

# **India's Intra-industry Trade:**

**An Analysis of the Pre-reform and Post-reform trends**

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**CERTIFICATE**

This is to certify that the dissertation entitled "**India's Intra-industry Trade: An Analysis of the Pre-reform and Post-reform trends**" submitted by **Debashis Chakraborty**, in partial fulfillment of the requirements for the award of the degree of **MASTER OF PHILOSOPHY**, is his own work and has not been submitted for the award of any degree of this or any other university.

We recommend that this dissertation be placed before the examiners for evaluation.

Prof. Alokesh Barua

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# Chapter 1

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## The Effects of Economic Liberalisation on Trade

There has been an extensive literature in international economics to show that introduction of economic reform policies are in general results in rapid expansion of trade and associated with economic growth in long run. The basic arguments floated in favour of liberalisation are (i) liberalisation reduces static inefficiencies arising from resource misallocation and waste, (ii) liberalisation enhances learning, technological change and economic growth, (iii) outward-oriented economies are better able to cope with the adverse external shocks, (iv) market-based economic systems are less prone to wasteful rent-seeking activities.<sup>1</sup> However, the dissertation will not explore the issue of growth in general, but concentrate on a particular aspect of liberalisation, namely, the consequence and nature of trade expansion in the post-reform period.

The idea mentioned above could be expanded in the following line. In the post-liberalisation period, the market-driven forces assume an increasingly important role and participation of private initiatives and enterprises ensure achievement of dynamic efficiency in the long run. The dynamic efficiency is reaped by the domestic producers in terms of productivity growth and attainment of scale efficiency. The scale efficiency in turn allows the producers to specialise in narrow product lines, and thereby creates a basis for intra-industry trade. The production structure of the economy also undergoes a change, the impact of which depends upon the extent of price distortion in the pre-reform era. The structural adjustment also helps the economy to achieve the international division of labour and technological advancement through proper utilisation of investment. Finally, the opening up of the economy helps in achieving and maintaining high rate of economic growth through globalisation. The increase in trade volume in the post-liberalisation period helps countries to improve their position in the world economy, apart from increase in income, consumption and economic growth at the domestic front. The literature on international trade suggests that policy of trade reform is always welfare raising.



The phenomenon of trade-led growth strategy has received tremendous support from the empirical literature on international trade. Specifically, the experience of the South-East Asian economies, namely Taiwan, South Korea, Hong Kong and Singapore has shown the efficiency of the export-oriented growth strategy in an open policy environment. In the sixties and seventies, a reform process was initiated in Korea and Taiwan to reduce the restrictiveness of trade regime to establish a free-trade regime for exporters. Since then, trade reform has been implemented in those countries in a gradual and coordinated manner. The liberalised framework also allowed the countries to reach a higher technological standpoint. Initially, the export baskets of these countries were characterised by predominance of labour-intensive industries. However, in subsequent period, they gradually shifted to technologically more advanced sectors. The success of the South-East Asian countries undoubtedly reaffirmed the superiority of outward-oriented growth policy over a import-substituting policy. No country can hope for economic development in today's world by following a policy of self-sufficiency.

### **Economic Reforms and Changing Pattern of Trade**

The phenomenon and outcome of trade liberalisation has been explained by trade theory with the help of two different frameworks. The first and foremost of the theories are the conventional factor proportion theory, developed in line with the notion of 'advantage'. The advantage theory was proposed by Smith and Ricardo and later extended by Heckscher-Ohlin-Samuelson (henceforth H-O-S) through their famous model to provide a solid theoretical backbone to the directional flow of international trade in line with the classical models. The model operated on a 2-commodity, 2-country, 2-factor framework and determined the basis of international trade in terms of comparative cost advantage. The two factors of production being capital and labour, the theory suggests that the capital-abundant country should export the capital-intensive product to the labour-abundant country and import the labour-intensive product from the later in return. In other words, like the classical trade models, the H-O-S model also proposes that an international specialisation pattern will evolve on the basis of the production efficiency. The capital-abundant country will specialise in the production of the capital-intensive commodity and vice-versa. The

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<sup>1</sup> Rodrik (1995), pp. 2932

specialisation could be complete or incomplete depending upon the production condition in these two countries.

The H-O-S theorem was readily accepted, as it drew support from the real world experience. The capital-intensive countries were identified with the developed countries (i.e., the North) and the labour-intensive countries were identified with the developing world (i.e., the South). It was generally proposed that the developed countries being relatively capital abundant, possess a comparative advantage in capital-intensive goods and hence will export manufactured items to developing countries. Similarly, the developing countries being relatively abundant in labour and land will export primary commodities or labour-intensive products to their developed counterparts. The trade pattern of various countries at different stages of development provided empirical evidence to this contention. Although Leontief's (1953) findings were not in line with the H-O-S result, several economists concluded that Leontief paradox arises from the computing methodologies.<sup>2</sup>

However, the H-O-S model assumed free trade to be prevalent, which under normal circumstances undoubtedly gives rise to inter-industry specialisation. However, trade is generally distorted by policy instruments like tariff and quota, and hence reforms in external sector does not necessarily lead to inter-industry trade. Countries tend to produce all commodities, even if their production does not fit in the line with the comparative advantage. Hence, the experience from the real world suggests that the trade pattern in the post-liberalisation era could also be explained in an alternate manner, which was defined by economists as intra-industry trade (henceforth IIT). The difference between the traditional inter-industry trade and IIT was that, while the former ruled out the possibility of overlap in trade, it was acknowledged in the later. IIT could be identified by simultaneous export and import of commodities.

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<sup>2</sup> Buchanan (1955) argued that Leontief's capital coefficients were actually investment requirement coefficients and therefore take no account of durability of capital. Loeb (1954) concluded that the capital-differences between export sector and the import-competing sector was not statistically significant. Swerling (1954) opined that 1947 as a sample year was an atypical one. Leamer (1980) argued that when a capital-abundant country has trade imbalance, the H-O-S does not necessarily lead to the conclusion that its exports will be relatively capital-intensive.

The concept of IIT carries more sense in the era of international trade rather than the notion of inter-industry trade fuelled by comparative advantage theory. In a world comprising multi-product industries, domestic producers possess comparative advantage in certain industries in comparison with producers in other countries and have simultaneous comparative cost disadvantage in other commodities within a specified commodity group. Hence for any developed and developing country, IIT can explain a significant portion of trade with its partners. It will be an interesting exercise to explore the trade pattern in developing countries like India in the post-liberalisation period.

The trade pattern of developed countries supported this claim, which was predominantly skewed in favour of simultaneous export and import of manufactured items.<sup>3</sup> This phenomenon could not be explained by the conventional factor proportion theory and a new set up was required to theorise this new concept. Linder (1961) argued that the similarity in demand pattern originating from similarity in income could explain the simultaneous export and import of commodities.<sup>4</sup> In subsequent period, the contributions of Dixit and Stiglitz (1977); Krugman (1979 and 1980) and Lancaster (1979) paved the way for theorizing IIT through imperfect competition theories. The Dixit-Stiglitz model considered the monopolistic competition theories instead of perfect competition and discussed optimum product diversity in presence of scale economies. Krugman developed a model where trade was created due to economies of scale rather than differences in factor endowments or technology.<sup>5</sup> The model conclusively proved the existence of gains from trade as the world economy would now produce a greater diversity of products. Lancaster also showed that given economies of scale, the market structure prevalent in industrialised countries would

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<sup>3</sup> Grubel-Lloyd (1975) found that the proportion of simultaneous trade in manufactures explains a significant proportion of total trade for developed countries. Linnemann (1992) found that the trade in manufactures among developing countries and between developed and developing is increasing over time. International Trade Statistics (2000) provided by WTO also shows that the phenomenon of simultaneous export and import of manufactured items is not uncommon across trading nations.

<sup>4</sup> Apart from this, Vernon (1966) and Posner (1961) explained the existence of north-south trade in manufactured commodities by international spillover of technology, which was ruled out by traditional trade models.

<sup>5</sup> "The approach differs from that of most other formal treatments of trade under increasing returns, which assume that scale economies are external to firms, so that markets remain perfectly competitive." Krugman, 1979, pp. 469

result in a high volume of IIT among them, although H-O-S does not predict a basis of trade in this case.<sup>6</sup>

### **IIT and Trade Liberalisation**

Grubel and Lloyd (1975) attempted to find out the proportion of total trade explained by IIT by analysing the trade pattern of a number of developed countries. The sample period was of immense importance as it experienced a wave of trade liberalisation in the sixties and seventies. To be specific, the Dillon Round (1960-61), Kennedy Round (1964-67) and Tokyo Round (1973-79) of GATT negotiations were concluded in that period, which resulted in a massive reduction in tariff and non-tariff barriers across the globe.<sup>7</sup> A sectoral analysis of the trade pattern of a number of developed countries revealed that the IIT indices for manufacturing commodities (SITC 5-8) hold a very high value. This led the authors to conclude that a significant proportion of total trade could be explained by IIT instead of conventional inter-industry trade.

The existing literature on IIT suggests that economic liberalisation process is in general associated with not only an increase in the value of total trade (including export and import) but also the IIT index. The theoretical basis is that liberalisation, either through multilateral negotiation process or through formation of regional trade bloc, facilitates trade expansion. On one hand, domestic players obtain more access in foreign markets, and on the other importers fully utilise this favourable condition. Therefore, it is common to observe that in the post-liberalisation period, simultaneous export and import of similar items are enhanced. The incidence becomes almost a certainty, if the endowments of the members of the regional trade bloc are similar in character.<sup>8</sup> In addition, the developed-developing country trade agreements have also shown the incidence of high level of IIT in the post-bloc formation period.

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<sup>6</sup> In short, three basic assumptions of the H-O-S model, namely, perfect competition, homogeneity of commodities and constant returns to scale, were replaced by alternate (and more realistic) assumptions of monopolistic competition, heterogeneous products and increasing returns to scale in these models, all of which were more compatible with real world scenario.

<sup>7</sup> "WTO: Trading into the Future" (April 1999)

<sup>8</sup> Presumably, the rise in IIT could be explained by Linder thesis, which considers similarity in demand via similarity in income as a strong basis for trade.

Several exercises have been undertaken by economists from time to time to analyse the impact of trade bloc formation on IIT. A sectoral analysis by Balassa (1966) on the common market manufacturing after formation of EEC has shown that the increased intra-bloc trade in manufacturing is associated with predominance of IIT. Existence of product differentiation allowed a possibility of an enhanced exchange of clothing articles, automobiles, machinery and equipments, as the intra-bloc tariff reduction acts in favour of specialisation in narrower range of products. Balassa argued that the prevalence of IIT in intra-EEC trade could be explained in this line, since the export patterns of the member countries has become more uniform in the post-bloc formation period. Faustino, Silva and Carvalho (1998) have also shown a sharp increase in the bilateral IIT between Portugal and Spain after both countries join EU. Analysing the impact of free trade agreement between Australia and New Zealand, Lloyd (1971) found that the level of IIT has increased considerably in the post-bloc formation period.<sup>9</sup> Two separate studies by Globerman (1990) and Andresen (2001) revealed that the formation of NAFTA has been very successful in increasing intra-bloc trade, and a significant portion of this increase in trade could be explained by IIT.<sup>10</sup>

The predominance of IIT in capital-abundant industrial economies, like EEC countries is not surprising. However, in order to draw a firm conclusion regarding regional trade liberalisation and IIT level, the developing country perspective must be considered. Willmore (1970) analysed the trade pattern of Central American Common Market (CACM) involving five developing countries, and found IIT index as well as the share of manufactures in the intra-region trade to increase considerably in the post-bloc formation period. The conclusion was that the consumer and capital goods industries in the CACM market had adjusted themselves in the form of intra-industry specialisation in production in the post-bloc formation period.<sup>11</sup> Musonda (1997) measured IIT between members of

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<sup>9</sup> IIT as percentage of the bilateral trade between Australia and New Zealand is higher than that between Australia and any of its trading partners, at all levels of aggregation.

<sup>10</sup> Globerman found that even though in the initial period, the weighted and unweighted IIT level between US-Canada was much higher than the same between US-Mexico, in the final year, these two stood at a comparable level.

<sup>11</sup> Willmore found that the share of IIT for consumer good industries was higher than the intermediate goods industries. He justified the finding by suggesting that product differentiation was higher among consumer goods than capital goods.

Common Market for Eastern and Southern Africa (COMESA), consisting twenty developing countries of Eastern Southern and Central Africa. The empirical estimates have shown that, although the level of IIT index has varied across member countries depending upon geographical proximity, similarity in export pattern etc., in general, the bloc formation has facilitated IIT.

The issue of existence of IIT has long been accepted as a common phenomenon. Several studies have proved that IIT is not something exclusive to the developed world, but a significant portion of trade for a number of developing countries could also be explained in this line. In this regard, the works of Balassa (1966), Grubel and Lloyd (1975), Aquino (1978), Tharakan (1983), Greenaway (1983), Falvey (1981), Havrylyshyn and Wolf (1983) could be mentioned. In recent periods, the shift of emphasis on IIT has shifted from looking at mere existence to analysing the nature of IIT and estimating the determinants of such trade.

#### **Difference in the types of IIT**

The theoretical literature on IIT, in general, suggests existence of two types of IIT, namely, horizontal and vertical IIT. Horizontal IIT is generally associated with trade in commodities differentiated by attributes. On the other hand, vertical IIT is prevalent when trade in commodities differentiated by quality takes place. Horizontal IIT are supposed to be more relevant when countries at similar stage of economic development trade with each other. Vertical IIT becomes particularly important when trade among unequal countries takes place. The recent empirical literature has, however, shown that even in trade among developed countries, vertical IIT could explain a substantial proportion.<sup>12</sup>

The horizontal and vertical specialisation pattern could again be discussed in two different ways. The first method is explained with the help of quality specialisation, i.e., the nature of trade is determined with respect to the quality of the products involved in the two-way trade, as reflected in the unit-price ratio of exports and imports. Here, the basic

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<sup>12</sup> The vertical or horizontal specialisation in recent literature is defined in the following way by calculating unit value index, which is discussed in detail in chapter 2. This method has been adopted by Abed-el-Rahman (1991), Greenaway, Hine and Milner (1995), Aturupane, Djankov and Hoekman (1997) and others.

difference between these two types of IIT arises from the difference in explanatory variables. Horizontal IIT could be explained by the economies of scale in the presence of product differentiation and imperfect competition. On the other hand, vertical IIT is more similar to the traditional trade models, as there exists a significant difference in factor endowment ratio of the trading partners. Falvey (1981) considered a single industry in a partial equilibrium framework and found that it is characterised by a stock of industry-specific capital and produces a continuum of products differentiated by quality. The products with higher capital-labour ratio are situated in the upper segment of the quality chain and vice versa. Therefore, within an industry, the capital-abundant countries in general export higher quality products and the labour-abundant countries do the reverse. Existence of two-way trade ensures certain demand in developed countries for lower quality products and vice versa. The basic glimpse of the model is presented below.

