to the simultaneous presence of imports and exports of products of a given industry. Verdoorn (1960), writing about the Benelux union, and Balassa (1966), focusing on the European Economic

Community, discovered that trade liberalization had led to a higher incidence of IIT. More recent studies also find a positive relationship between trade liberalization and IIT. For example, following the demise of central planning, an increasing share of the trade between many Central and Eastern European countries and the European Union was found to be intra-industry in nature (Hoekman and Djankov 1997). Fontagne and Freudenberg (2002) showed considerable growth of IIT in intra-EU trade between 1980 and 1999, and Fukao, Ishido and Ito (2003) reported the growing significance of IIT in East Asia.

According to these studies, in a liberalized environment, different countries will specialize in different types of products, and exports from practically every manufacturing industry could increase. Fears that import liberalization might lead to the demise of domestic industries in the developing countries – de-industrialization – will subside if the intensity of IIT increases with the reduction of trade barriers. The widely held 'smooth adjustment hypothesis' states that a high share of IIT will be associated with relatively low adjustment costs, since workers move within industries rather than between them.[1]

Intra-industry trade grows due to greater specialization in the manufacturing of unique varieties or product lines by individual plants in different countries. Because there are fixed costs associated with the production of each variety, it is imperative that each plant specializes in a unique variety, if economies of scale in production are to be exploited. Therefore, the firms in each country would manufacture a subset of the varieties within an industry to meet domestic demand and to export. At the same time, firms and individuals will import varieties which are not produced within the country in order to meet domestic demand. The result is IIT in final consumer goods (Helpman and Krugman 1985). Further, greater specialization at the level of distinct components used in an industry will promote IIT in intermediate goods (Ethier 1982).

There are two distinct types of IIT – horizontal and vertical. Horizontal IIT refers to the simultaneous export and import of differentiated products within an industry which are of a similar quality. Vertical IIT refers to the exchange of differentiated products of different qualities. Horizontal IIT arises when countries with similar factor endowment ratios specialize in unique varieties to exploit internal-scale economies. Vertical IIT, however, arises when countries with different factor endowment ratios specialize in varieties that are differentiated by quality: capital-abundant countries would specialize in the production of higher quality varieties, while labor-abundant countries would specialize in low-quality varieties. Vertical IIT will arise between two countries when there is an overlap in the demand for different qualities, particularly when there is a large gap in factor endowments (Falvey 1981; Falvey and Kierzkowski 1987). In practice, the trade which emerges from specialization at different production stages of a particular good may also be treated as vertical IIT (for example,

China imports components and exports the finished product). The extent of adjustment cost associated with trade liberalization can differ depending upon whether IIT is horizontal or vertical. While any type of IIT entails relatively lower adjustment costs than inter-industry trade, the adjustment cost will be the least when IIT is horizontal in nature.

This chapter analyzes IIT trends and patterns in the merchandise trade of India and China. Following an overview of the main features of liberalization in India and China and their implications for IIT in the two countries, I will compare the merchandise trade performance of India and China and identify any patterns of IIT in India and China.

LIBERALIZATION IN INDIA AND CHINA

Prior to their market-oriented reforms, both India and China followed a relatively autarkic trade policy accompanied by a battery of trade and exchange controls which severed the link between domestic and world relative prices (Lal 1995). Exchange rates were overvalued in both countries, creating a bias against exports. In China, a handful of centrally controlled foreign trade corporations monopolized trade activities. India instituted an elaborate system of exchange controls and allocation to ensure that any foreign exchange profits earned by exporters were used to import only those commodities which conformed to the priorities set in the five-year plans (Srinivasan 1990).

Beijing decentralized foreign trade rights, allowing hundreds of thousands of firms to participate in trade activities. China also created special economic zones and actively promoted foreign direct investment (FDI) in joint ventures. Imports of intermediate inputs for use in the production of exports and capital goods for use in joint ventures were completely liberalized. Quantitative restrictions (QRs) on imports were removed and tariffs rates were gradually reduced. Processing trade and foreign investments enjoyed major tariff exemptions. After 14 years of arduous negotiations, China became a member of the World Trade Organization (WTO) in 2001.[2]

Until the reforms, China had severe distortions in all its factor and commodity markets (Lal 1995). The Chinese labor market was characterized by direct allocation of jobs and administrative control of wages. Beijing has gradually liberalized the labor market, particularly in the non-state sector, providing greater flexibility in the allocation of resources (Meng 2000; Brooks and Tao 2003). A flexible factor market will facilitate changes in the structure of production on the basis of comparative advantage and exploit the allocative efficiency gains from trade liberalization.

Disillusioned with the import-substitution policy, India cautiously began to reorient its policy framework in the early 1980s. The policy reforms included deregulation of state controls in selected industries, softening restrictions on monopolies, liberalizing capital goods imports with a view toward upgrading technology and modernizing industry, some shifts from QRs to tariffs, greater subsidies for exports and a policy of active exchange-rate depreciation.

The reforms became far more comprehensive and systemic after a severe balance-of-payments crisis in 1991. Significant progress has been made in dismantling the industrial licensing system, price controls and trade and exchange controls. The QRs on importing capital goods and intermediates were completely removed in 1992, although the ban on importing consumer goods continued, with some exceptions, until the late 1990s. Alongside the removal of QRs, customs duties in the manufacturing industries were gradually reduced. In 1993 the government adopted full convertibility of the rupee for the current account, making the exchange rate dependent on the demand for and supply of foreign exchange in the market. FDI has been encouraged in all manufacturing industries (except those of strategic or environmental concern) and the approval process has been made simple and transparent. The list of industries reserved for the public sector has been reduced considerably and the amount of government equity holdings in the portfolio of public sector enterprises has been gradually reduced.

However, although policy changes have gone a long way toward easing the entry barriers, the multiple barriers to exit for non-viable production units still remain, due to India's rigid labor and bankruptcy laws (Ahluwalia 2002). Labor market rigidities and other exit barriers can hobble the process of resource reallocation on the basis of comparative advantage.

IMPLICATIONS OF THE POLICY REGIMES FOR INTRA-INDUSTRY TRADE

The nature and bias of protection policies shape the patterns of industrial specialization under import substitution. In general, import substitution provides no compulsion for product rationalization, as the domestic producers are protected irrespective of the considerations of efficiency and comparative advantage. Under such circumstances, there is limited potential for intra-industry specialization and IIT. The criterion of 'indigenous non-availability' which had been followed in granting import licenses in India virtually ruled out the possibility of recording 'competing imports' (Bhagwati and Desai 1970). However, opening up the economies of India and China changed the rules of the game.

The transition from a controlled to a market-based economy can result in three types of allocative efficiency gains. First, productive resources could shift from inefficient to efficient industries (inter-industry resource reallocation). Second, resources may shift from inefficient to efficient firms within an industry (intra-industry resource reallocation). Third, resources could shift from inefficient to efficient activities and product lines within the firm (intra-firm resource reallocation). Which scenario best describes the situation in India and China?