The two main differences of this model with the traditional H-O-S model are that, capital is industry-specific in this model and at least one sector produces differentiated goods. Now, the industry, which produces the quality-differentiated goods, is assumed to be able to produce a continuum of products given by the index:

$$\alpha (\alpha^L < \alpha < \alpha^H) \quad (1)$$

Where the superscripts L and H depict the lower and the higher quality of the product respectively.

The cost of producing a given quality is given by:

$$C(\alpha) = w + \alpha \cdot r \quad (2)$$

Where w and r represents wage rate and rental rate respectively.

Falvey assumes  $w^* < w$  and  $r^* > r$  in order to incorporate provisions for trade in the model (expressions with superscript '\*' represent the wage and rental rate in foreign country). The assumption ensures the existence of a range of qualities, which are produced in the home country at a lower unit price, and another range of products, which are produced in the foreign country at a lower price. Since,  $C(\alpha)$  and  $C^*(\alpha)$  are continuous in  $\alpha$ , for any

given  $r^* > r$ , there exists some 'marginal quality'  $\alpha_1$  such that  $C(\alpha_1) = C^*(\alpha_1)$ . Hence, substituting the values of  $C(\alpha_1)$  and  $C^*(\alpha_1)$  in the equality from equation (2):

$$\alpha_1 = (w - w^*) / (r^* - r) \quad (3)$$

For all other qualities,  $C(\alpha) - C^*(\alpha) = (\alpha_1 - \alpha) \cdot (w - w^*) / \alpha_1$ . Since, by assumption,  $w^* < w$ , and  $\alpha_1$  is always positive,  $(w - w^*) / \alpha_1$  will always be positive. Hence,

$$[C(\alpha) - C^*(\alpha)] < 0, \text{ for } \alpha > \alpha_1; \quad [C(\alpha) - C^*(\alpha)] > 0, \text{ for } \alpha < \alpha_1 \quad (4)$$

From equation (4), it could be inferred that home country has a comparative advantage in goods with greater quality than  $\alpha_1$ , and the foreign country has a comparative advantage in goods with lesser quality than  $\alpha_1$ . Therefore, as long as there exists a demand for high and low quality goods, vertically differentiated IIT will occur (Greenaway and Milner, 1986).

Falvey and Kierzkowski (1987) developed this idea in a more concrete way. Each individual was assumed to demand only one particular differentiated product and given the relative prices of these differentiated products, the preferred quality was determined uniquely by the individual's income. Since, the income level of individuals differ in a society, the aggregate demand consists of a band of differentiated products.

Several economists have tried to explore the basis of trade in commodities differentiated by quality. Falm and Helpman (1987) developed an alternate method to define higher quality products, where the higher quality products were represented on the basis of usage of relatively large labour inputs. The differences in income distribution ensured the existence of trade in this case similar to the analysis of Falvey and Kierzkowski. Shaked and Sutton (1984) defined the quality differences in an alternate manner, where the primary focus is on markets, which consider R. & D expenditure as a prerequisite for quality improvement. The authors suggested that if the countries in trade are dissimilar, then the higher income country specialises in higher quality products and vice versa, thereby resulting in vertical IIT. Tharakan and Kerstens (1995) argued that income distribution situation in North and South is sufficient to ensure a situation where low income groups in the former will generate demand for low quality goods and high income groups in the latter



for high quality goods, thereby generating IIT within the industry between the two types of countries.

Now, the second definition deals with IIT pattern relies on end-use of a product. It is often observed that a substantial proportion of trade in industrial items is held not in final products but in raw materials and semi-finished goods. The idea theorised by Sanyal (1983), in a two-country, one-good, one-factor framework has shown that a good has many stages along its vertical spectrum, and a country can specialise in any one of these stages. The framework developed in the analysis suggested that if the trading countries specialise in the particular stage of production according to their comparative advantage, then both would experience welfare gain. The model provided a theoretical framework for analysing the trade pattern of countries in developed-developing country framework, where the traditional trade models suggest that exports of less developed countries are dominated by raw materials and primary goods and the developed countries in general export finished products.

Several empirical analyses have conclusively shown the predominance of vertical specialisation in international trade. It could be seen from the empirical literature that the predominance of vertical specialisation is not development specific, as it holds an important position, both for developed and developing countries. A cross-industry analysis of UK's trade by Greenaway, Hine and Milner (1995) has shown that the vertical IIT was consistently higher and of more importance than horizontal IIT.<sup>13</sup> Bocconi (2000) has shown that Italy's bilateral trade with other European countries is predominantly vertical. Andresen's analysis (2001) on NAFTA also revealed the predominance of vertical specialisation in the trade pattern.

Aturupane, Djankov, and Hoekman (1997) have attempted to isolate the importance of vertical and horizontal IIT in trade between West Europe and eight Central and East European countries, all of which show a relatively high level of IIT with EU. The results show that the extent to which vertical IIT dominates horizontal IIT for all these eight

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<sup>13</sup> The analysis involved 77 industries at 5-digit level of SITC classification.

countries is remarkable. The conclusion is that vertical IIT accounts for 80 to 90 percent of total IIT.

Hellvin, (1996) found that the IIT between China and the OECD is mainly of vertical nature, due to large differences in relative factor endowments, and China is exporting lower quality products in exchange of higher quality products.<sup>14</sup> Tharakan and Kerstens analysed the trade between eight developed EC countries and a number of low-income toy-producing nations in Asia. The econometric findings suggested that the bilateral IIT between the high-income countries and the low-income countries in the toy industries is determined significantly by horizontal product differentiation and economies of scale. It was also suggested, that the protection provided to the toy industry in the industrialised countries has led to this kind of trade pattern.

#### **Intra-industry trade and welfare**

Although the concept of free trade under traditional trade models is welfare raising for the country as a whole, it poses a redistributive cost on the economy in the short run. When trade opens up, the capital-abundant country would export capital-intensive product and import labour-intensive product from labour-abundant country, in line with the comparative advantage. Therefore, the domestic import-competing sector will lose out to cheaper imports and hence there will be a consequent reallocation in the labour market. This movement, at least in the short run, is potentially welfare reducing.

The imperfect competition models, aided with the assumption of product differentiation and the demand for variety, on the contrary suggests that IIT could be welfare improving as adjustment to trade expansion might be easier. The welfare gain is generated by two aspects, scale efficiency and absence of adjustment cost. Firstly, as a result of IIT, firms specialise in narrow product lines, and hence they could reap the benefits of scale economies. Secondly, unlike the case of the traditional trade theories, the IIT type of trade does not require closure of any sector of the economy, and hence the adjustment problem

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<sup>14</sup> The result is not very surprising since over the years, the Chinese export pattern has become more skewed towards manufactured items. The proportion of manufactured items in total exports increased from less than 50 percent in 1950s to over 80 percent in 1992.

does not arise in this case. Krugman (1981) has argued that the welfare impact of IIT type of trade yields a better outcome than the same under conventional type of trade. It has been shown by Krugman that if countries have sufficiently similar factor endowments, both factors could gain from trade and substitutability of products has a major role to play. The study arrived at a conclusion that growth of IIT is not likely to pose serious income-distribution problems.

However, several economists also argued that considering availability of wider range of products as a source of welfare gain might not always be appropriate. It has been shown by Spence (1976), and Scherer (1980) that in most circumstances, there exists a socially optimal level of product variety. It has been pointed out by James and Stewart (1981), Greenaway and Tharakan (1986) that if the trade level in differentiated commodities crosses that "socially optimal" level then welfare could be actually reduced. James and Stewart argued that trade in differentiated goods between developed and developing countries could reduce welfare as a result of introduction of "inappropriate" product varieties.

### **Economic Reform Experience in India**

To appreciate the ongoing liberalisation process since 1991, an analysis of India's trade regime in the pre-reform period should be mentioned in brief. After attaining independence, the policymakers of the country decided to put a cap on dependence on rest of world by achieving the goal of self-reliance. To materialise this objective, they formulated a centrally planned economy, which was guided by the motive of import-substitution led growth. No specific stress was given towards expanding exports in the initial years, which is reflected in the declining trend of India's share in world exports throughout the period.<sup>15</sup> The import regimes were also skewed in favour of capital goods industries (e.g. machinery and equipments) for supporting the ongoing industrialisation process and fuels (oils and lubricants). The Import Licensing policy and other similar procedural hassles compounded the problem further.<sup>16</sup>

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<sup>15</sup> India's share in world exports was 2% in 1950. It declined to 1% in 1965, 0.5% in 1970, and further to a meager 0.4% in 1980. However, in the post-liberalisation period, India's share has shown an increasing trend, and presently is slightly higher than 0.7%.

<sup>16</sup> The economy was ruled by a 'LPG' model, namely, License, Permit and Government. The Government regulations shackled the economy in many respects.

However, the importance of earning foreign exchange through an enhanced export basket was soon realised from mid-sixties onward, mainly due to two reasons. Firstly, to keep the rapid industrialisation process viable, import of machinery, equipment, industrial raw material and technical know-how were to be financed. Secondly, a large quantity of foodgrains had to be imported due to extensive failure of crops in 1965-66, resulting in a huge trade deficit. Guided by these experiences, from mid-sixties onwards, several policies were undertaken to promote exports, but in general, they were never fruitful to the desired extent.<sup>17</sup> To make matters worse, the two oil-shocks aggravated the balance of payment (BOP) crisis in the seventies. The growing BOP deficit of India in the late eighties and nineties is shown in table 1A. It could also be seen from table 1A that India's BOP deficit as a percentage of GDP is also increasing, even in the post-liberalisation period. The deficit reached a staggering height in the early eighties, when the Government had to approach the IMF in November 1981 for a huge loan. In order to overcome this adverse BOP situation, in the following period, a limited liberalisation process was initiated in the Seventh Plan period (1985-86 to 1989-90). Even though the liberalisation process succeeded in boosting export to some extent, it resulted in only a widening trade deficit, as imports grew faster over the period.<sup>18</sup>

In 1991, the economic reform process was initiated in India. In the beginning, the reform was not brought into force as a planned policy, but merely to get rid of the acute crisis shadowing over the economy. The balance of payments situation in that period was precarious and international confidence in Indian economy reached an all-time trough. Due to a sharp decline in the capital inflow through commercial borrowing and NRI deposit following the Gulf war, the foreign exchange reserves witnessed a sharp reduction, despite large-scale borrowings from IMF. In the month of July, the level of foreign exchange

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<sup>17</sup> Among the Ad Hoc limited liberalisation exercises since mid-sixties, devaluation in June 1966, delicensing of certain industries in early 1970s, and move towards ad valorem tariff system instead of quantitative restriction in 1980s deserves special mention.

<sup>18</sup> The major factor behind increase in imports was the upshot in non-POL (petroleum-oil-lubricant) import in this period as a result of the import liberalisation.

reserve was sufficient only to finance imports for a mere fortnight.<sup>19</sup> Due to a combination of all these extremely unfavourable external and internal factors, the inflationary pressure on the price level increased substantially to produce a double-digit inflation.

In this backdrop, Indian policymakers rightly identified the initiation of economic reform in various sectors, viz. fiscal, external, financial sector; in a co-ordinated manner, as the proper way out. In his budget speech, the then Finance Minister Dr. Manmohan Singh mentioned "Any further postponement of macro-economic adjustment, long-overdue, would mean that the balance of payments situation, now exceedingly difficult, would become unmanagable and inflation, already-high, would exceed limits of tolerance."<sup>20</sup> Since then, the stream of economic reform was never reversed, although the pace of the reform process fluctuated from time to time.

Stated in an alternate manner, the earlier 'LPG' model was substituted by a new 'LPG' mantra, whose basic motto was, 'Liberalisation, Privatisation, and Globalisation.' The reform process gained momentum in the following years, with gradual progress in different sectors of the Indian economy. The level of Government control was loosened over a vast area, and presently it retains exclusive monopoly only for insurance, railways and postal services sector. The banking sector is gradually being opened up for private investors. In addition, replacement of FERA by new FEMA, disinvestment in several public sector enterprises, opening up of a number of key sectors for FDI, reforms in direct and indirect taxes, building up infrastructure through liberalised policy framework, etc. has increased the reliability of the reform policies.<sup>21</sup> Participation of private sector in insurance and allowance of FDI in print media is under consideration. Considering all these changes, the reform process initiated since 1991 constitute a major and decisive break with the past.<sup>22</sup> However, the dissertation henceforth will concentrate on external sector reforms only, and the word 'reform' will necessarily depict trade policy reform.

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<sup>19</sup> The problem was further compounded by two additional domestic crises, (i) failure of the public sector enterprises to generate investible resources and (ii) the constant rise in Government budget deficit as a percentage of GDP.

<sup>20</sup> Budget 1991-92, Speech of Dr. Manmohan Singh, Minister of Finance, Government of India

<sup>21</sup> Now, private investment in power is unrestricted with 100 percent of foreign equity allowed. Moreover, foreign investment in mining is allowed upto 50 percent of equity.

### **India's commitments under WTO**

The trade policy reform undertaken throughout the nineties was further facilitated by India's increasing association into multilateral agreements and organisations like GATT and WTO. The GATT negotiations were operational during the entire 70s and 80s, and were intensified after the Uruguay Round negotiations since 1986, as a result of which, the World Trade Organisation finally came into being in 1995. The accession of higher market access through WTO acted as a driving force in boosting India's trade reform processes. India was a signatory member in WTO right from the beginning and lowered its tariffs and non-tariff barriers in accordance with the WTO specified guidelines. A brief account of the broad policy initiatives already implemented is presented in the following.

A very cumbersome and compulsory licensing requirement system was in force throughout the pre-reform era, where almost 80 percent of the importables were subject to Government approval system. The licensing requirement for agricultural products, intermediaries, and capital goods has been eliminated as per the WTO guideline and the current system is operated in a transparent manner. There were export controls over 400 items, most of which were agricultural commodities. The level of this export control has been reduced and likely to be phased out by 2005. The quantitative restrictions on imports has been totally withdrawn and replaced by ad valorem tariffs. In addition, following the WTO guideline, the applied tariff rates on product lines have been lowered in accordance with the relevant Uruguay Round bound rate.

The above measures contributed significantly in boosting the volume of import, especially the textile products and manufactured items. For example, the import of most of the consumer good items was not allowed upto 1991-92. The specific example of apparel items under HS sections 61 (articles of apparel and clothing knitted) and 62 (articles of apparel and clothing not knitted) could be cited here. After the initiation of the reform process only, import of these items received a boost. In addition, lowering of tariff on machinery and equipment resulted in an upshot in import of these items. Apart from this, import of a number of agricultural and food-processing items were blocked for a long time

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<sup>22</sup> Tendulkar (1998)

in order to protect the interest of local producers, on the ground of adverse balance of payments situation. However, imports of these items were liberalised in recent years following a WTO verdict.<sup>23</sup> The tariff reform of India for a number of important HS industries is provided in Annex 3.

The WTO commitment of leading trade partners of has also been extremely favourable for India. The compliance of trading nations under WTO resulted in a reduction of trade barriers globally, thereby acting as a positive factor in favour of Indian exports, which increased 8-fold over the study period. It could be seen from World Development Indicator, 2000; that the tariff level in all major trading nations in the 98-99 period stood at a much lower level as compared to the 1993-94 level, both for primary commodities as well as manufacturing items. The change in the tariff rate in case of a number of leading trade partners of India is shown in annex 4.

Domestically, the government has also undertaken a number of policies aiming at export promotion. Several export-processing zones were brought into force, with attractive schemes like tax holidays, simplified provisions eyeing greater FDI inflow, establishment of area-specific export promotion centres etc., each of which contributed a lot in boosting export. Last but not the least, the move towards a more deregulated and market-dependent exchange rate management system (“pegged float”) effectively favoured the Indian export items by making the products relatively cheaper in the international market.

### **Impact of Reform**

The impact of the external sector reform on the export and import are shown in table 1A at the end of the chapter. In the years following the initiation of reforms, the export growth rate stood at an impressive double-digit level upto 1996-97. The next two years witnessed a lower export growth rate, which however, recovered in 1999-2000. Over the sample period, a steady increase in the volume of import was also observed, although in the

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<sup>23</sup> US complained to the Dispute Settlement Body of WTO that the quantitative restriction imposed on a large number of agricultural products on BOP ground is inconsistent with India’s obligations under Agreement of Agriculture and Import licensing Agreement of GATT. The WTO Panel found merit in the complain and asked India to bring its domestic policies in line with the WTO provision. India appealed against the decision. However, the AB maintained the Panel findings and rejected India’s claim.

post-1997 period, rate of import growth also declined in comparison with the initial years. Throughout the period 1987-91, trade balance was found increasing steadily, which however declined drastically in 91-92 owing to rapid increase in exports. The trade balance remained low for the next four years. From 1995-96 onwards, however, trade balance increased at a higher rate upto recent period, as export growth lagged behind the import growth rate. The period has also witnessed a fluctuating trend in trade balance expressed as a percentage of GDP, although an increasing trend is noticed in recent years. But as a whole, the Indian economy became more and more globalised, as the total trade expressed as a percentage of GDP continuously increased over time and stood around 30 percent at the end of the period.

### **The change in trade composition**

Since the initiation of reforms, there had not been very significant changes in the composition of India's trade, barring a few sectors. The changing composition of HS sections, which could have a major implication on the changing level of IIT, has been illustrated with the help of annex 5 and 6.<sup>24</sup> It is clearly seen from annex 5 that percentage share of HS-Section I-V, i.e. primary commodities comprising animal products and processed foodstuffs in India's export, have declined. Among intermediate and light manufacturing products, VI, VII and X have increased proportionately, whereas VIII and IX have declined. Among the remaining sections, only XII (Footwear, headgear, umbrellas; prepared feathers and articles thereof) is found to decrease. Section XI (Textile and textile articles) and XIV (Pearls, precious and semi-precious stones/ metals and articles thereof; imitation jewellery and coin) are found to be more or less constant when the end years are considered. For section XI, the underlying cause of the stagnation is probably the MFA quota.<sup>25</sup>

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<sup>24</sup> A detailed identification of HS industry and sections is provided in annex 1 and 2 respectively.

<sup>25</sup> Kumar, Sen and Vaidya (2000) computed the 'Revealed Comparative Advantage' (RCA) for the export items in the post-liberalisation period, and the commodities with increasing RCA were identified as 'gainers'. For example, India started exporting a number of manufactured products in the post-liberalisation period, which had always been imported traditionally. Specialisation in narrow product lines is another major outcome of the new era. However, on the whole, the picture was not very colourful. While the analysis revealed that India is gaining competitiveness in certain items and losing in some others groups, it clearly does not possess competitiveness in a vast number of commodities. The analysis also suggested that the gainer commodities are mainly labour-intensive products.



The corresponding figures of India's import regime from annex 6 shows that Section I-IV, i.e., the primary commodities is showing a decline. A similar trend is noticed in the other sections barring the exceptions of V (Mineral products), VIII (Hides and skins; leather products, furskins and articles thereof), XI (Textile & textile articles) and XIV. Import of section VI (Products of the chemical and the allied industries) and XII (Footwear, headgear, umbrellas; prepared feathers and articles thereof) in proportional terms did not show any appreciable change over time. But on the whole, the export and import shares and their relative position did not show an appreciable change. A very high level of rank correlation coefficient between export and import shares for 87-88 and 2000-01, reported in table 1B supports this plea.

The impact on HS-industries is illustrated with the help of annex 7 and 8, where the time series trend of export and import shares of them are presented respectively. The prominent export items are mineral fuels (HS-27), chemical products (HS-29), articles of leather (HS-42), articles of apparel and clothing (HS-61 and 62), gems and jewellery (HS-71), and machinery and equipment (HS-84 and 85). It is observed that import share of manufacturing items are increasing in general. The most significant import items are mineral fuels (HS-27), gems and jewellery (HS-71), and machinery and equipment (HS-84 and 85).

#### **The directional change in India's trade**

The directional change in trade pattern is also another important issue. In 1987-88, India's trade with countries of socialist block accounted for a significant proportion of total trade. In addition, the trade pattern was somewhat skewed in favour of trade with the developed countries. However, at the end of the sample period, it is seen that India's trade is significantly higher with the newly industrialised Asian economies, viz., Indonesia, Malaysia, South Korea etc. and the members of the OECD countries. This directional change could also bear important factor in determining India's IIT. This directional composition of India's trade is illustrated in Annex 9 with the trade shares of a few major trade partners of India. Comparing the shares of export and import for 1987-88 and 2000-01, it could be seen that in the later period, India's trade with developing countries has increased. However, still a significant portion of India's trade is directed towards western

developed countries. Although India retained membership in regional agreements like SAARC, Bangkok Agreement etc., any regional concentration in the trade pattern was never noticed.<sup>26</sup>

### IIT trends in Indian Economy

The earliest analysis available was undertaken by Pant and Barua (1986), which considered 1960-80 as the sample period, full of incidents with national and international importance.<sup>27</sup> Looking at the IIT index of India at 3-digit and 1-digit level of aggregation, the authors found that inspite of a sufficient increase in exports and imports over the sample period, there was no appreciable change in the IIT level barring a few commodity groups. IIT level was high for section 2 (Crude materials except fuels) and section 5 (Chemicals), but not in case of industrial commodities. The study arrived at two conclusions. Firstly, the studies undertaken between developed countries suggest that IIT level increase due to exploitation of economies of scale by specialising in narrow product lines. However, since India's trade was biased towards developed countries, the specialisation in industrial commodities could not take place to the desired extent as these countries traditionally view LDCs as source of raw materials. The export pessimism in earlier years fuelled this notion further. Secondly, over the sample period, the export potential of the manufacturing sector actually declined, and therefore an export boost was not expected. This could be another plausible explanation of relatively low IIT level in India. In the light of these findings, the study strongly recommends an increasing emphasis on mutual cooperation with other developing countries through regional trade blocs like ASEAN or SAARC.

Bhattacharyya conducted an analysis for seventies and eighties and found that IIT indices to portray a rising trend in aggregate and the manufacture sector, while showing a

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<sup>26</sup> It was a long-standing complain of the SAARC member countries that India protects her market by tariff and various non-tariff barriers from other members of the trade bloc. From April 1, 1999, India offered a unilateral removal of NTBs on imports from other SAARC countries, by removing huge a number of quantitative restrictions in various fields. However, India's intra-SAARC import did not register a very appreciable upturn in the following period.

<sup>27</sup> The study period witnessed a change in attitude towards export promotion from the early ideology of import substitution. In addition, the oil price shocks and exchange rate devaluations were two important events, which bore a long-lasting impact on Indian economy. In addition, due to increased trade, the trade classification system had undergone a change twice over the period.

declining trend for primary commodities. This implied that not only the level of IIT increased for a number of secondary products, it has actually increased fast enough to outweigh the negative influence originating from declining index for the primary sectors. The conclusion was that the IIT index is rather skewed in favour of a few selected industry groups, namely SITC 6 (Manufactured goods classified by material), 5 (Chemicals and related products), and 7 (Machinery and Transport Equipment). The study also found India's IIT to be considerably higher with developed countries and NICs in comparison with the underdeveloped world. The empirical finding also suggested that the link between industrial organisation and international trade, which was so effectively established for developed countries, does not hold good in the case of India.<sup>28</sup>

The theoretical framework of IIT suggests that IIT level should be high between countries with similar endowments, specifically when linked by an economic union, and this notion draws a strong support from the empirical observations by Balassa (1966), Willmore (1972) and others. Kantawala (1997) attempted to compare India's IIT level for the intra-SAARC region and the world as a whole for the period 1981-92. The study found that the experience of SAARC bears a sharp contrast with the other trade blocs. India's involvement in SAARC was not very high, and the share of intra-SAARC export in total export declined over the sample period and intra-SAARC import in total import remained at an insignificant level. It was also noticed that a number of countries do not trade with each other (e.g., Maldives and Nepal, Bangladesh and Maldives etc.).<sup>29</sup> In this backdrop, it was hardly surprising that Kantawala did not find a significant intra-SAARC IIT level for India.<sup>30</sup>

Veeramani (1999) tried to analyse the IIT trends in the capital goods industries. Apart from the multilateral analysis, the study calculated the bilateral IIT for India-US as well, since US is the leading trade partner of India. The analysis registers a marginal increase in the IIT index of India over the years. Considering the capital goods industries separately, namely HS groups 84-89, it is seen that IIT level is high for the first four groups

<sup>28</sup> The study period was 1970-87, i.e., the pre-reform era.

<sup>29</sup> Barring the sole exception of Nepal (intra-SAARC export and import 51 and 55 percent respectively), no other country traded significantly with other members of the bloc.

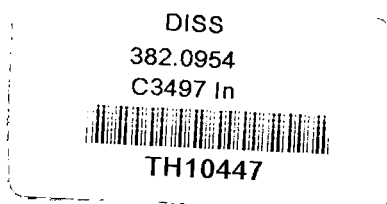
and low for the remaining two groups. An analysis of the nature of trade revealed that India's trade is predominantly vertical in nature, both in the case of multilateral and bilateral trade, although the quality difference appears to be coming down. Veeramani came out with the policy prescription that the export promotion strategy should try to exploit the comparative advantage at the finer industry level rather than focusing any sector as a whole.

In another paper, Veeramani (2001) explored two aspects of the liberalisation process initiated in India in the early 90s on IIT level for the manufacturing commodities. Firstly, the changes in the intensity of multilateral IIT in the post-liberalisation period as compared to the earlier period and secondly, the influence of several country specific factors on the intensity and probability of IIT in India's bilateral trade has been considered. The analysis revealed that the IIT level is lower for resource intensive and primary commodities with little scope of product differentiation. However, for the remaining commodities, the relatively higher IIT indices are associated with high growth of export and a rising share in the export basket in general. He also found that the growth in India's IIT in the post-liberalisation period is export-led in character. The analysis of India's bilateral IIT revealed that India has showed a relatively higher IIT with high-income countries than with countries at similar stage of development, a phenomenon more consistent with the vertical IIT models. However, The country specific factors analysis suggests that IIT is positively related with similarity among countries in terms of market size, larger market size and fewer trade restrictions; but negatively with income distribution. Veeramani concluded that the observed increase in India's IIT is partly due to intra-firm trade between MNC parents located in developed nations and their subsidiaries operating in India.

### Objective of the Dissertation

Upto 1991, India continued on the path of a self-sufficiency, which, instead of making exports competitive in the world market, concentrated on protecting the interests of the domestic producers at home. The primary goal of the dissertation is to analyse the dynamics of the IIT trend in the Indian economy in the post-liberalisation period and the consequent impact, if any, on the industrial sector. The relevance of IIT trend in the Indian

<sup>30</sup> The study pointed out that IIT accounts for 29.93 percent of total trade when trade with world as a whole is



context has large been ignored and specifically, only a couple of studies has been undertaken on the post-liberalisation trends. Even in those analyses, no interaction between trade and industry has been sought. A brief survey of the earlier studies in Indian context has been provided, and neither of them noted a high level of IIT. It could be seen from annex 5 and 6 that the trade composition of India did not register a very appreciable change barring a few sectors. Moreover, it is seen from annex 9 that India's trade is predominantly skewed in favour of developed countries, and the same with countries at similar level of development is not very significant. Therefore, a marked increase in IIT level could not be expected, even in the post-liberalisation period. Further, since India is technologically less advanced in comparison with her partners, the trade is presumably vertical in nature. The dissertation plans to explore the validity of these presumptions.

### **Chapterisation**

The dissertation is organised on the following lines. Three issues are discussed in the dissertation, the existence of IIT in India, the nature of the IIT, and, finally, the policy implications. In chapter 2, the methodology used in the dissertation is discussed in brief. In chapter 3, the trend in IIT indices in India is discussed in detail. A cross-country analysis is also provided. Later, an analysis is provided to measure the impact of certain determinants on IIT. In chapter 4, the nature of India's IIT in certain leading sectors are analysed. In chapter 5, some policy areas are explored. The impact of economic liberalisation on the manufacturing industries is analysed with respect to scale effect and employment repercussions. Finally, in chapter 6, the conclusions of the dissertation are summarised followed by a brief note on policy prescription.