As already pointed out, factor-market rigidities might stand in the way of resource reallocation. Labor market reforms have not yet been undertaken in India, due to political concerns and opposition from organized labor unions.[3] China's labor market, in comparison, is far more flexible. Therefore, it might be easier to reallocate productive resources from one industry to the other (inter-industry) in China than in India. The industrial composition of Chinese exports might also show greater degree of structural change than India's.

The second channel – reallocation of resources from inefficient to efficient firms within the industry – would also be slower to operate in India, as the barriers to exit continue to be high due to legislation preventing retrenchment. Labor-market rigidities, however, need not necessarily block the third channel – intra-firm resource reallocation from inefficient to efficient activities and product lines. Firms are likely to restructure their operation whereby individual plants tend to specialize in fewer product lines to exploit economies of scale.[4]

While it is plausible that all three allocative efficiency channels operate in China, in general, Indian manufacturing firms could realistically exploit only the third channel, due to the rigidities in the organized labor market. Despite these unused channels in India's liberalization, IIT can grow as a result of the rationalization in the choice of product lines by the individual plants and intra-firm resource reallocation. While IIT may grow in both India and China, the industry composition of the latter's exports may undergo a greater degree of structural change due to the higher flexibility of China's labor market.

COMPARATIVE TRADE PERFORMANCE, 1950–2005

Several studies argue that economic liberalization leads to rapid growth of exports through efficient resource allocation, greater specialization, diffusion of international knowledge and heightened competition. In order to assess the impact of liberalization on export growth, however, it is important to keep in mind that the growth is determined by external as well as internal factors. Among the external factors, the most crucial is the growth of world demand.

The internal and external factors combine to determine the export performance of a country. A country may fail to exploit the buoyancy of world demand if the domestic policy environment is highly restrictive. Similarly, even with policy reforms, a country's exports may not grow faster if world demand happens to decelerate in the post-reform period. Clearly, a simple before and after comparison, without taking into account the world demand (or world export) conditions, can be misleading. It is therefore appropriate to compare the country's export performance in the pre- and post-liberalization periods, keeping in mind the world demand conditions in the two periods.

The next section provides a brief overview of the merchandise trade performance of India and China from 1950 to 2005. (Analysis of trade in services is beyond the scope of this study.) The decade of the 1980s is divided into two sub-periods: 1980–85 (a period which witnessed major deceleration in world demand following the second oil price hike) and 1986–1990 (a period of recovery and faster growth of world demand). India's post-liberalization period (1992–2005) is divided into three sub-periods: 1992–97 (before the East Asian financial crisis); 1999–2001 (immediately after the crisis) and 2002–2005 (a period of rapid export growth in India, China and the world as a whole).

Growth of Trade

Exports were largely neglected during the first (1950–56) and second (1956–61) five-year plans in India, a stance based on the argument that demand for Indian exports was inelastic. While global exports were growing at 6.3 per cent per annum during the 1950s, exports from India stagnated (see Table 4.1). In China, exports were perceived mainly as a means of financing planned imports for 'socialist industrialization' (Lardy 1992). Thus, China's exports and imports both grew rapidly during the 1950s.

As global exports expanded relatively faster during the the 1960s, growth of China's exports and imports decelerated sharply while the growth rate of India's exports improved marginally compared with the 1950s. Clearly, both countries failed to make the best use of the trade possibilities available during the 1960s. World exports registered a hefty annual growth rate of 20.4 per cent during the 1970s. Buoyant world demand and a relatively favorable domestic policy in both India and China provided an atmosphere conducive to the rapid growth of exports. As industrialization progressed, imports also grew rapidly in both countries.

The export boom of the 1970s, however, could not be maintained during the first half of the 1980s. As the growth rate of world exports turned negative in the aftermath of the second oil price hike, exports decelerated in both India and China. The world economy, however, recovered during the second half of the

Table 4.1 Comparative Trade Performance, India and China (US$ Millions)

Period[b]	Average annual growth rates[a]					Share of world exports	
	Exports			Imports			
	India	China	World	India	China	India	China
1950–59	0.22	20.91	6.30	4.73	15.18	1.39	1.55
1960–69	3.58	1.75	8.77	1.36	1.49	0.90	1.29
1970–79	17.97	19.24	20.41	19.52	23.07	0.54	0.81
1980–85	2.39	7.64	–0.86	0.79	13.77	0.47	1.19
1986–90	17.76	18.29	12.36	11.15	7.78	0.48	1.63
1992–97	13.33	17.13	9.64	14.06	11.62	0.60	2.74
1999–01	10.26	16.84	4.09	3.57	21.24	0.66	3.86
2002–05	25.29	30.02	17.58	35.25	31.27	0.81	6.14

Notes:
a. Growth rates are calculated using semi-logarithmic regressions.
b. The year 1991 is excluded due to a major balance-of-payments crisis in India; the year 1998 is excluded due to the East Asian crisis.

1980s, and exports from both countries grew at a healthy pace, driven by the buoyancy of world demand and domestic economic reforms.[5]

India's economic reforms became far more comprehensive and systemic after a severe balance of payments crisis in 1991. During 1992–97, India's exports recorded a growth rate of about 13 per cent per annum and China's about 17 per cent. As a result of the slow-down in world demand triggered by the financial crisis that swept East Asia in 1997–98, India's exports declined in absolute value from 1997 to 1998. While China's exports continued to grow at a rate of about 17 per cent, India's exports showed signs of recovery during 1999–2001, growing by about 10 per cent annually. As the world economy fully recovered from the Asian crisis, India and China showed exceptional export performance, growing at an annual rate of about 25 per cent and 30 per cent, respectively, during 2002–2005.

A separate growth-decomposition exercise established that the actual export growth of India had been far below the potential offered by the growth of world demand in the pre-reform period (Veeramani 2007). The lack of competitiveness and specialization in the 'wrong' commodities were the major factors constraining export growth in the pre-reform period. In contrast, throughout the post-reform period, India's actual export growth has been above the potential offered by the growth of world demand, and the gap between the actual and the potential comes from an improvement in the overall competitiveness of India's exports. While the competitive surge of China since

1980 is well known, the growth-decomposition exercise also shows a major improvement in the competitiveness of India's exports since 1991.

Structure of Exports

The combined share of primary products (SITC 0–4) and textiles (SITC 65) in India's total exports declined from 90 per cent in 1962 to 70 per cent in 1970 and 33 per cent in 1980.[6] Lardy (1992, 32) noted, 'The share of primary product exports in China's total exports did fall sharply from almost 80 per cent in 1953 to 64 per cent in 1957, and then 56 per cent in 1965–66'. The share of primary goods in China's exports remained fairly constant at around 53–54 per cent throughout the 1970s. The share of manufactured goods in India's total exports showed a consistent increase from about 54 per cent during 1980–84 to about 76 per cent during 2000–2003, and it has increased from 64 per cent to almost 90 per cent in China (Veeramani 2008). Much of China's increase in the share of manufactured exports can be attributed to machinery and transport equipment; the total export share of these sectors increased from 7 per cent to 38 per cent between 1980–84 and 2000–2003. Detailed analysis by Schott (2006) showed that China's export basket contains more 'sophisticated' items than countries with similar relative endowments.