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concerned, whereas the corresponding figure for intra-SAARC region is only 19.83.

**Table 1A: The Time-series trend in India's Export and import**

(Rs. Crore)

Year	Export (X)	Export Growth (%)	Import (M)	Import Growth (%)	Trade Balance	TB Growth(%)	GDP at Factor Cost	TB as % of GDP	X+M as % of GDP
1977-78	5408		6020		-612		374267	-0.16	3.05
1978-79	5726	5.88	6811	13.14	-1085	77.29	394861	-0.27	3.18
1979-80	6418	12.09	9143	34.24	-2725	151.15	374323	-0.73	4.16
1980-81	6711	4.57	12549	37.25	-5838	114.24	401162	-1.46	4.80
1981-82	7806	16.32	13608	8.44	-5802	-0.62	425111	-1.36	5.04
1982-83	8803	12.77	14293	5.03	-5490	-5.38	437638	-1.25	5.28
1983-84	9771	11.00	15831	10.76	-6060	10.38	471191	-1.29	5.43
1984-85	11744	20.19	17134	8.23	-5390	-11.06	490027	-1.10	5.89
1985-86	10895	-7.23	19658	14.73	-8763	62.58	514059	-1.70	5.94
1986-87	12452	14.29	20096	2.23	-7644	-12.77	536337	-1.43	6.07
1987-88	15674	25.88	22244	10.69	-6570	-14.05	556874	-1.18	6.81
1988-89	20232	29.08	28235	26.93	-8003	21.81	615206	-1.30	7.88
1989-90	27658	36.70	35328	25.12	-7670	-4.16	656469	-1.17	9.59
1990-91	32553	17.70	43198	22.28	-10645	38.79	693051	-1.54	10.93
1991-92	44041	35.29	47851	10.77	-3810	-64.21	702067	-0.54	13.09
1992-93	53688	21.90	63375	32.44	-9687	154.25	738003	-1.31	15.86
1993-94	69751	29.92	73101	15.35	-3350	-65.42	781345	-0.43	18.28
1994-95	82674	18.53	89971	23.08	-7297	117.82	888031	-0.82	19.44
1995-96	106353	28.64	122678	36.35	-16325	123.72	899563	-1.81	25.46
1996-97	118817	11.72	138920	13.24	-20103	23.14	970083	-2.07	26.57
1997-98	130101	9.50	154176	10.98	-24075	19.76	1016266	-2.37	27.97
1998-99	139753	7.42	178332	15.67	-38579	60.25	1083047	-3.56	29.37
1999-00	162925	16.58	204583	14.72	-41658	7.98	1151991	-3.62	31.90

Source: Economic Survey, 2000-01

**Table 1B: Rank correlation coefficient between export share and import share**

<b>Characteristic</b>	<b>Rank correlation coefficient</b>	<b>Constant</b>	<b>R-square</b>
<i>Export share</i>			
Coefficient	.907	.929	0.8227
t-value	8.881	0.799	
p-value	0.000	0.436	
<i>Import share</i>			
Coefficient	.9280702	.7192982	0.8613
t-value	10.275	0.698	
p-value	0.000	0.494	

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## Chapter 2

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### The Methodological Issues:

In the following three chapters, this dissertation will try to focus on three issues, the extent of IIT, the quality of IIT and finally, the consequent impact on the industry sector. In certain cases, indices are calculated using the formulae, and in other occasions the hypothesis has been tested empirically. In the current chapter, the methodologies used under those circumstances are described in brief. In section 2.1 and 2.2, the definition of industries and the formulae for calculation of IIT indices are discussed, which are used in Chapter 3. In section 2.3 and 2.4, the unit price method and the end-use method are discussed in brief, with the help of which, the horizontal-vertical specialisation pattern is analysed in Chapter 4. In section 2.5 to 2.7, the methodologies applied in Chapter 5 to measure the impact of liberalisation in the factory sector are discussed.

### 2.1. Definition of Industry

There has been a wide debate over the proper method to measure IIT in an accurate manner in the seventies. The first and foremost problem centered on the definition of an industry. To get rid of the aggregation bias, it was argued if an industry 'j' is defined in such a manner that the component sub-groups at 'j-1' level of aggregation have widely differing factor ratios, then IIT index calculated using this data would be distorted.<sup>1</sup> Finally, the Standard International Trade Classification (SITC) was in general accepted by economists as the ideal indicator to represent an industry. Under the SITC convention, countries have adopted identical descriptions and coverages for documentation of the trade figures at the 1-, 2-, 3-, and 5-digit level. The 3-digit classification is widely accepted as an industry and takes care of the categorical aggregation problem.<sup>2</sup> The analysis by Grubel and Lloyd (1975) in

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<sup>1</sup> Greenaway and Milner (1983), pp. 901. In addition, Gray (1979) opined that aggregation bias could be induced by two conceptually distinct components, 'opposite sign effect' and 'weighting effect'. These two effects could work against each other and make the situation cumbersome.

<sup>2</sup> "This adjustment proceeds on the assumption that categorical aggregation is associated with opposite signs on trade imbalances at lower levels of aggregation. Thus, if there are a number of fourth-digit activities with different factor input ratios and limited scope for substitutability, this may be reflected in offsetting trade imbalances. When intra-industry trade is measured at the third digit, these imbalances are aggregated and the third digit  $B_j$  correspondingly inflated. When  $C_j$  rather than  $B_j$  is used, however, the opposite signed



this regard has been accepted by all quarters. Normally, the trade data for the sub-industries at 4-digit level within a 3-digit industry classification is collected and the IIT index is calculated from these figures. Therefore, it offered a significant comparability for the trade data collected by different countries, as well as the IIT index calculated from it. The earlier studies on Indian economy had also followed the Grubel-Lloyd technique of selecting the industries at the 3-digit level of SITC classification.

However, the dissertation faces a problem in adopting the technique followed by earlier studies. The problem arises due to a change in the Indian Trade Classification (ITC) system after mid-eighties as seen from the following:

“Indian Trade Classification, Revision-2 (ITC-Rev. 2) which was based on Standard International Trade Classification Revision-2 (SITC-Rev.2), was in vogue from April, 1977 to March, 1987. A new system of commodity classification known as Indian Trade Classification (based on Harmonised Commodity Description and Coding Systems), in short, ITC (HS), has been adopted from April 1987. The ITC (HS) is an extended version of the international classification system called ‘Harmonised Commodity Description and Coding System’ evolved by Customs Co-operation Council, Brussels.”<sup>3</sup>

Hence, from 1987 onwards, the Indian trade data is available following the HS-classification principle. Although, the International Trade Statistics Yearbook, United Nations, provide SITC data, it does not publish export and import figures of the traded items, whose values are less than 0.3 percent of total trade. Hence, a number of commodities will remain excluded, if the UN data is to be used. In order to overcome this problem, the main source of data for this analysis has been the trade figures provided under the HS system from various issues of Monthly Statistics of the Foreign Trade of India, Ministry of Commerce. The export and import figures are provided in f.o.b. and c.i.f. valuation respectively.<sup>4</sup>

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imbalances do not offset each other and the resultant measure is free of this distortion.”, Greenaway and Milner (1983), pp. 905

<sup>3</sup> Monthly Statistics of the Foreign Trade of India, Ministry of Commerce, DGCIS

<sup>4</sup> The change in the data structure has posed two problems. The first one, associated with the definition of industry could be solved by following the notion of industry embodied in the HS system. However, the second problem, which relates to the comparability of the results with earlier studies, remains unattended. Barring the

Under the HS system, the commodities and sub-industries are defined at 8-digit and 4-digit levels respectively. The industries are defined at 2-digit level and there are 99 HS-industries. In addition, the commodities in the HS system are distributed in twenty one sections (section I-XXI). While calculating important figures like export and import shares, IIT indices etc., the dissertation drops the last three HS-industries (97-99) and two HS-sections (XX-XXI) and concentrates on the rest.<sup>5</sup> Furthermore, the period of analysis has been 1987-88 to 2000-01, as it is constrained by the availability of uniform data, with 1991-92 being considered as the reform year.

## 2.2. Measurement of IIT index in horizontal specialisation

Another important issue in the field of IIT has always been the measurement of an accurate index. Several economists have proposed methods to calculate the IIT index, and the most widely used measures are discussed in the following section. The analysis could be initiated with the index proposed by Balassa (1987). The IIT index for industry  $i$  in trade between country  $j$  and  $k$ , denoted by  $IIT_{jki}$ , is defined as follows:

$$IIT_{jki} = 1 - \frac{|X_{jki} / X_{jki} - M_{jki} / M_{jk}|}{|X_{jki} / X_{jki} + M_{jki} / M_{jk}|}$$

The index takes values from 0 to 1, where complete IIT is denoted by the upper value and the lower value signifies perfect inter-industry trade. Even though the index is easier to calculate, it suffers from a serious drawback, as it does not provide a mechanism for correcting the trade imbalance.

Grubel and Lloyd (1975) had argued that the most useful statistics for summerising the distribution of a set of individual measures is the mean, using as weights the relative size of exports plus imports of each industry in the total value of exports plus imports of the set

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sole exception of Veeramani, all other studies has concentrated on pre-87 period. Hence the result obtained from the analysis could not be compared with most of the earlier studies.

of  $n$  industries. Therefore, their suggested measure of IIT index of country  $j$  for industry  $i$ , more familiar as GL (U) (uncorrected index of Grubel-Lloyd) is calculated as follows:

$$B_i = \frac{\sum_i (X_{ij} + M_{ij}) - \sum_i |X_{ij} - M_{ij}|}{\sum_i (X_{ij} + M_{ij})} \times 100$$

The measure finds out average IIT directly as a percentage of the export plus import trade. It is also equal to the sum of the IIT for the industries as a percentage of total export plus import trade of the  $n$  industries. Hence the IIT index could also be rewritten in the following manner:

$$B_i = \frac{\sum_i [(X_{ij} + M_{ij}) - |X_{ij} - M_{ij}|]}{\sum_i (X_{ij} + M_{ij})} \times 100$$

The index could vary between 0 and 100. It is clear from the formula that when exports are exactly equal to imports, i.e., the entire trade is explained by IIT, the index is 100. On the other hand, when either of these two is zero, then the index is zero, which means IIT no longer exists. In other words, entire proportion of trade is explained by H-O-S theory.

However, the main drawback of GL (U) is that it will be biased downward if a country's overall trade is imbalanced. With an imbalance between exports and imports, the mean will always be less than 100, irrespective of the pattern of exports and imports as these two could never match in each and every industry. Hence for calculating the IIT index, Grubel and Lloyd, in their corrected measure, adjusted for the aggregate trade imbalance by expressing IIT as a proportion of total commodity export plus import trade less the trade imbalance as follows:

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<sup>5</sup> The last three HS-industries and two HS-sections contain only miscellaneous manufactured items and items not specified elsewhere.

$$B_i = \frac{\sum_i (X_{ij} + M_{ij}) - \sum_i |X_{ij} - M_{ij}|}{\sum_i (X_{ij} + M_{ij}) - |\sum_i X_{ij} - \sum_i M_{ij}|} \times 100$$

The adjusted measure suggested by G-L, even though a modification over the unbalanced one, suffers from a major drawback. If within a particular group  $j$ , total trade is imbalanced, then G-L corrected index is a biased measure of IIT. The problem stems from the fact that the index depends on the values of  $\sum_i |X_{ij} - M_{ij}|$ . Now the speciality of this expression is that if for a particular industry  $X_{ij} \leq M_{ij}$ , or  $X_{ij} \geq M_{ij}$  for all  $i$ , then its value is exactly equal to  $|\sum_i X_{ij} - \sum_i M_{ij}|$ , irrespective of the individual values of  $X_{ij}$  and  $M_{ij}$ . Under these circumstances, both the numerator and the denominator will have similar value and hence the IIT index will be 100, which is not likely to depict the actual situation.

Aquino criticised the G-L index by pointing that “one cannot possibly maintain that the overall imbalance does not have an imbalancing effect on the single commodities’ trade flows and then recognise that the imbalancing effect appears at the highest level of industry aggregation.”<sup>6</sup> To overcome this problem in calculating IIT index, Aquino suggested an alternate measure. The argument was that the correction for overall imbalance should be performed at the elementary level, which requires an estimate of what the values of exports and imports of each commodity would have been if total exports has been equal to total imports. Although there is no reason to expect the imbalancing effect to be equiproportional in each and every industry in isolation, Aquino argued that on average, the imbalancing effect on each industry’s trade must be equal to overall imbalance. In his words, “In the absence of any information about inter-commodity differences in the strength of the imbalancing effect, the best one can do is then to assume that it is equiproportional in all industries and equal to the overall imbalance.”<sup>7</sup> The index first calculates the theoretical values of estimated export and import from the actual values based on the equiproportionality assumption, denoting a superscript ‘e’ to them.

$$X_{ij}^e = X_{ij} \cdot (1/2) \cdot \sum_i (X_{ij} + M_{ij}) / \sum_i X_{ij}, \text{ and}$$

<sup>6</sup> Aquino, 1978, pp. 280

$$M_{ij}^e = M_{ij} \cdot (1/2) \cdot \sum_i (X_{ij} + M_{ij}) / \sum_i M_{ij}$$

It is evident from the formula that  $\sum_i X_{ij}^e = \sum_i M_{ij}^e = (1/2) \cdot \sum_i (X_{ij} + M_{ij})$ .

The Aquino index  $Q_j$  is calculated using the following formula:

$$Q_j = \frac{\sum_i (X_{ij} + M_{ij}) - \sum_i |X_{ij}^e - M_{ij}^e|}{\sum_i (X_{ij} + M_{ij})} \times 100$$

However, this measure has also been subjected to several criticisms from various quarters. Greenaway and Milner (1981) have argued that the Aquino measure may in fact create more problems than it may remove. They argued in the following line:

“In the absence of a full structural model for the appropriate level of disaggregation, there is no obvious way of measuring the nature of diffusion of any macro-balancing effect. .. Furthermore, we can question the equiproportionality assumption in a somewhat less direct manner. The assumption would be justifiable, for instance, if price and income elasticities of demand for all imports and exports were identical and if supply was infinitely elastic at home and abroad.”<sup>8</sup>

Greenaway and Milner also suggested that averaging at the industry or product group level would be an improvement over the index proposed by Aquino. Now, Tharakan (1984) portrayed a reconciliation between the two most widely used index of IIT, Aquino index and the Grubel-Lloyd measure, by highlighting a one-to-one correspondence between them. The Spearman rank correlation coefficients between these two alternate indices for a number of countries were found very high. This led Tharakan to conclude that any of these two indices could be used for the analysis.<sup>9</sup> However, there has been no linear movement towards finer measures with the passage of time.

<sup>7</sup> Aquino, 1978, pp. 280

<sup>8</sup> Greenaway and Milner (1981), pp. 760

<sup>9</sup> “.. Spearman rank correlation coefficients between IIT<sub>i</sub> indices measured according to Grubel-Lloyd formula and the Aquino reformulation of it. These coefficients speak for themselves. For the year 1972, all the coefficients were above 0.99 except the one pertaining to USA, which was above 0.96. .. Even the lowest Spearman rank correlation coefficient obtained – that for Italy for the year 1974 – was as high as 0.948. In all cases, the coefficients are significant far above 0.1 level in a two-tailed test. Thus it makes virtually no

The dissertation calculates the total IIT index of India by using all three aggregative methods, the two G-L indices and the Acquino method. However, at the sectional level it is seen that under a few circumstances, the value of export or import items at the 4-digit level are uniformly higher than the corresponding import or export items. Under these circumstances, using G-L index may not be the appropriate method. Hence, for calculating the IIT values at the industry and sectional level the Acquino method is used as the more appropriate measure.

An analysis of the determinants of IIT is also performed. The estimation is done by using panel data technique described under section 2.6.

### 2.3. Measurement of Vertical Specialisation by Unit Price Method

It has been suggested in recent literature on IIT that differences in unit values (UV) of the commodities can be assumed to represent the quality difference among them. If  $UV^X$  and  $UV^M$  represent the unit values of export and import items of an industry respectively, then the trade is regarded as horizontal if the ratio of the unit values differ by less than  $\alpha\%$ , and vertical otherwise. In other words, for the trade to be horizontal, the following condition must hold:

$$1 - \alpha \leq (UV^X / UV^M) \leq 1 + \alpha$$

If the above condition is violated, then the trade is considered to be vertically differentiated.  $\alpha$ , the arbitrary parameter, could take different values. However, throughout the literature on horizontal and vertical IIT, two values, 15% and 25%, have been used most widely. The 15% threshold is used when the price differences are supposed to reflect only quality differences, based on the assumption of perfect competition, i.e., consumers will not purchase a similar, or lower quality good at a higher price. However, in case of imperfect information, where price difference could result from brand names as well, the 15% difference is too narrow. Instead of using 15% as the threshold limit, 25% should be the accurate level for this purpose. Both of these values could be used in order to check the

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difference which of the two indices we use as dependent variable in the regression analysis.”, Tharakan (1984), pp. 215

robustness of the result. The rationale for using UVs is that assuming perfect information, a variety sold at a higher price is in general associated with a higher quality, or, stated otherwise, relative prices reflect relative qualities. This notion is in line with the findings of Stiglitz (1987), which states that even with imperfect information, prices tend to reflect quality.

The dissertation collects trade data from the DGCIS Monthly Statistics of Foreign Trade. Four intermediate years, namely, 1988-89, 1992-93, 1996-97 and 1999-2000 has been selected for the purpose of analysing the nature of trade in selected sectors. For determining the nature of specialisation, trade data at 6-digit level is used, since unit value could be collected easily at this level of classification. After obtaining the unit values and the unit value ratio, the robustness of the analysis is checked at both 15% and 25% threshold level. Twelve industries at HS 2-digit level are selected, which holds an important position in India's trade.

#### **2.4. End-Use Method**

The name, 'end-use method' is self-suggesting. In this method, the trade pattern is differentiated in terms of the composition of traded products. Within an industry, the export and import basket consists of several intermediate and finished products, as discussed by Sanyal (1983), and Barua (1979). On the basis of end-use, the stage of production at which the commodity in question is placed could be identified. The expression 'stage of production' necessarily implies whether the product is a raw material, intermediate goods or finished item. Through an analysis of trade figures at 4-digit level of HS classification, the key areas of the industry in concern are figured out and analysed. The term 'stage of production' as used by the dissertation could be made clear with help of the following example:

*Industry*

8479 (machines having individual function)

*Commodity (final)*

84791000 (machinery for public works, building/the like)

8520 (magnetic tape recorders)

*Commodity (intermediate)*

84799001 (parts of machines for public works, building/the like)

8522 (parts and accessories of industries under 8519-8521)

It could be seen from the above example that the intermediate goods under the HS system are classified either within the industry group itself or under a separate industry group. As already mentioned, under the harmonised system the industries are represented at HS 4-digit level and the commodities are defined at the 8-digit level. The dissertation considers import (or export) of intermediate goods and export (or import) of finished products within an industry group as vertical IIT and both way trade in intermediate goods or in finished goods as horizontal IIT.

Every HS 2-digit group consists of several 4-digit industries within the commodity group. The dissertation plans to consider the two end points of the study, namely 1987-88 and 2000-01, and through a cross-sectional analysis the change in the commodity composition within the industry group will be considered. In addition, the directional composition of trade is also examined.

### **Selection of commodities**

Since determination of specialisation pattern for all 99 sectors involve an enormous exercise, only a few key sectors have been selected for the purpose of the analysis, where the market structure permits existence of a wide variety of products. In other words, special attention is given while selecting the industries, where products of lower quality and higher quality could be exchanged. For unit value method, the commodities selected are chemical and pharmaceutical products, plastic, rubber and leather products, articles of gems and jewellery, manufactured items of iron and steel, machinery and equipment, road vehicle and parts etc. It could also be seen that India's exports of these items are rising in value terms, i.e., India possesses certain comparative advantage in these areas. A similar trend has been noticed in India's import in these sectors over the years. However, it could be seen from annex 7 and 8 that although these commodities have shown an increase in trade in value



terms, percentage share of them in total trade did not show a uniform trend. In case of end-use method, special attention is given to the commodities where there is sufficient existence of different stages of production. With this objective, only three industries from the earlier analysis (chemicals and pharmaceuticals) are dropped from the current discussion and the nature of trade is considered for the remaining industries.

## **2.5. Concordance between Trade and Industry Code**

The IIT indices of India for different HS-sections are calculated using the trade data, obtained from the DGCIS monthly foreign trade statistics. On the other hand, the principal characteristics of the industry are obtained from the various issues of Annual Survey of Industries, which provide the industry data at NIC (1987), at different level of classifications. In order to find a relationship between liberalisation and the impact on the industry, a correspondence between these two sets of data is necessary. Several economists had tried to establish a correspondence between the trade data and the industry data from time to time. The dissertation plans to follow the correspondence worked out by Debroy and Santhanam (1993) between HS 4- and 6-digit code and NIC 3-digit code. The concordance is not suitable for the dissertation since it calculates the IIT indices at HS 2-digit level. Hence, based upon the work of Debroy and Santhanam, the dissertation attempts a slight modification to obtain a correspondence between HS 2-digit code and NIC 3-digit code. While deriving the ITC-HS matching, the method of mode is applied, i.e., the most repetitively occurring HS-code with respect to the NIC industry has been chosen. The final version of the concordance prepared is provided in Annex 10.

## **2.6. Production Function Estimation**

The dissertation plans to explore whether there has been any appreciable improvement in the scale efficiency in the factory sector at the aggregate and sectional level in the aftermath of reform. In order to capture the scale effects, the dissertation plans to estimate the aggregate production function of India. The estimation is done in a two-input framework. The basic idea goes in the following manner. If the production function is assumed to hold the form,

$$Y = A \cdot K^\alpha \cdot L^\beta$$

where, Y, K and L are output, capital and labour respectively, then, sum of the powers of the inputs, i.e.,  $(\alpha + \beta)$  represents the scale efficiency. The production function is subject to increasing, constant or decreasing returns to scale depending on the fact whether  $(\alpha + \beta)$  is greater than, equal to or less than one.

In the proposed model, gross-value added data is taken as an indicator to represent output Y. The price changes have been corrected by deflating it by the yearly price index of the manufactured products. However, while estimating the production function at the 2-digit industry level, the sectoral price index has been used as the deflator. Two inputs have been considered, namely, capital and labour. The calculation of labour is done directly, the number of employees has been considered as a representative of labour input. However, measurement of capital requires certain adjustments in the reported value of capital stock, since it differs from the market value. The discrepancy arises due to two reasons, one, the reported figures are at historical prices, and the other, officially allowed depreciation is much higher than the capital consumption. Following the most widely used *Perpetual Inventory Method*, the dissertation plans to overcome this shortcoming. The method is briefly described in the following:

Let,  $B_t$  be the book value of fixed assets at the end of year t.

$D_t$  be the reported depreciation.

$P_t$  be the capital-goods price index for the year.

$\{I_t\}$  be the series of real investments.

Then *Perpetual Inventory Method* suggests that,

$$I_t = (B_t - B_{t-1} + D_t)/P_t$$

Further, let  $K_0$  be an estimate of real capital stock for a benchmark year, then the capital stock series  $\{K_t\}$  may be derived by using the following relationship:

$$K_t = K_{t-1} + I_t$$

$$\text{or, } K_T = K_0 + \sum I_t$$

However, the initial value of the capital stock should also be calculated. Several techniques have been suggested to overcome this problem. The dissertation plans to adopt the technique employed by Hashim and Dadi, where they considered the market value to be two times the book value following a rule of thumb.

For estimating the production function, data at 3-digit level is taken for all industries (NIC-1987) from the factory sector summery results as furnished in various issues Annual Survey of Industries. The repair and servicing sector is dropped.<sup>10</sup> From the remaining 183 industries, 15 industries have been dropped, which are not economically productive uniformly throughout the period. Since the purpose of the exercise is to compare the trade results with the industry results, selection of 1987-88 to 2000-01 as the sample would have been ideal.<sup>11</sup> However, published data on Indian industries exists only upto the year 1998-99. Besides the industry classification system has undergone a change from the very year 1998-99. Hence, in order to the obtain a comparable data set on trade and industry, the dissertation selects the 11-year period (1987-88 to 1997-98) as the sample period.

By selecting only two inputs, capital and labour, the dissertation plans to proceed with the simplest form of production function, the Cobb-Douglas type. Since the purpose of the dissertation is to measure the scale effect, the production function is written in the logarithmic form in the following way:

$$Y_{it} = \mu + \beta_1 \cdot X_{1it} + \dots + \beta_K \cdot X_{Kit} + V_{it} \quad (1)$$

Where,  $i = 1 (1) N$ , and  $t = 1 (1) T$ .

Where  $Y$  is the logarithm of output and  $X_1, \dots, X_K$  are the logarithms of inputs. In the current context,  $X_1$  is labour and  $X_2$  is capital. However, the assumption that all parameters are identical for all individuals across the sample period is not realistic. Hence, the dissertation plans to select the following model:

$$Y_{it} = \mu_i + \beta_1 \cdot X_{1it} + \dots + \beta_K \cdot X_{Kit} + V_{it} \quad (2)$$

<sup>10</sup> The repair and servicing sectors are included in 39-43, 74, 91, 95-97. Therefore, the dissertation concentrates on industries ranging from 20-21 to 38.

<sup>11</sup> IIT indices have already been calculated for this period.

Where  $\mu_i$  is constant over time and specific to the individual cross-section unit – it is called the individual effect. There are two basic frameworks through which the model, which will necessarily be a panel estimation, could be generalized; one, fixed effect model and the other random effect model. In the fixed-effect approach,  $\mu_i$  is considered to be a group-specific constant, whereas in random effect model  $\mu_i$  is considered to be a group-specific disturbance term.

### Fixed effects model

The fixed effects model assumes that differences across different sectors could be captured by differences in constant terms. Then in equation (2), each  $\mu_i$  is a parameter to be estimated. Let  $Y_i$  and  $X_i$  be the  $T$  observations for the  $i$ th unit and let  $V_i$  be the  $(T \times 1)$  vector of the disturbance terms. Then (2) could be rewritten as,

$$Y_i = i. \mu_i + X_i. \beta + V_i \quad (3)$$

Collecting these terms, we get,

$$Y = [ d_1 \ d_2 \ \dots \ d_n ] \begin{bmatrix} \mu \\ \beta \end{bmatrix}$$

which could be rewritten as,

$$Y = D. \mu + X. \beta + V \quad (4)$$

To test the significance of the group effects, a usual F-test is performed. The null hypothesis is:

$H_0$  : All  $\mu$ 's are simultaneously equal to zero (so that a pooled estimator is efficient)

### Random effects model

When the sample consists of a relatively large period of time, then we can consider random effects model in the following form:

$$Y_{it} = \mu + \beta_1. X_{1it} + \dots + \beta_K. X_{Kit} + u_i + V_{it} \quad \dots (5)$$

Where the new component  $u_i$  is the random disturbance characterizing the  $i$ th observation and is constant through time. Generalised least square technique is applied to estimate this model.

In order to obtain a certain idea about the selection of estimation technique, Hausman Test is performed. The guiding motive is to figure out whether fixed effect or the random effect model is more appropriate for the analysis. The appropriate measure is selected on the basis whether the Hausman test statistics is significant at 5% level of significance. The test is based on the idea that if it is a random effect model then the two estimates should not differ systematically. If the null hypothesis that there is no systematic error cannot be rejected, then random effect model is more appropriate.

After estimating the aggregate production function, individual production functions of industries at 2-digit level are estimated. The only point of difference from the earlier analysis is that here output is obtained by deflating the gross value added by the price index for the individual industries in order to obtain a more appropriate result.

However, it is observed from the industry that an industry is often not economically operational for a couple of years. This make the panel unbalanced as in the logarithmic form, a few variables are left out from the analysis. Hence in order to make the unbalanced panel balanced, GLS estimator is used instead of ordinary OLS estimator, Heteroscedasticity and Autocorrelation are also corrected by using the robust measure. While reporting the regression results, the result of the GLS estimation is reported owing to its superiority over the OLS estimator.

In the Indian context, 1991 is widely accepted as the initial year of reform, although the required thrust was not there right from the declaration of reforms. In order to get a fair idea of the process; this dissertation considers 1987-88 to 1990-91 as the pre-reform period, 1991-92 as the reform year, and 1992-93 as the post-reform period. Then the production function is estimated for the two separate periods, and the returns to scale in the periods are compared. Based upon the comparison, the scale efficiency of the factory sector is analysed.

<sup>12</sup> An intuitive analysis to find any link between scale efficiency of manufacturing industries and the trade balance of the industries is also performed, although no formal model is used in this analysis.