The industry structure of India's export basket shows a high degree of persistence during the post-reform period. Spearman's rank correlation coefficients are estimated to gauge the extent of structural changes over time in India's exports. Between 1993 and 2005, the correlation coefficient of the shares of various commodities (at the two-digit level of SITC) in India's total exports is 0.92. The correlation coefficient between 2002 and 2005 is as high as 0.98. The high positive correlations (both significant at the 1 per cent level) suggest that there have been no major structural changes (at the two-digit level) in India's merchandise exports during the post-reform period. A plausible explanation for the high degree of persistence in the structure of India's export profile during the post-reform period is the rigidities in the labor market, that might have discouraged resource reallocation across industries.

Using disaggregated trade data, I have shown elsewhere (Veeramani 2008) that the industry structure of China's exports had undergone a greater degree of structural change over the years than has India's. In addition, China's gain of market share (or comparative advantage) in a given product did not necessarily mean India's loss of market share (or comparative advantage) in the same product and vice versa. The fear of a 'Chinese invasion' of India's export markets is just a popular myth; the two countries have been expanding their exports by specializing in different product lines within each of the product categories.

TRENDS AND PATTERNS OF INTRA-INDUSTRY TRADE

Having established the positive impact of trade liberalization on export growth in India and China, I now investigate the hypothesis that liberalization increases IIT. My previous studies provided estimates of India's IIT in selected sections of commodities during the 1990s (Veeramani 2002, 2004). These estimates showed a significant increase in the intensity of IIT in India's trade flows. The present study makes some important departures from the previous analysis. First, it disaggregates IIT into its horizontal and vertical components. Second, it uses a different data set (COMTRADE–WITS), plus it covers a longer time period (1962–2005) and the entire spectrum of commodities. Third, I compare the trends and patterns of India's IIT with those of China.

Measurement and Data

I use the Grubel and Lloyd (1975) index to measure the intensity of IIT in a particular industry. The index of IIT (GL_{jt}) in industry j and year t in the multilateral trade of the country under consideration (India or China) is defined as:

$$GL_{jt} = \frac{(X_{jt} + M_{jt} - |X_{jt} - M_{jt}|}{(X_{jt} + M_{jt})} \quad (4.1)$$

where: X_{jt} = value of exports from India or China in industry j and year t and M_{jt} = value of imports to India or China in industry j and year t.

The numerator of the ratio in (4.1) represents the value of IIT in industry j, which is the difference between total trade ($X_{jt} + M_{jt}$), and the absolute value of net trade $|X_{jt} - M_{jt}|$. The index, therefore, measures the percentage share of IIT in the total trade (the denominator is total trade) between the two trading partners in industry j. As the degree of IIT increases, this measure approaches 100 (GL_{jt} becomes 100 when $X_{jt} = M_{jt}$), as either exports or imports dominate trade in the industry (inter-industry trade), GL_{jt} approaches zero (GL_{jt} becomes zero when one of X_{jt} or M_{jt} is zero). While GL_{jt} measures IIT in a specific industry, its trade-weighted average could be used to measure IIT in the aggregate groups of industries and the economy as a whole.

As the GL_{jt} refers to the pattern of trade in one year, it is often referred as a 'static' measure of IIT. Hamilton and Kniest (1991) pointed out certain problems encountered in comparing the Grubel–Lloyd indexes for different time periods. In order to overcome such problems, they proposed the use of an index of 'marginal IIT' which measures the share of IIT in the *change* in trade flows between the two years under consideration. One such index (B_j), suggested by Brülhart (1994), is a transposition of the GL_{jt} formula to first-differenced trade flows:

$$B_j = \frac{(|\Delta X_j| + |\Delta M_j|) - |\Delta X_j - \Delta M_j|}{(|\Delta X_j| + |\Delta M_j|)} \times 100 \quad (4.2)$$

where Δ is the difference operator. The value of B_j, like the Grubel–Lloyd index, varies from 0 to 100; the closer the value to 100, the greater the share of IIT in the change in trade flows between the two years under consideration. The trade-weighted average of B_j could be used to measure the marginal IIT in the aggregate groups of industries and the economy as a whole. The above indexes are measured here assuming that the products grouped under the four-digit level of SITC constitute an industry j.[7] Trade data for India and China at the four-digit level of SITC are taken from COMTRADE–WITS.

Following Abd-el-Rahman (1991) and Greenaway, Hine and Milner (1995), I separate total IIT into its two components – horizontal and vertical – using relative unit values of export and imports. The rationale for using unit value is that a variety sold at a higher price must be of higher quality than a variety sold more cheaply (Stiglitz 1987). In the case of India, I use the unit value data from the Directorate General of Commercial Intelligence and Statistics (DGCI&S) supplied in electronic form by the Centre for Monitoring the Indian Economy (CMIE). As far as China is concerned, I rely on the estimates available in Zhang, Witteloostuin and Zhou (2005) to assess the relative importance of horizontal and vertical IIT.

Horizontal IIT (HIIT) was defined as the simultaneous export and import of a product where the ratio of export unit value to import unit value was within the range of 0.85 to 1.15. When the ratios were outside that range, any IIT was considered to be vertical in nature (VIIT). I have disentangled the total IIT in each four-digit industry into its horizontal and vertical components. First, I computed the ratio of export unit value to import unit value at the six-digit level of the Indian trade classification system (ITC).[8] Then for each four-digit ITC industry, I isolated those six-digit items with ratios within the specified range (0.85 – 1.15) from those outside the range. Export and import values of those six-digit items within the specified range (0.85 – 1.15) and within a given four-digit ITC industry are aggregated to measure horizontal IIT in that industry. Similarly, the export and import values of the six-digit items which are outside the range are aggregated to measure vertical IIT in a given four-digit ITC industry. Specifically, HIIT in given industry j is measured using equation 4.3.

$$HIIT_{jt} = \frac{\sum_i^h \left[\left(X_{ijt}^h + M_{ijt}^h \right) - \left| X_{ijt}^h - M_{ijt}^h \right| \right]}{\sum_i^h \left(X_{ijt}^h + M_{ijt}^h \right)} \times 100 \quad (4.3)$$

where i^h refers to the six-digit ITC item within the four-digit ITC industry j with the ratio of the unit values within the range of 0.85 – 1.15. Similarly, VIIT in a given industry j is measured using equation 4.4.