## 2.7 Industry Characteristics and IIT

The IIT indices have shown an increasing trend over the years. A similar trend has been noticed in the movement of output of the industry, represented by gross value added. The IIT in different HS-industries and output across industries are calculated and a relationship between these two is explored. The idea is to check whether the growth in output is associated with high IIT rate in corresponding sections. In addition, the employment elasticity of output is also found out.

The manufacturing sector has shown an increasing trend in capital-labour ratio and skill formation over the years. The capital-labour ratio is calculated directly, dividing the capital series by the number of labourers. The number of skilled workers is obtained by deducting the number of workers from the number of employees. Dividing the number of skilled workers by total number of employees, the percentage of skilled workers in the industry is obtained. After that, a relation between IIT and skill formation and capital-labour ratio, if any, is attempted. Based upon these results, the impact of IIT on Indian factory sector is considered.

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<sup>12</sup> NIC-29, namely manufacture of leather products is left out of the analysis. NIC 29 consists of 8 industry groups at 3-digit level. Now 3 among these 8 industry groups were not economically operational for a considerable period during the sample years. Since, no clear indication on pre-reform and post-reform trends could be obtained from such a small sample size, production function of leather industry is not considered separately in the analysis.

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## Chapter 3

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### Intra-industry trade of India

To analyse the impact of liberalisation exercise in India, the aggregate annual IIT indices are calculated. In graph 3.1, the trend in three of the most widely used indices of IIT, namely; Grubel-Lloyd (uncorrected), Grubel-Lloyd (corrected), and Aquino index at aggregate level over the sample period are provided. The detailed statistics regarding the value of the indices are presented in Table 3A. It is clearly seen from the table that although the indices registered a positive growth, the extent of this growth is not comparable with the same noticed in case of IIT among developed nations. It could also be seen that all these indices registered a peak in 1989-90 and a trough in 1994-95. In the subsequent years, a clear increasing trend is noticed in all of them, though the growth rate of the index was different under each case. All three indices assumed a value of nearly 30 at the end of the sample period. In comparison with the experience in other countries where IIT has increased significantly in the post liberalization period, the result seems quite remarkable.

In the light of these findings, this dissertation feels it necessary to focus its attention to the directional change in the IIT index at a more disaggregated level, i.e., at HS-2 digit industry level and HS-section level. Due to the supremacy of Aquino measure over the other three indices (as already discussed in methodology), the IIT indices for HS industries and sections over the sample period are calculated using this method. The calculated indices are summarised in table 3B. It is observed from the table that the IIT indices have registered a steady increase in case of a number of manufacturing and intermediate products. Specifically, industry groups like inorganic chemicals (HS-29), raw hides and skins (HS-41), articles of leather (HS-42), man-made filaments (HS-54), knitted or crocheted fabric (HS-60), footwear (HS-64), articles of iron and steel (HS-72 and 73), machinery and electrical equipments (HS-84 and 85), transport equipment (HS-87) should be mentioned. In addition, for a number of primary groups like live trees and plants (HS-6), edible fruits (HS-8), coffee, tea etc. (HS-9), oilseeds (HS-12), lac, gum etc. (HS-14), the IIT index was found to have a significant value.

The IIT level at the HS-section level also deserves attention. It could be seen from table 3C that IIT level for almost all HS-Sections are increasing, barring Mineral products (section V), raw hides and finished leather products (section VIII), Footwear, headgear etc. (section XII), and gems and jewellery (section XIV).

The findings of table 3B and 3C are presented in tables 3D-3G in a more comprehensive manner. The indices for four years at the industry level and section level are arranged here in ascending order of their value. It could be clearly seen that at HS 2-digit level, in the initial period, majority of industries had a very low level of IIT and the index is lower than 40 for a number of industries. In the later years, it is found that a large number of industries are recently placed within the 40-60 interval. A similar result follows when IIT at the sectional level is analysed. The only exception is the gems and jewellery sector, where the IIT level was very high in the pre-reform, and declined gradually in the post-reform era. The increase in IIT level across industries and HS sections over the sample period is obvious from the table.

### **The cross-country analysis**

The study so far has concentrated on the overall trade pattern of India, i.e., its trade with the rest of the world at the aggregate level. However, given the fact that India's trade is non-uniform in nature and inclined towards developed countries instead of developing countries, a cross-country analysis could reveal interesting results. It could be seen from India's trade pattern in Annex 9 that proportionate trade with developing countries is on the rise in recent period. This could bear certain important consequences for bilateral IIT. With this view, the study selects four prominent trade partners of India, viz. US, UK, as developed countries; South Korea as NIC (neo-industrialised country) and Bangladesh as underdeveloped country. The study then looks at the cross-country IIT level in these cases over the sample period.

The bilateral IIT indices are presented in table 3H. It is clearly seen from the analysis that the bilateral IIT level in 2000-01 is pretty low for all four countries. The figure is



particularly low for Bangladesh, where trade is mostly one-way, since India's import from the latter is insignificant. The reason is probably the lack of adequate specialisation in differentiated products. The analysis with UK and US show a slightly higher IIT indices. Although India's trade with South Korea has increased considerably in recent times, the corresponding IIT index is still low, as India does not import a number of commodities from South Korea.

In addition, a cross-section analysis is performed for UK and US with whom India trades to a significant level. The IIT indices are reported in table 3I. The results clearly show absence of a uniform trend in the sectional level. Broadly, the IIT indices are low in case of the primary and intermediate goods and relatively higher for manufacturing products. The sections with relatively high IIT level are chemical products (section VI), plastic and rubber (section VII), paper products (section X), gems and jewellery (section XIV), metals (section XV), and machinery and equipment (section XVI). The IIT level in instrument and apparatus (section XVIII) and arms and ammunition (section XIX) is also worth mentioning.

### **Determinants of IIT**

As already discussed, the IIT level in India has been found to increase over the sample period, but the level of increase is not quite significant as compared to other developed or developing countries narrated under literature survey in chapter 1. In this backdrop, an analysis of the determinants of India's IIT could reveal interesting results. The model constructed below attempts to identify the determinants of India's IIT at the sectional level (i.e., HS section I to XIX) and analyse their influence on its level.

Over the sample period, the export and import shares of the sections have undergone a change, the extent of which has already been illustrated with the help of table 2D and 2E. This change could have an influence on the IIT level of the economy. Also, the trade balance of the sections, which also changed over time, could play an important role in determining the IIT trend. In addition, the effect of trade liberalisation, if any, is attempted to measure with help of a dummy variable. The dummy assumes the value of 0 in the pre-92

period and one afterwards. Since the time-period is too small for a time-series analysis, panel regression is attempted to identify the influence of the determinants on IIT level.

The model could be written in the following manner:

$$Y_{it} = \mu_i + \beta_1 \cdot X_{1it} + \beta_2 \cdot X_{2it} + \beta_3 \cdot X_{3it} + D + V_{it} \quad (1)$$

Where,

$Y_I$  = IIT at sectional level

$X_1$  = Export share of the HS-section

$X_2$  = Import share of the HS-section

$X_3$  = Trade balance of the HS-Section

$D$  = Liberalisation dummy, values 0 and 1 in the post and pre-liberalisation period respectively

### Results of the regression

The preliminary regression analysis shows that the coefficient of trade balance is very small and insignificant at 5% level. Hence the regression is re-run by dropping trade balance and the result is represented in table 3J. It could clearly be seen from the table that the coefficients of export share, post-liberalisation dummy and the constant are positive. Only the coefficient of import share is found negative in the analysis. From the t-values, it could be seen that only import share and constant are significant at the 5% level. A Hausman test is performed and the on the basis of it the test is repeated with fixed effect specification: A similar result follows.

The results clearly signify that India's IIT growth is actually export-led in nature and negatively influenced by import growth. It is also seen that, although in the post-liberalisation period, the IIT index has registered an increase, the liberalisation dummy is not significant at 5% level. However the coefficient bear a positive sign.

The results are in unison with the findings of Veeramani (2001), where he arrived at a conclusion that Indian IIT growth in the post-liberalisation period is basically export-

driven. Import growth has actually acted as a retarding force on growth of IIT in this period. This result also partly explains why in the post-liberalisation period, the IIT index has not registered a high growth rate unlike the western countries, where the import growth facilitated IIT growth.

### **Findings**

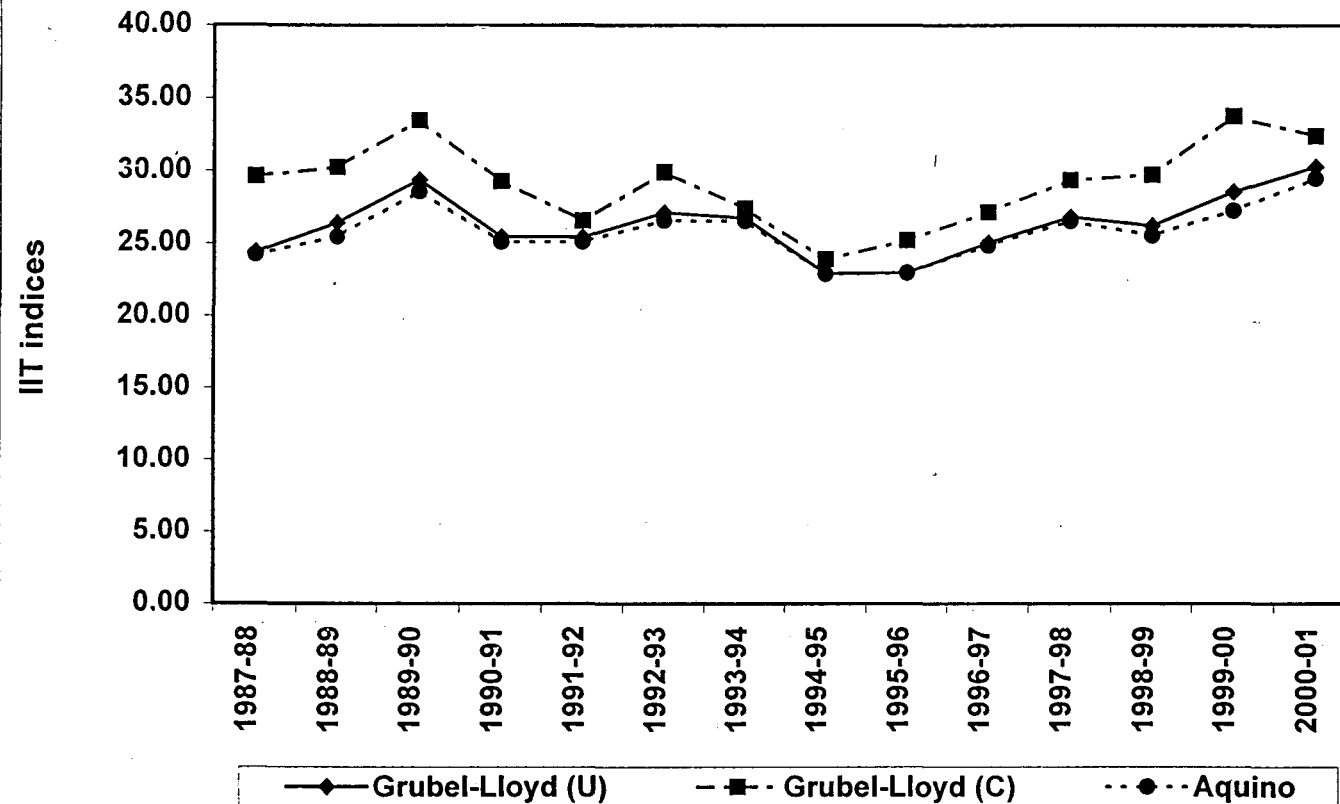
The key findings of this chapter are summarised in the following section:

- The index of IIT over the sample period calculated at a 2-digit level did not show a uniform trend. For a number of industries, it is found that the IIT index is increasing over the years, although a declining trend in certain sectors was also observed. For example, in case of machinery and equipments, the IIT index has registered an increase. On the other hand, in case of gems and jewellery and primary product industries, IIT index has declined over the years. On the whole, it could be concluded that the IIT index at the 2-digit level has, in general, been increasing over the sample period.
- The Aquino measure of IIT index undertaken at sectional level shows a mixed trend, although a very interesting fact immediately attracts attention. The extent of increment has been fairly high in case of primary and intermediate groups like IV, VI, VII, X, XVI, XVII, XVIII in all of which trade has increased significantly. The index of IIT has also registered a marginal increment in case of I, II, and XIX. IIT has declined for V, VIII, XII, and XIV. In the earlier period, import of these items was traditionally low. In the post-liberalisation period, the restrictions were relaxed and the increase in import as well as export has been reflected in the increasing trend.
- It is quite surprising to see that even though several sectors have registered an increment in IIT level, the IIT index as a whole has been more or less stagnant over the years. All three most widely acknowledged measures of IIT used in the study have shown a marginal increment over the sample period. One possible explanation is that unlike the developed countries, in the case of India, at the aggregate level agricultural and primary

commodities play an important role, thereby producing a dampening effect on aggregate IIT index.

- Since the increment in total IIT index falls short of the expectation, a cross-country analysis is also performed. Over the sample period, a few important trade partners of India are selected and the relevant IIT indices are calculated. The cross-country analysis reveals that India's IIT is multilateral, rather than bilateral in nature. The low values of IIT stems from the fact that in a number of cases a specific product under a particular industry is subject to one-way trade, although it is less frequent in case of UK and US. Hence the overall IIT index possesses a low value.
- The analysis on determinants of India's IIT has clearly shown that India's IIT is positively influenced by export share and negatively by import share. In other words, the growth in India's IIT is export driven. Increase in import share has actually produced a dampening effect on IIT level.