$$VIIT_{jt} = \frac{\sum_i^V \left[\left(X_{ijt}^V + M_{ijt}^V \right) - \left| X_{ijt}^V - M_{ijt}^V \right| \right]}{\sum_i^V \left(X_{ijt}^V + M_{ijt}^V \right)} \times 100, \tag{4.4}$$

where i^V refers to the six-digit ITC item within the four-digit ITC industry j with the ratio of the unit values outside the range of 0.85 – 1.15. Unit values of either exports or imports or both are not available for a few six-digit items in the sample. Exports and imports of these items within a given four-digit industry are also aggregated separately in the above manner to measure IIT, but without categorizing these as either horizontal or vertical (treated as 'residual'). Thus, the total IIT in a given four-digit ITC industry (IIT_{jt}) is split into three categories: $IIT_{jt} = HIIT_{jt} + VIIT_{jt} + residual$. The trade-weighted averages of IIT_{jt}, $HIIT_{jt,}$ and $VIIT_{jt}$ are computed for aggregate groups of industries and the economy as a whole. Finally, VIIT is further subdivided into high-quality VIIT (HVIIT) and low-quality VIIT (LVIIT). If the ratio of the unit value of export to import is greater than 1.15, then the quality of exports is higher than the quality of imports (HVIIT), while ratios below 0.85 indicate higher quality imports compared with exports (LVIIT).

Trends and Patterns of IIT

Table 4.2 provides estimates of IIT in India and China for primary and manufactured goods for selected years. As expected, manufactured products generally show higher IIT intensity compared with primary products, a logical result since the opportunities for specialization based on product differentiation and scale economies are greater for manufactured goods than for primary goods. Further, a steady increase in IIT intensity can be observed in India's manufacturing trade, while the primary products do not show any particular trend in either India or China. The increase in the Grubel–Lloyd index in India's manufacturing industries has been accompanied by a marked decline of the coefficient of variations, indicating the growing convergence of IIT intensity in the individual industries within the manufacturing sector.

China's IIT in manufactured products showed some decline in the early 1990s followed by a slight increase. It may be surprising that the share of IIT in India's manufacturing trade has been higher than that of China since 1993. Careful examination of the data, however, suggests that the difference is attributable to just two commodities – SITC 6672 (diamonds, not industrial,

Table 4.2 Intra–Industry Trade in India and China, Weighted Averages of GLjt, Selected Years[1]

Groups[a]	1962	1970	1980	1986	1990	1993	1997	2000	2002	2005
					India					
Primary products	11.8	10.7	3.7	6.7	6.2	9.4	10.0	7.1	7.5	7.6
	(1.6)	(1.6)	(1.9)	(1.8)	(1.8)	(1.5)	(1.3)	(1.3)	(1.1)	(1.1)
Manufactured products	6.5	17.6	25.5	27.7	36.8	38.0	40.9	46.3	47.9	48.3
	(1.3)	(1.2)	(1.1)	(1.1)	(0.9)	(0.9)	(0.7)	(0.7)	(0.6)	(0.6)
Manufactured products[b]	6.5	15.3	16.7	16.8	25.4	25.6	32.4	36.6	38.3	42.0
Total	9.3	14.5	14.0	20.8	27.4	30.2	32.5	33.4	35.2	34.9
	(1.4)	(1.3)	(1.3)	(1.3)	(1.1)	(1.1)	(0.9)	(0.9)	(0.8)	(0.7)
Total[b]	9.3	13.2	9.5	13.1	18.7	20.4	25.5	25.5	27.1	29.5
					China					
Primary Products					21.3	32.1	30.5	22.2	22	17.2
	–	–	–	–	(1.3)	(1.1)	(1.0)	(1.1)	(1.1)	(1.1)
Manufactured products					42.2	31.3	39.3	44.7	42.8	43.9
	–	–	–	–	(0.8)	(0.7)	(0.7)	(0.7)	(0.7)	(0.7)
Manufactured products[b]	–	–	–	–	42	31.2	39.2	44.5	42.6	43.8
Total					37.8	31.4	37.9	41.5	40.4	40.5
	–	–	–	–	(0.9)	(0.9)	(0.8)	(0.9)	(0.9)	(0.9)
Total[b]	–	–	–	–	37.6	31.4	37.8	41.4	40.2	40.4

Notes:

a. 'Primary products' comprises SITC 0–4 and 'Manufactured products' comprises SITC 5–8.

b. Excluding SITC 6672 ('Diamonds, not industrial, not set') and SITC 6673 ('Other precious and semi-precious stone').

c. Values in parentheses are coefficient of variations of GLjt.1. The years are chosen keeping in mind the periodization used in Table 4.1 and the availability of data. COMTRADE data are available since 1962 for India and since 1984 for China. China's IIT estimates are provided since 1990 as there is considerable missing data pertaining to China for the earlier years. In order to deal with the 1991 balance-of-payment crisis, the Indian government took some temporary measures of import compression during the early 1990s. Import compression, however, was temporary and withdrawn by 1993. The year 1993 has been chosen (instead of 1992) keeping in mind the possibility that import compression might bias the estimates of India's IIT.

not set) and SITC 6673 (other precious and semi-precious stones). Due to their extremely high export (and import) values in India's trade, these commodities exert an undue influence on the overall index, that is a weighted average. Thus, when these commodities are excluded, China's manufacturing trade shows a higher level of IIT than India's although the difference has narrowed considerably over the years. By 2005 the manufacturing industries of the two countries showed roughly similar values on the IIT index: 42 per cent in India and 44 per cent in China. However, the overall level of IIT (primary and manufactured products combined) remains considerably higher in China than in India, due to the higher IIT in the primary products of China.

Since the trend analysis of two aggregated sectors might mask the differential performances at a more detailed level of the industry classification, I present the Grubel–Lloyd index at the one- and two-digit levels of SITC (see Table 4.3). There is a significant increase in the levels of IIT in the case of various food items in both India and China. In particular, processed food items show significant levels of IIT. As many as 21 primary product groups (out of 28) at the two-digit level showed a higher IIT index in 2005 compared with 1990 in India. In the case of China, 17 groups showed higher indexes in 2005 compared with 1990, while 11 groups showed a decline. Among the primary products, India's IIT is found to be the highest in 'fruits and vegetables' (SITC 05), 'miscellaneous food preparations' (SITC 09) and 'beverages' (SITC 11), while China shows significant levels of IIT in 'fish and fish preparations' (SITC 03), 'miscellaneous food preparations' (SITC 09) and 'tobacco and tobacco manufactures' (SITC 12).

India's manufacturing industries show steadily increasing levels of IIT. As many as 22 manufacturing industry groups (out of 28) at the two-digit level showed higher IIT index in 2005 compared with 1990 in India. Since the mid-1970s India has made periodic efforts at trade liberalization in selected industries, such as machinery. Thus, groups like machinery and transport equipment (SITC 7) attained relatively high IIT indexes as early as 1980 and increased further since then.