Graph 3.1: Trend in IIT indices of India



**Table 3A: India's total IIT trend in the post-reform period**

Year	Grubel-Lloyd (U)	Grubel-Lloyd (C)	Aquino
1987-88	24.43	29.63	24.25
1988-89	26.41	30.23	25.46
1989-90	29.37	33.47	28.59
1990-91	25.47	29.29	25.12
1991-92	25.44	26.58	25.14
1992-93	27.13	29.90	26.60
1993-94	26.74	27.41	26.55
1994-95	22.92	23.90	22.90
1995-96	22.98	25.19	22.98
1996-97	25.02	27.15	24.84
1997-98	26.82	29.35	26.52
1998-99	26.19	29.72	25.54
1999-00	28.53	33.77	27.26
2000-01	30.29	32.41	29.48

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Note: Calculated on the basis of various issues of Monthly Statistics of Foreign Trade, DGCIS

Table 3B: IIT trend in India in HS-Industry level

Year	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01
1	59.86	66.69	0.00	45.05	11.88	19.72	37.21	8.32	5.67	6.43	0.00	19.52	0.01	0.04
2	63.89	22.00	0.00	66.25	28.11	0.00	1.02	0.00	0.00	15.74	0.00	10.28	21.79	5.52
3	16.22	8.49	0.04	0.46	14.14	16.30	3.97	43.03	1.06	4.45	9.20	3.18	10.68	20.94
4	86.34	62.11	14.01	23.00	38.65	22.58	40.93	34.50	52.66	13.08	11.79	18.21	32.41	28.80
5	38.56	23.57	26.34	11.15	22.26	20.24	16.12	12.73	23.64	19.78	21.77	24.14	33.52	32.90
6	31.78	46.15	35.58	43.48	35.27	31.96	26.01	25.88	23.83	20.32	11.60	18.86	24.51	37.35
7	9.33	11.29	12.34	12.33	16.56	22.92	23.51	23.00	23.99	23.12	45.53	35.98	53.75	45.95
8	63.07	61.76	61.32	67.34	84.29	79.03	80.74	79.22	81.54	68.99	65.81	69.17	74.41	65.03
9	26.99	8.66	13.82	13.23	17.24	90.58	20.87	30.61	35.56	40.77	46.90	46.39	48.25	52.15
10	29.15	35.17	85.97	70.24	84.08	20.02	30.60	97.14	8.14	17.95	0.04	0.53	3.43	58.19
11	10.89	20.24	29.18	25.23	16.34	21.78	11.33	27.93	22.54	48.13	40.99	24.26	18.92	22.26
12	41.46	59.95	62.55	45.73	23.24	41.17	42.52	38.94	33.05	41.25	33.62	52.38	52.93	41.34
13	52.07	62.62	65.99	62.70	80.93	77.93	79.43	70.59	67.28	72.71	63.08	64.76	66.49	74.53
14	60.36	43.92	47.87	33.30	43.73	46.67	38.06	54.65	43.29	70.81	51.26	42.19	40.60	45.26
15	3.70	6.30	5.79	8.78	9.54	23.92	18.53	15.54	12.72	3.25	5.55	2.50	3.60	6.63
16	29.60	4.66	0.00	3.33	33.33	39.38	14.72	81.38	35.99	18.89	52.51	49.02	29.74	41.13
17	95.61	5.89	65.97	58.19	16.48	7.46	10.31	86.63	77.23	21.86	92.51	35.64	28.38	55.53
18	20.38	2.24	0.00	0.00	10.95	1.98	45.22	8.25	33.19	40.19	36.42	21.11	30.83	66.86
19	84.43	79.21	34.31	65.07	58.44	58.22	38.82	39.49	10.94	43.99	50.70	28.96	54.71	56.72
20	26.01	17.63	0.00	13.00	1.31	1.38	0.31	9.28	21.33	6.75	33.48	21.11	17.93	19.87
21	20.46	15.81	9.32	11.72	21.91	9.92	11.67	10.41	8.33	16.84	10.13	7.64	14.16	18.33
22	86.90	28.62	37.27	29.47	45.15	60.74	85.09	56.61	80.38	27.26	85.14	73.76	67.37	41.11
23	37.01	25.69	0.57	26.10	21.37	19.65	11.51	5.53	6.03	5.18	5.75	5.45	6.43	8.95
24	43.11	19.11	36.54	27.12	30.84	46.09	58.01	46.63	58.73	45.16	73.53	83.70	75.14	89.33
25	3.64	4.66	4.34	3.60	3.17	3.27	3.76	4.28	5.27	7.80	6.94	7.33	8.89	9.40
26	8.55	11.53	21.69	7.51	10.11	6.38	19.72	42.31	25.30	25.56	18.75	6.28	15.69	10.92
27	24.80	34.68	36.46	40.84	38.08	39.28	41.93	46.86	54.46	46.72	46.84	49.92	33.14	8.70
28	15.70	7.37	9.64	12.48	9.44	10.32	13.67	12.90	15.74	19.89	20.09	17.99	14.73	18.38
29	46.34	36.39	46.81	51.93	50.28	51.65	53.82	56.38	52.88	51.21	55.68	57.84	59.59	61.30

30	72.46	68.60	88.51	90.25	72.26	73.53	73.52	64.41	53.99	62.97	59.82	65.88	65.76	67.93
31	30.10	8.18	2.01	27.33	33.29	50.15	44.37	12.77	44.44	30.56	48.77	21.45	47.90	74.92
32	26.03	31.49	23.72	31.83	32.45	31.11	32.39	37.52	33.98	23.82	32.15	32.35	29.96	32.84
33	48.89	49.39	49.30	51.72	46.62	45.79	48.83	53.33	66.94	61.95	60.26	62.70	66.26	60.61
34	6.14	31.83	59.11	55.31	67.03	52.16	42.80	36.08	48.98	53.98	56.34	61.45	60.88	71.69
35	21.91	45.74	35.56	48.30	38.59	39.72	49.15	63.73	41.35	27.19	46.12	24.79	21.39	18.74
36	74.49	61.82	64.77	63.21	69.51	47.39	19.27	38.98	23.75	51.30	64.63	53.40	57.04	68.28
37	51.10	61.47	61.67	23.70	44.39	49.52	25.79	31.38	27.62	22.69	35.64	41.22	38.28	39.82
38	24.49	25.64	26.55	19.40	31.88	26.25	34.16	38.53	35.68	33.76	37.08	34.73	33.31	45.01
39	25.03	18.56	20.40	20.14	18.42	24.46	19.63	37.69	37.09	32.79	40.18	42.64	50.19	62.34
40	18.71	15.82	17.13	15.89	22.98	20.68	19.34	17.28	18.22	22.36	21.37	27.93	27.65	26.90
41	64.71	34.39	52.51	48.76	50.75	51.99	59.77	56.06	58.01	56.39	55.11	50.26	52.71	53.41
42	10.69	11.47	10.61	13.16	51.53	35.68	46.76	35.36	36.29	84.58	71.75	63.17	62.93	54.41
43	7.55	1.53	7.88	0.82	52.33	26.85	0.00	1.19	41.53	8.74	1.04	62.75	39.23	29.80
44	3.69	11.53	4.58	3.44	11.85	2.01	3.29	5.54	7.64	12.35	10.39	45.17	8.00	10.59
45	25.33	14.53	12.02	13.46	29.32	34.97	24.20	35.63	29.03	27.15	39.10	33.89	21.10	39.02
46	0.00	14.96	35.70	65.94	66.36	0.00	88.08	83.00	25.90	61.47	98.92	8.69	69.56	99.54
47	27.26	35.26	35.89	54.89	50.63	7.16	33.96	37.32	19.76	13.05	46.35	49.93	26.51	46.97
48	28.62	24.41	23.55	29.81	27.98	23.44	27.82	32.19	31.17	31.66	35.36	39.40	49.13	41.94
49	64.69	90.51	61.88	62.80	69.76	62.10	68.35	75.16	78.04	52.71	60.00	46.42	48.97	53.72
50	3.23	2.37	6.00	8.41	6.36	4.93	5.34	6.09	3.86	13.58	12.22	11.51	7.69	4.86
51	21.72	65.64	54.99	19.53	7.99	7.36	5.53	13.18	6.67	4.92	8.71	10.03	6.60	7.35
52	26.89	19.70	46.34	42.99	56.63	23.71	62.15	13.16	15.63	55.65	48.98	37.63	8.71	11.54
53	42.80	30.63	4.04	10.76	39.22	29.88	11.38	5.17	8.21	8.26	21.64	18.98	9.89	8.02
54	42.99	36.27	31.38	21.91	33.00	43.34	40.89	42.02	48.17	56.25	85.36	61.90	52.79	56.38
55	48.67	62.90	74.92	55.41	42.53	34.04	38.52	31.99	24.26	23.12	24.70	36.35	46.82	36.66
56	58.18	64.73	70.51	60.73	67.37	42.03	42.44	55.65	59.34	55.74	56.44	47.02	42.96	33.71
57	0.00	0.00	49.41	0.00	1.17	1.73	5.48	68.64	45.47	23.21	35.79	38.58	42.82	39.90
58	34.98	27.67	24.85	20.37	19.69	22.56	27.86	17.66	27.19	19.88	28.75	27.38	26.10	17.18
59	28.07	28.94	30.75	46.57	52.17	54.99	54.46	59.58	50.49	50.85	60.03	79.57	81.08	73.55
60	40.10	25.75	29.34	30.06	62.98	72.06	75.09	43.23	34.88	61.73	72.68	87.17	55.99	73.33
61	1.59	1.81	2.43	1.61	1.01	1.35	8.51	3.19	3.10	9.23	44.36	45.45	69.36	36.32
62	1.69	0.20	0.30	0.21	0.19	0.92	27.86	13.62	6.33	6.62	30.07	49.38	58.23	67.35



63	7.55	4.54	1.13	2.46	3.62	3.14	2.22	3.12	1.83	5.37	16.22	21.40	16.07	19.58
64	70.23	72.18	68.28	64.84	62.60	52.01	45.20	39.61	43.06	39.59	51.59	52.98	44.11	54.96
65	35.48	25.37	36.91	31.73	23.85	21.27	14.38	31.86	36.76	23.06	55.75	41.73	41.72	64.20
66	26.77	9.83	20.85	5.91	3.02	23.57	32.31	15.11	9.47	24.62	49.98	80.37	32.09	68.32
67	8.41	4.38	5.20	0.77	0.12	2.33	7.73	5.95	5.73	30.26	3.07	18.02	2.12	3.22
68	26.53	25.87	22.73	22.44	22.02	13.36	13.27	11.96	10.81	11.43	13.49	16.10	15.67	17.49
69	38.46	29.12	18.35	29.66	32.86	28.59	29.02	32.23	29.79	33.55	35.31	41.01	40.87	34.57
70	31.27	18.13	30.08	30.50	30.27	20.68	41.33	28.70	27.76	34.52	40.21	40.48	46.44	46.89
71	96.71	95.59	94.48	93.23	87.92	89.76	91.04	69.59	70.41	74.45	50.98	42.31	53.57	50.71
72	26.23	22.81	35.46	26.48	33.06	27.34	33.56	33.31	38.94	37.90	41.75	48.45	45.13	49.64
73	33.93	36.28	38.96	34.30	36.52	43.41	42.21	37.42	49.19	48.55	56.83	46.68	49.32	46.23
74	23.68	6.31	24.22	30.60	12.82	11.75	9.19	13.75	20.04	16.83	16.07	20.40	19.38	25.68
75	8.22	12.81	4.15	15.33	43.39	41.07	12.27	6.81	13.48	10.52	39.59	21.02	25.99	21.64
76	26.02	73.46	78.77	64.74	68.08	37.97	73.90	71.39	63.15	80.36	73.40	56.76	59.46	62.65
78	16.09	1.96	0.55	54.13	9.55	73.78	51.97	72.61	59.46	86.50	59.58	46.84	20.25	19.22
79	64.77	1.07	0.25	2.85	0.23	64.84	82.33	45.83	6.15	36.13	77.74	73.41	16.78	9.45
80	8.28	5.57	6.74	47.90	2.60	72.75	13.26	61.46	46.24	56.12	38.92	31.97	24.48	17.83
81	26.71	6.03	29.85	17.01	33.98	61.79	59.08	53.40	41.38	43.82	42.92	41.13	43.36	69.90
82	30.66	31.96	34.48	24.39	19.28	24.93	20.93	26.23	28.21	26.50	30.15	28.76	30.05	32.67
83	18.25	22.57	32.92	42.79	28.34	27.37	25.20	26.22	27.58	36.99	25.22	35.87	54.52	47.09
84	53.26	54.51	55.42	60.54	56.52	61.62	62.40	63.60	62.60	62.19	67.15	67.53	62.69	65.36
85	50.73	44.22	50.58	49.73	48.54	51.24	49.51	46.97	56.09	54.71	51.46	51.41	56.38	56.79
86	18.89	24.20	19.91	10.50	12.90	9.91	14.76	20.33	24.09	47.50	43.26	49.25	38.97	42.25
87	57.64	60.28	47.55	42.68	40.62	36.60	34.92	34.95	35.99	29.85	39.02	42.88	42.31	44.75
88	52.27	97.08	17.22	36.02	92.17	53.48	11.04	41.89	55.56	8.48	84.45	40.73	67.64	34.70
89	31.73	15.05	12.43	31.34	24.20	2.60	59.93	18.64	16.32	62.39	70.99	74.65	77.79	26.46
90	39.31	37.41	53.18	55.06	50.95	57.35	57.58	61.28	63.32	65.95	63.34	60.43	61.75	63.46
91	53.54	20.45	13.71	29.73	20.07	14.60	10.26	7.68	15.40	12.91	27.75	20.07	30.60	33.74
92	59.45	63.65	61.17	62.11	63.66	50.55	51.23	59.25	58.92	33.13	41.05	35.35	78.69	49.74
93	26.01	33.51	27.53	36.01	2.63	35.52	54.05	40.85	34.41	44.44	87.75	50.43	46.43	36.97
94	38.37	51.81	56.74	40.55	43.35	54.08	50.35	47.33	29.51	28.24	42.43	58.99	59.21	66.52
95	68.60	64.62	83.31	88.07	57.65	86.43	68.63	67.22	71.44	69.37	53.45	48.17	36.69	48.04
96	26.78	28.22	29.78	30.88	39.17	47.59	51.50	48.56	53.45	54.96	56.92	55.29	57.89	57.86