China's manufacturing trade recorded relatively high IIT intensity as early as 1990 and no consistent trend can be observed since then. This is expected, since China's trade liberalization was initiated a decade before India's. There are several important differences in the IIT industry pattern of the two countries. India's IIT is generally higher than China's in 'chemicals', 'non-metallic mineral manufactures', 'iron and steel', 'manufactures of metal', 'wood', 'furniture' and 'sanitary, plumbing, heating items'. China's IIT is higher than India's in 'machinery and transport equipments' 'leather products' 'textile yarn, fabrics, and made-up articles' and 'scientific and control instruments'. India's textile and leather industries were reserved for small-scale production (Ahluwalia

2002) and overly protected from imports until the early 2000s (Das 2003). These would have hobbled the rationalization process in these industries, therefore their low IIT intensity in India's trade until recently is not surprising.

In the year 2005, the Spearman rank correlation coefficient between the IIT indices of India and China at the four-digit level is only 0.27 in manufactures and 0.32 in primary products. The relatively small value of the correlations, although statistically significant, indicates considerable dissimilarities in the industry structure of IIT in India and China. This is consistent with the observation that China's export items are more 'sophisticated' than countries with similar relative endowments (Schott 2006) and that China sells products which are associated with a productivity level which is much higher than a country at China's level of income (Rodrik 2006).

A different way of addressing the temporal changes of IIT is by analyzing marginal IIT, that measures the share of IIT in the *change* in trade flows between the two years under consideration. The indexes of marginal IIT computed for the different time intervals are shown in Tables 4.4 and 4.5. These tables reinforce the findings discussed above based on the Grubel–Lloyd index. The value of the marginal IIT index in India's manufacturing sector is the highest for the time interval '2000 (over 1990)', a period which witnessed significant trade liberalization in India, compared with previous time intervals. The value of the index in India's manufacturing sector shows further growth in the more recent periods – specifically, '2005 (over 2000)' and '2005 (over 2002)'. In the case of China, the value of the marginal IIT index has remained above 40 per cent since 1990 and no particular trend can be observed. The pattern of marginal IIT at the two-digit level of SITC (Table 4.5) largely conforms to the general pattern here.

Apart from the evidence shown here, econometric analysis, using panel data from Indian industries, shows that the reduction of trade barriers contributed significantly to the increase in IIT intensity (Veeramani 2008). Similarly, the econometric analysis of China's bilateral IIT by Zhang, Witteloostuin and Zhou (2005) established the negative relationship between trade barriers and IIT. In short, both descriptive evidence and available econometric studies indicate that trade liberalization has had a positive effect on IIT in India and China.

While it is clear that trade liberalization causes higher levels of IIT, the effect of FDI inflows on IIT may differ depending upon the nature of the multinational activity in the host country. The relationship between FDI and IIT can be positive if the multinational activity is export-promoting in nature (vertical FDI), while it can be negative if the multinational activity is primarily targeted toward the domestic market (horizontal FDI).[9] According to the 2003 *World Investment Report* (UNCTAD 2003), FDI has contributed to the rapid growth of China's merchandise exports at an annual rate of 15 per cent

Table 4.3 *Intra-Industry Trade in India and China, Weighted Averages of GL_{jt}, Selected Years*

Code	Description	India						China		
		1962	1970	1980	1990	2000	2005	1990	2000	2005
0	Food & Live Animals	7	12	11	13	22	26	16	33	34
00	Live animals	0	4	4	0	0	22	6	9	30
01	Meat & meat preparations	1	0	0	0	0	0	13	60	23
02	Dairy products & eggs	2	2	3	26	26	7	7	27	21
03	Fish & fish preparations	5	0	4	0	1	3	14	50	56
04	Cereals & cereal preparations	0	4	22	25	5	3	17	14	19
05	Fruit & vegetables	53	56	18	30	65	61	9	15	23
06	Sugar, sugar preparations & honey	0	1	47	5	23	36	21	30	28
07	Coffee, tea, cocoa, & spices	3	1	4	3	12	32	5	13	21
08	Feed.-stuff for animals	0	1	1	1	8	6	37	40	24
09	Miscellaneous food preparations	64	80	0	46	43	50	58	39	45
1	Beverages & Tobacco	13	0	1	7	12	24	63	50	51
11	Beverages	3	2	66	78	57	60	27	28	33
12	Tobacco & tobacco manufactures	13	0	0	1	5	11	87	76	71
2	Crude Materials, inedible, except fuels	23	12	5	7	12	15	18	12	11
21	Hides, skins & fur skins	7	8	9	1	1	24	23	4	2
22	Oil-seeds, oil nuts & oil kernels	0	7	3	4	3	11	6	11	8
23	Crude rubber	0	0	0	1	9	35	10	8	9
24	Wood, lumber & cork	63	4	22	0	1	2	23	20	30
25	Pulp & paper	1	0	4	0	1	0	1	1	1
26	Textile fibers, not manufactured	37	22	1	10	18	35	23	13	15
27	Crude fertilizers & crude mineral	8	8	6	10	16	21	10	24	27
28	Metalliferous ores & metal scrap	8	5	6	4	9	10	17	4	7
29	Crude animal & vegetable materials	22	12	11	28	25	30	18	41	42
3	Mineral Fuels, lubricants	7	5	1	0	1	1	30	23	15
32	Coal, coke & briquettes	18	10	18	2	7	4	18	6	35
33	Petroleum & petroleum products	7	5	1	0	0	0	32	26	12
34	Gas, natural & manufactured	0	20	0	0	0	9	18	25	15
35	Electric energy	0	0	0	0	0	0	12	28	53
4	Animal & vegetable oils & fats	9	1	1	7	4	5	14	14	6
41	Animal oils & fats	3	0	4	52	78	36	3	13	19
42	Fixed vegetable oils & fats	4	1	1	2	1	2	14	14	4
43	Oils & fats, processed	31	16	8	62	31	24	11	15	26
5	Chemicals	7	23	17	33	52	58	40	36	42
51	Chemical elements & compounds	32	18	15	45	59	64	68	53	49
52	Crude chemicals	65	38	0	9	0	84	7	29	26
53	Dyeing, tanning & colouring materials	5	48	41	28	26	37	65	50	62
54	Medicinal & pharmaceutical products	9	48	72	49	45	42	71	39	37
55	Perfume materials, toilet & cleansing	32	40	21	43	56	59	34	56	55
56	Fertilizers, manufactured	0	0	1	0	4	1	2	14	22
57	Explosives & pyrotechnic products	0	28	7	40	37	65	1	1	2
58	Plastic materials, etc.	1	49	5	15	97	87	27	15	29
59	Chemical materials & products, nes	10	16	16	29	57	55	37	40	48
6	Manufs. classified chiefly by material	7	16	29	49	55	64	42	47	46
61	Leather & products & dressed fur skins	1	0	1	18	32	45	61	47	59
62	Rubber manufactures, nes	52	37	49	28	37	47	41	41	35
63	Wood & cork prodts excluding furniture	28	9	11	62	58	58	10	27	20

Table 4.3 (continued)

Code	Description	India						China		
		1962	1970	1980	1990	2000	2005	1990	2000	2005
64	Paper, paperboard & manufactures	5	14	4	10	49	42	49	36	44
65	Textile yarn, fabrics, made-up articles	9	2	2	11	15	31	47	65	53
66	Non-metallic mineral manufactures	18	69	82	84	82	83	36	43	45
67	Iron & steel	4	20	9	31	58	69	31	36	46
68	Non-ferrous metals	1	13	7	18	28	53	56	37	50
69	Manufactures of metal, nes	16	48	47	58	48	58	38	40	38
7	Machinery & Transport Equipments	3	21	32	37	50	38	54	60	52
71	Machinery, other than electric	4	19	34	40	49	45	38	61	56
72	Electrical machinery & apparatus	1	28	40	35	55	37	51	64	51
73	Transport equipment	3	22	22	29	45	30	78	31	41
8	Miscellaneous Manufactured Articles	14	8	8	8	18	19	25	23	26
81	Sanitary, plumbing, & heating	38	7	3	63	38	55	58	11	13
82	Furniture	49	31	28	82	80	81	37	8	8
83	Travel goods, h&bags & similar	6	0	0	0	3	10	3	2	4
84	Clothing	5	2	1	0	1	2	1	7	4
85	Footwear	0	0	0	0	4	11	1	1	2
86	Scientific & control instruments	8	9	19	22	36	34	74	70	57
89	Miscellaneous manufactured articles	21	14	28	31	49	30	53	30	28
9	Commodities & transactions not classified according to kind	3	2	38	10	2	4	24	53	50
94	Animals, nes, incl. zoo animals	9	3	58	37	0	11	24	52	52
95	Fircarms of war & ammunition	0	0	0	48	20	12	0	68	35
96	Coin, other than gold coin	0	0	0	0	0	0	13	4	45

between 1989 and 2001. In 1989 foreign affiliates accounted for less than 9 per cent of total Chinese exports, but by 2002 they provided 50 per cent. In contrast, FDI has been much less important in driving India's export growth, except in information technology. FDI accounted for only 3 per cent of India's exports in early 1990s, and in the 2000s it is estimated to account for less than 10 per cent of India's manufacturing exports. In short, while the multinationals mostly engage in export activities in China, they target the domestic markets in India (Wei 2005). This differential behavior of multinationals may be the result of the relatively high trade barriers in India (which encourage market-seeking FDI) and the rigidities in India's labor market (which discourage export- promoting FDI).

The econometric analysis by Zhang, Witteloostuin and Zhou (2005) established the positive impact of FDI on China's IIT, which is consistent with the evidence that China's inward FDI is mostly vertical (export-promoting) in nature. But another econometric analysis (Veeramani 2008) suggests that horizontal (market-seeking) multinational activities in the domestic industries of India exert a negative influence on IIT. This conforms to the consensus that India's inward FDI is mostly horizontal in nature and that the horizontal multinationals displace direct exports to the host country.

Table 4.4 Marginal IIT in India and China, Weighted Averages of Bj, at Selected Time Intervals

	India						China		
Groups[a]	1970 (over 1962)	1980 (over 1970)	1990 (over 1980)	2000 (over 1990)	2005 (over 2000)	2005 (over 2002)	2000 (over 1990)	2005 (over 2000)	2005 (over 2002)
Primary products	7.7	2.5	6.0	5.2	5.5	4.9	12.4	13.5	13.2
Manufactured products	14.3	25.0	31.0	37.5	45.2	44.4	42.8	41.0	41.8
Manufactured products[b]	11.6	14.7	21.4	27.0	40.3	40.5	42.6	40.8	41.8
Total	12.0	12.4	24.5	26.0	32.0	30.7	38.5	37.6	37.9
Total[b]	10.2	7.5	15.8	18.2	27.9	27.3	38.4	37.4	37.9

Notes:
a. 'Primary products' comprises SITC 0 – 4 and 'Manufactured products' comprises SITC 5–8.
b. Excluding SITC 6672 ('Diamonds, not industrial, not set') and SITC 6673 ('Other precious & semi-precious stone').

Table 4.5 Marginal Intra-Industry Trade in India and China, Weighted Averages of B_j

		India					China	
Code	Description	1970 (over 1962)	1980 (over 1970)	1990 (over 1980)	2000 (over 1990)	2005 (over 2000)	2000 (over 1990)	2005 (over 2000)
0	Food & live animals	13	8	17	19	17	28	33
00	Live animals	1	3	3	0	13	1	0
01	Meat & meat preparations	0	0	0	0	0	54	21
02	Dairy products & eggs	3	3	2	19	5	37	18
03	Fish & fish preparations	0	5	0	2	7	40	61
04	Cereals & cereal preparations	8	2	29	4	2	14	11
05	Fruit & vegetables	57	12	30	51	35	11	24
06	Sugar, sugar preparations, honey	0	37	49	22	6	24	18
07	Coffee, tea, cocoa, & spices	0	6	7	16	34	19	27
08	Feed.-stuff for animals	5	2	0	16	5	7	0
09	Miscellaneous food preparations	82	65	46	0	42	36	40
1	Beverages & tobacco	0	0	13	19	23	39	44
11	Beverages	7	8	75	42	43	24	30
12	Tobacco & tobacco manufactures	0	0	3	12	10	60	65
2	Crude materials, inedible, except fuels	3	3	3	7	12	9	9
21	Hides, skins & fur skins	9	5	0	1	37	0	1
22	Oil-seeds, oil nuts & oil kernels	0	4	6	2	19	2	3
23	Crude rubber	0	0	1	6	44	7	10
24	Wood, lumber & cork	3	42	0	1	3	20	28
25	Pulp & paper	0	6	0	3	0	1	1
26	Textile fibers, not manufactured	2	0	3	3	6	8	13
27	Crude fertilizers & crude mineral	2	1	5	20	27	26	26
28	Metalliferous ores & metal scrap	5	5	4	4	10	1	7
29	Crude animal & vegetable materials	4	10	16	18	22	48	43
3	Mineral fuels, lubricants	3	1	2	1	1	6	11
32	Coal, coke & briquettes	21	3	1	9	3	0	47
33	Petroleum & petroleum products	2	1	2	0	0	5	5
34	Gas, natural & manufactured	20	0	0	0	10	25	2
35	Electric energy	0	0	0	0	0	0	88
4	Animal & vegetable oils & fats	4	1	1	3	4	9	3
41	Animal oils & fats	0	15	0	69	14	16	58
42	Fixed vegetable oils & fats	2	1	0	1	2	7	2
43	Oils & fats, processed	29	6	25	23	11	15	36
5	Chemicals	19	13	27	31	53	30	44
51	Chemical elements & compounds	17	13	42	36	59	47	45
52	Crude chemicals	37	38	9	0	0	0	25
53	Dyeing, tanning & colouring materials	6	26	22	22	49	46	73
54	Medicinal & pharmaceutical products	39	60	38	32	36	23	35
55	Perfume materials, toilet & cleansing	1	18	53	29	55	48	53
56	Fertilizers, manufactured	0	1	1	5	0	8	18
57	Explosives & pyrotechnic products	0	6	11	31	44	1	5
58	Plastic materials, etc.	27	3	17	31	83	13	39
59	Chemical materials & products, nes	19	15	14	60	53	35	52
6	Manufs. classified chiefly by material	17	31	45	44	63	38	35
61	Leather & products, dressed fur skins	0	1	17	0	35	36	59

Table 4.5 (continued)

Code	Description	India 1970 (over 1962)	India 1980 (over 1970)	India 1990 (over 1980)	India 2000 (over 1990)	India 2005 (over 2000)	China 2000 (over 1990)	China 2005 (over 2000)
62	Rubber manufactures, nes	9	51	19	44	51	35	33
63	Wood & cork prodts excluding furniture	1	11	4	22	57	12	3
64	Paper, paperboard & manufactures	10	2	10	49	35	31	19
65	Textile yarn, fabrics, made-up articles	8	2	13	11	35	50	24
66	Non-metallic mineral manufactures	69	82	78	80	82	42	37
67	Iron & steel	16	7	20	8	67	28	47
68	Non-ferrous metals	4	3	1	15	47	35	37
69	Manufactures of metal, nes	18	48	59	39	63	37	37
7	Machinery & Transport Equipments	10	30	34	44	34	59	48
71	Machinery, other than electric	8	33	42	44	43	63	51
72	Electrical machinery & apparatus	23	44	30	56	31	62	46
73	Transport equipment	10	15	25	18	26	28	39
8	Miscellaneous Manufactured Articles	3	7	7	23	19	24	27
81	Sanitary, plumbing, & heating	4	2	64	32	53	7	13
82	Furniture	0	27	0	80	81	5	8
83	Travel goods, h&bags & similar	0	0	0	5	22	2	7
84	Clothing	2	1	0	1	3	9	3
85	Footwear	0	0	0	7	16	1	4
86	Scientific & control instruments	4	22	20	45	30	70	52
89	Miscellaneous manufactured articles	4	22	26	52	20	29	27
9	Commodities & transactions not classified according to kind	2	0	4	2	0	11	8
94	Animals, nes, incl. zoo animals	47	0	19	16	0	0	0
95	Firearms of war & ammunition	0	0	53	14	4	68	68
96	Coin, other than gold coin	0	0	0	0	0	4	54

Having established the growing significance of IIT in India and China, the next section examines the relative shares of horizontal and vertical IIT (see Table 4.6). The results suggest that vertical IIT constituted the major share of India's total IIT across all the commodity sections in 1990–91 as well as in 2005–06. However, the growing significance of HIIT in India's trade is evident. The increased intensity of total IIT in 2005–06 over 1990–91 is shared by both HIIT and VIIT indexes in all the commodity sections. It is also evident that in most of the commodity sections VIIT arises in India's trade primarily due to the exports of low-quality varieties from India and simultaneous imports of high-quality varieties from other countries (LVIIT). Nevertheless, the share of the high-quality VIIT (in total VIIT) seemed to have increased in 2005–06 (compared with 1990–91) in many commodity sections, including: 'chemicals', 'plastics and rubber', 'textiles', 'footwear and umbrellas', 'base metals',

Table 4.6 HIIT and VIIT in India's Trade, 1990–91 and 2005–06

		1990–91				2005–06			
Code	Sections	HIIT	VIIT	Total IIT	LVIIT (%of VIIT)	HIIT	VIIT	Total IIT	LVIIT (%of VIIT)
I	Live animals, products	0.0	0.5	0.6	22.7	0.7	2.4	3.1	47.2
II	Vegetable products	0.1	19.5	21.7	11.5	0.2	33.1	33.3	11.2
III	Fats & oils	0.0	5.8	6.2	7.6	1.0	3.4	4.4	1.8
IV	Beverages & tobacco	0.1	8.5	8.8	34.5	3.1	12.2	16.1	66.7
V	Mineral Products	0.0	0.5	0.6	98.9	0.0	1.8	16.2	61.1
VI	Chemicals	1.2	25.9	29.4	68.2	10.1	31.1	41.2	49.4
VII	Plastics & rubber	0.6	12.6	13.3	79.5	18.5	40.4	59.0	65.2
VIII	Hides, skins & leather	3.3	10.5	13.8	0.3	1.8	14.5	16.3	21.7
IX	Wood & cork	0.3	0.9	2.0	0.3	2.0	8.7	10.8	41.7
X	Paper	0.4	7.9	8.3	65.9	2.7	30.3	33.1	88.5
XI	Textiles	0.7	1.9	4.9	65.9	2.4	8.3	14.9	58.8
XII	Footwear, umbrellas etc	1.0	2.6	3.6	89.5	0.2	14.9	15.2	7.0
XIII	Stone & cement	0.2	19.7	23.7	41.9	3.7	33.4	38.8	82.0
XIV	Gems & Jewelry	0.0	1.3	47.1	9.6	2.5	16.1	18.6	1.6
XV	Base Metals	2.9	19.0	22.7	96.9	12.8	29.4	42.2	85.2
XVI	Machinery	0.5	26.9	27.5	82.4	1.8	36.5	38.6	74.4
XVII	Transport equipments	0.4	25.9	26.9	79.0	0.9	31.5	32.3	97.1
XVIII	Instruments, apparatus	0.2	10.9	12.3	96.8	1.7	31.7	38.3	70.0
XIX	Arms & ammunition	0.0	23.3	30.9	95.2	0.0	29.6	29.6	42.4
XX	Misc. Manufactures	2.0	10.4	25.2	99.5	4.5	50.0	58.4	58.7
XXI	Works of art etc	0.0	0.1	4.6	97.4	19.3	2.9	22.2	82.3

Note: Total IIT differs from the sum of HIIT and VIIT due to the residual.

'machinery', 'instruments and apparatus' and 'miscellaneous manufactures'. In short, it is clear that while VIIT dominates the IIT of India, HIIT seems to be gaining importance. Further, low-quality VIIT accounts for the major share of India's VIIT, although the share of high-quality VIIT is clearly on the increase.

The predominance of VIIT over HIIT in China's trade has been established in Hu and Ma (1999) and Zhang, Witteloostuin and Zhou (2005). While the VIIT index in China's total trade increased from 19.4 per cent during 1992–94 to 32.4 per cent during 1999–2001, the HIIT index declined from 11.4 per cent in the first period to 7.6 percent in the second period (Zhang, Witteloostuin and Zhou 2005). By comparison, HIIT in India's total trade increased from 0.7 per cent in 1990–91 to 4 per cent in 2005–06, while VIIT increased from 9.7 per cent to 18 per cent.[10] In short, VIIT dominates the IIT of both India and China; therefore comparative advantage, on the basis of factor endowment differences, has an important role in explaining the IIT in both the countries.

The analysis used in this chapter has a multilateral context – that is, IIT has been measured with respect to the trade relation of each country (India and

China) with the rest of the world. A detailed analysis of IIT in the bilateral trade of India and China is beyond the scope of this chapter. My previous studies have established that, unlike industrialized countries, India tends to have relatively less IIT with countries at a similar stage of development: India's IIT is more intense with high-income countries than with low- and middle-income countries (Veeramani 2002). The intensity of India's IIT showed considerable variation across the trading partners. The econometric analysis, carried out to explain the cross-country variation of India's IIT, provided support to the hypotheses drawn from the theoretical models of VIIT. For example, greater factor endowment dissimilarity between India and her trading partners promotes IIT intensity. Further, IIT is higher if the trading partner is larger in size and is closer geographically (Veeramani 2002).

Hu and Ma (1999) and Zhang, Witteloostuin and Zhou (2005) established significant variation in the intensity of China's bilateral IIT across the developing and developed countries. Their econometric analysis provided support to the various hypotheses drawn from the theoretical models of IIT. For example, *similarity* between China and its trading partners was found to be important in explaining HIIT, while China's *difference* from her trading partners is important in explaining VIIT. Further, trading partners with a larger market size tend to display higher HIIT and VIIT, while greater geographical distance between China and her trading partners discourages both types of IIT.

CONCLUSION

While both India and China failed to take advantage of opportunities offered by growing world trade under import substitution, the export levels of both the countries have been growing faster than the growth rate of world exports since they began economic reforms. India's share of world exports has been increasing since the 1990s, yet she contributed only 1 per cent of total world exports in 2006. The export performance of China, in comparison, has been spectacular, accounting for nearly 8 per cent of world exports in 2006. Several factors might have contributed to the superior export performance of China, such as a favorable exchange rate, large domestic market, flexible labor market and the huge volume of vertical FDI inflows.[11] The analysis in this chapter showed that China's rapid export growth has been accompanied by significant changes in the commodity composition of China's exports. India's export structure, in comparison, has been more persistent over time. This observation underlines the imperative of achieving structural changes, on the basis of a country's comparative advantage, for rapid export growth. Rapid structural changes in production and exports, in turn, are facilitated, *inter*

alia, by a flexible labor market. Rigidities in India's labor market stand in the way of maximizing the allocative efficiency gains from trade liberalization. A flexible labor market, low trade barriers and adequate physical infrastructure are imperative for attracting vertical (export-promoting) FDI. All these factors make China an attractive destination for vertical FDI compared with India. Viewed from this perspective, China's rapid export growth of labor-intensive products, compared with India's, is not surprising.

While labor-market rigidities might have discouraged vertical FDI and the inter-industry reallocation of productive resources in India, the Indian firms could survive competition from imports, *inter alia*, by rationalizing the choice of their product line and by reallocating resources within the firm. Thus, the significant growth of intra-industry trade (IIT) in India's manufacturing sector is not surprising. By 2005, the manufacturing industries of India and China show a roughly similar intensity of IIT. Growing IIT reflects greater specialization in unique varities and product lines by the individual plants in India and China. The apprehension that import liberalization might lead to the large-scale demise of domestic industries in developing countries (the fear of de-industrialization) is unwarranted. The majority of domestic manufacturing industries and firms in both India and China could compete and survive by specializing in narrow product lines.

The analysis showed that vertical IIT (VIIT) dominates the IIT of both India and China. Further, low-quality VIIT accounts for the major share of India's VIIT, although the share of high-quality VIIT and horizontal IIT (HIIT) show some increase in the recent years. Low-quality VIIT refers to the export of low-quality varieties and the simultaneous import of high-quality varieties within the same industry. Though IIT has been growing in both India and China under trade liberalization, the dominance of VIIT (rather than HIIT) implies that trade liberalization may entail some adjustment costs in both countries. Nevertheless, growth of any type of IIT generally implies relatively lower adjustment costs compared with the adjustment costs associated with the growth of inter-industry trade. The primary sector, however, might have faced and may continue to face greater adjustment difficulties under trade liberalization, since the scope for intra-industry specialization is much more limited in the primary sector.

New policy measures are needed to attract vertical FDI into India, if multinationals have to augment the process of integrating Indian industry with the fragmented structure of global production activities. A flexible labor market, with appropriate social safety nets, would stimulate the ongoing process of resource reallocation and would lead to a rapid growth of labor-intensive exports from India.

NOTES

1. Empirical tests of this hypothesis can be seen, for example, in Greenaway, Hayes and Milner (2002) and Brülhart (2000).
2. For details of China's trade reforms, see Lardy (1992, 2002).
3. 'Any firm wishing to close down a plant or to retrench labor in any unit employing more than 100 workers can only do so with the permission of the state government, and this permission is rarely granted' (Ahluwalia 2002, 76). Besley and Burgess (2004) establish the deleterious effect of labor market rigidities in India's manufacturing production.
4. In a review of economic policy reforms in developing countries, Krueger (1992,104) noted that '[i]n some instances, firms that held monopoly or quasi-monopoly positions in the domestic market and that were high-cost have been able to make sharp reductions in their cost structure once incentives have been changed. This can come about because of increased specialization within individual plants in fewer lines of output, because of rationalization or for other reasons'.
5. It is well known that China has witnessed major reforms since the late 1970s. As far as India is concerned, a major depreciation of the real effective exchange rate (REER) of the rupee and increased export subsidies led to an improvement in export competitiveness during the second half of the 1980s (Joshi and Little 1994). This period also witnessed some doses of industrial deregulation and liberalization of capital goods imports in India.
6. Estimated from COMTRADE-WITS.
7. Use of a more detailed system of classification is not necessarily better, as it might separate commodities which are good substitutes in production and consumption (Balassa 1979).
8. As the unit values are more reliable at the finer level of data disaggregation, I use the data at the six-digit level rather than at the four-digit level.
9. 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. 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 (Markusen 1995).
10. Note that Zhang, Witteloostuin and Zhou (2005) used the unit value data at the four-digit level of SITC which is substantially more aggregated than six-digit ITC data used here. Further, Zhang, Witteloostuin and Zhou used a unit value dispersion of 25 per cent to disentangle HIIT and VIIT, while I used a dispersion of 15 per cent, that is used more frequently in the literature. Thus, my estimates for India are not strictly comparable with the ones for China provided in Zhang et al. It may also be noted that the criterion of 25 per cent unit value dispersion would lead to higher estimates of HIIT than the criterion of 15 per cent unit value dispersion. In fact Zhang, Witteloostuin and Zhou noted that using the criterion of 15 per cent results in very low HIIT indices for China. Thus, based on the HIIT indices reported above for India and China, it cannot be concluded that Beijing has a higher HIIT intensity than New Delhi.
11. Even after adjusting for the 'round tripping' of capital and other definitional problems, the gap in the volume of FDI into China and India remains very high (Wei 2005).

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