Table 3C: IIT Trend In India at HS-Section level

Year	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01
I	1.99	2.00	2.29	1.70	1.96	1.81	3.42	5.34	2.62	5.32	6.33	3.44	6.05	9.03
II	23.74	25.36	32.78	34.97	27.30	33.67	32.49	30.06	20.03	26.62	21.59	21.89	34.45	34.32
III	3.70	6.30	5.79	8.78	9.54	23.92	18.53	15.54	12.72	3.25	5.55	2.50	3.60	6.63
IV	10.43	9.18	6.95	8.18	7.30	6.49	8.92	6.79	17.12	9.70	12.68	9.79	10.69	22.59
V	22.27	29.89	31.95	37.52	34.27	35.42	34.87	37.16	36.25	36.81	32.93	17.09	12.80	8.67
VI	25.27	14.49	23.35	28.87	23.64	24.04	27.04	31.24	31.13	31.47	33.60	33.61	33.63	40.61
VII	18.03	16.77	17.62	16.79	19.23	21.76	19.79	32.12	31.89	28.33	33.69	36.57	41.91	50.88
VIII	50.08	32.30	38.83	25.78	20.81	18.65	22.53	26.70	21.86	20.79	16.61	14.24	16.15	21.52
IX	3.81	11.46	4.70	3.54	11.98	2.29	3.45	5.78	7.79	12.38	10.36	62.01	7.96	10.59
X	22.75	27.98	20.58	25.12	24.85	23.60	22.94	29.74	28.02	26.04	30.65	31.82	35.77	34.22
XI	8.84	9.40	11.84	9.97	12.73	12.17	12.90	11.16	11.72	14.65	19.94	19.78	14.48	15.77
XII	63.83	68.43	67.29	63.77	61.54	51.06	44.54	39.00	42.02	38.70	49.15	50.01	41.44	49.44
XIII	24.21	19.64	23.65	22.75	21.24	17.34	21.84	21.49	21.60	23.75	21.40	25.44	29.09	31.63
XIV	96.71	95.59	94.48	93.23	87.92	89.76	91.04	69.59	70.41	74.45	50.98	42.31	53.57	50.71
XV	21.79	20.86	30.23	22.73	26.54	23.83	30.40	31.22	35.52	36.10	39.87	40.48	39.29	43.53
XVI	52.70	50.56	53.57	57.12	53.51	58.36	58.41	57.66	59.93	58.10	60.44	60.94	59.68	60.14
XVII	38.65	46.19	29.22	37.13	37.20	29.00	18.78	23.70	27.63	28.92	39.18	39.20	44.54	43.86
XVIII	37.00	35.47	49.50	51.85	47.87	53.28	52.42	53.46	56.12	58.19	59.68	55.98	57.71	57.10
XIX	26.01	33.51	27.53	36.01	2.63	35.52	54.05	40.85	34.41	44.44	87.75	50.43	44.90	36.97

**Table 3D: Index of IIT in India (1987-88)**

Value of the index	HS- Code Number
I = 0	46, 57
0 < I ≤ 20	61, 62, 50, 25, 44, 15, 34, 43, 63, 75, 80, 67, 26, 7, 42, 11, 28, 78, 3, 83, 40, 86
20 < I ≤ 40	18, 21, 51, 35, 74, 38, 27, 39, 45, 93, 20, 76, 32, 72, 68, 81, 66, 96, 52, 9, 47, 59, 48, 10, 16, 31, 82, 70, 89, 6, 73, 58, 65, 23, 94, 69, 5, 90
40 < I ≤ 60	60, 12, 53, 54, 24, 29, 55, 33, 85, 37, 13, 88, 84, 91, 87, 56, 92, 1
60 < I ≤ 80	14, 8, 2, 49, 41, 79, 95, 64, 30, 36
80 < I ≤ 100	19, 4, 22, 17, 71
Value of the index	HS- Section Number
I = 0	-
0 < I ≤ 20	I, III, IX, XI, IV, VII
20 < I ≤ 40	XV, V, X, II, XIII, VI, XIX, XVIII, XVII
40 < I ≤ 60	VIII, XVI
60 < I ≤ 80	XII
80 < I ≤ 100	XIV

**Table 3E: Index of IIT in India (1991-92)**

Value of the index	HS- Code Number
I = 0	-
0 < I ≤ 20	67, 62, 79, 61, 57, 20, 80, 93, 66, 25, 63, 50, 51, 28, 15, 78, 26, 18, 44, 1, 74, 86, 3, 11, 17, 7, 9, 39, 82, 58
20 < I ≤ 40	91, 23, 21, 68, 5, 40, 12, 65, 89, 48, 2, 83, 45, 70, 24, 38, 32, 69, 54, 72, 31, 16, 81, 6, 73, 27, 35, 4, 96, 53
40 < I ≤ 60	87, 55, 94, 75, 14, 37, 22, 33, 85, 29, 47, 41, 90, 42, 59, 43, 84, 52, 95, 19
60 < I ≤ 80	64, 60, 92, 46, 34, 56, 76, 36, 49, 30
80 < I ≤ 100	13, 10, 8, 71, 88
Value of the index	HS- Section Number
I = 0	-
0 < I ≤ 20	I, XIX, IV, III, IX, XI, VII
20 < I ≤ 40	VIII, XIII, VI, X, XV, II, V, XVII
40 < I ≤ 60	XVIII, XVI
60 < I ≤ 80	XII
80 < I ≤ 100	XIV

**Table 3F: Index of IIT in India (1995-96)**

Value of the index	HS- Code Number
I = 0	2
0 < I ≤ 20	3, 63, 61, 50, 25, 1, 67, 23, 79, 62, 51, 44, 10, 53, 21, 66, 68, 19, 15, 75, 91, 52, 28, 89, 40, 47
20 < I ≤ 40	74, 20, 11, 5, 36, 6, 7, 86, 55, 26, 46, 58, 83, 37, 70, 82, 45, 94, 69, 48, 12, 18, 32, 93, 60, 9, 38, 16, 87, 42, 65, 39, 72
40 < I ≤ 60	35, 81, 43, 64, 14, 31, 57, 80, 54, 34, 73, 59, 4, 29, 96, 30, 27, 88, 85, 41, 24, 92, 56, 78
60 < I ≤ 80	84, 76, 90, 33, 13, 71, 95, 17, 49
80 < I ≤ 100	22, 8
Value of the index	HS- Section Number
I = 0	-
0 < I ≤ 20	I, IX, XI, III, IV
20 < I ≤ 40	II, XIII, VIII, XVII, X, VI, VII, XIX, XV, V
40 < I ≤ 60	XII, XVIII, XVI
60 < I ≤ 80	XIV
80 < I ≤ 100	-

**Table 3G: Index of IIT in India (2000-01)**

Value of the index	HS- Code Number
I = 0	-
0 < I ≤ 20	1, 67, 50, 2, 15, 51, 53, 27, 23, 25, 79, 44, 26, 52, 58, 68, 80, 21, 28, 35, 78, 63, 20
20 < I ≤ 40	3, 75, 11, 74, 89, 40, 4, 43, 82, 32, 5, 56, 91, 69, 88, 61, 55, 93, 6, 45, 37, 57
40 < I ≤ 60	22, 16, 12, 48, 86, 87, 38, 14, 7, 73, 70, 47, 83, 95, 72, 92, 71, 9, 41, 49, 42, 64, 17, 54, 19, 85, 96, 10
60 < I ≤ 80	33, 29, 39, 76, 90, 65, 8, 84, 94, 18, 62, 30, 36, 66, 81, 34, 60, 59, 13, 31
80 < I ≤ 100	24, 46
Value of the index	HS- Section Number
I = 0	-
0 < I ≤ 20	III, V, I, IX, XI
20 < I ≤ 40	VIII, IV, XIII, X, II, XIX
40 < I ≤ 60	VI, XV, XVII, XII, XIV, VII, XVIII
60 < I ≤ 80	XVI
80 < I ≤ 100	-

**Table 3H: Aggregate IIT indices at cross-country level**

No.	Country status	Country	IIT index
1	Developed	US	13.04
2		UK	12.42
3	Developing	South Korea	10.9
4	LDC	Bangladesh	1.49

**Table 3I: IIT indices at sectional level**

IIT index/ Sections	Country	
	US	UK
I	5.64	6.39
II	9.57	16.90
III	16.27	4.90
IV	16.32	17.68
V	4.29	5.47
VI	31.13	36.93
VII	32.81	43.21
VIII	8.58	5.40
IX	14.88	23.37
X	30.50	44.32
XI	8.53	9.13
XII	10.26	42.92
XIII	14.60	20.47
XIV	71.97	34.08
XV	36.30	21.18
XVI	52.68	45.05
XVII	16.87	20.36
XVIII	49.52	33.51
XIX	63.92	83.81

**Table 3J: Determinants of India's IIT**

Variables	Coefficient	t-value	p-value	R-square	Hausman test Statistic
				0.1304	0.0004
Export share	.6296355	1.278	0.202		
Import share	-1.745993	-5.716	0.000		
Constant	34.76283	11.184	0.000		
Liberalisation dummy	1.809091	1.569	0.118		

## Chapter 4

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### Horizontal and vertical specialisation

In chapter 3, the dissertation has analysed the IIT of India as a whole, i.e., two-way trade within a given commodity classification has been considered. The findings have clearly shown that the IIT index has been rising in the post-liberalisation period in general, although the trend is weaker in comparison with other developed and a number of developing countries. However, the existence of IIT does not provide any information about the nature of specialisation within the industries and an in-depth study on the IIT pattern within the industry group could reveal interesting results. It could be seen that the traded products differ widely in quality, and this requires a clear distinction between horizontal and vertical specialisation.

The dissertation initially adopts the unit price method, and determines the specialisation pattern evolved in India in this manner. The underlying assumption is that relative prices tend to reflect qualities. In case of horizontal trade, the price difference is not appreciable, but in case of vertical specialisation, there exist a huge price difference among the exportable and importable commodities.

#### 4.1 Results on Distinction by Quality

The results of the analysis of specialisation pattern by unit price method are shown in tables 4A-4D. The tables clearly suggest that India's total trade in the selected commodities is predominantly vertical in nature. Specifically the machinery and equipments sector, i.e., HS-84, HS-85, HS-87 should be mentioned, where the proportion of vertical trade consistently remained at a very significant level. For all the four years selected for the analysis, it is observed, that vertical specialisation is generally showing a high trend.<sup>1</sup> For example, in 1992-93 for commodity groups like rubber products (40), leather products (42), and gems and jewelry (71), the trade was totally vertical in nature at 15% level of

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<sup>1</sup> In the first two years of the study data at 6-digit level of aggregation for pharmaceutical industry (HS-30) is not available. Data is also not available for leather industry in 1988-89. However in the subsequent period, the relevant data is provided in the DGCIS figures.

significance. In a number of occasions, it is observed that the difference between the trend in vertical specialisation at 15% and 25% interval is quite narrow. This clearly suggests that the difference between unit price of export and import is too high under these circumstances. The example of gems and jewelry industry should be mentioned, where the proportion of vertical and horizontal trade differs between 15% and 25% level only in 1999-2000, the last year of the sample period.

With the help of diagram 4.1-4.12, the level of vertical specialisation in the commodities and the dynamics in their IIT indices are analysed.<sup>2</sup> It could be seen that barring the exception of inorganic chemicals (HS-28), all other sectors have a high level of IIT. In addition, this high level of IIT has been associated with a high proportion of vertical specialisation. Only in the case of rubber products (HS-40), leather products (HS-42) and road vehicle and parts (HS-87), the vertical specialisation pattern has shown a fluctuating trend. A similar trend has been noticed in their respective IIT indices as well. Only in the case of pharmaceutical industry (HS-30), the proportion of vertical specialisation has shown a sharp decline. The findings clearly demonstrate that the trade pattern in case of the selected commodities is vertical in nature by unit price method. Now, the nature of trade pattern of India is analysed with the nature of the traded commodity.

#### **4.2 Distinction on end-use**

The analysis suggests the existence of a fairly high amount of vertical IIT in all these sectors. However, the existence of horizontal IIT in these sectors is also worth mentioning. The dynamics in these industries are discussed in the following section.

##### **Plastic industry (HS-39)**

Over the sample period, total trade in plastic products as well as the IIT index of the industry has shown a growing trend. Export of plastic products has increased proportionately in total export, although import has shown a reverse trend during the sample period. The industry consists of 26 HS 4-digit industries. The first fifteen groups could be considered as primary and intermediate products, and the remaining groups as final commodities.

The analysis of export and import pattern of plastic products reveals that in 1987-88 the import mainly consisted of polymers of different commodities, which accounted for more than 70 percent of the total import. Specifically polymers of ethylene (39.01) and polymers of vinyl chloride (39.04) could be mentioned, which explained 42 and 22 percent of total import. However, in 2000-01, the import of the first fifteen groups declined from 90 percent to 67 percent, although the import of polyacetals (39.07) increased significantly. Among the finished items, import of other articles of plastic (39.26) increased to 10 percent of total import from an insignificant 2 percent in 1987-88. A reverse trend is observed in the case of export of plastic products, where the proportionate share of the first fifteen groups has increased from 17 percent to 50 percent over the period. In 1987-88, India's main export items were other plates, sheets of plastic (39.20), articles for the conveyance (39.23), and of other articles of plastic (39.26), which accounted for 32 percent, 13 percent and 27.5 percent of the total export respectively. In 2000-01, barring the exception of 39.23 (which remained almost constant) the relative share of other two groups (39.20 and 39.26), declined significantly. Exports of polymers of ethylene (39.01), polymers of propylene (39.02), polymers of vinyl chloride (39.04), and polyacetals (39.07) increased considerably.

The directional flow of plastic products shows that India imports plastic products significantly from US, UK and other developed countries. The major export destinations are developed countries such as UK, US, Germany, Italy, Belgium on one hand, and developing countries like Bangladesh, China, Egypt, United Arab Emirates, Sri Lanka on the other.

The change in the export and import share of India's trade within the industry reveals that in recent years the export of raw materials and intermediate goods has increased, whereas import of final products has gone up. In essence, the trade pattern suggests existence of both vertical and horizontal IIT for plastic products.

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<sup>2</sup> The IIT value of the industry under consideration has been provided in the inset.



**Rubber industry (HS-40)**

Over the sample period, the IIT index of the industry has registered an increase. Export of this industry has increased proportionately in the total export, although import has fallen over the period. In addition, the sector has become a surplus sector in 2001-01, whereas it was a deficit sector in 1987-88. HS section 40 consists of seventeen 4-digit industry groups, in which the first eight groups could be considered as intermediate products. These 4-digit groups mainly consist of natural rubber, rubber in primary forms, waste and scrap of rubber, plate, sheets and strips of rubber etc. The remaining nine groups consists of final products.

During the sample period, import of natural rubber (40.01) has declined from 38 percent to 2 percent, whereas the same for synthetic rubber (40.02) has shot up from 32 percent to 51 percent. Among the final commodities, the import of vulcanised rubber (40.16) has registered a sharp increment in recent years from 11 percent to 26 percent. The import of tubes, pipes and hoses has also increased over the period. At the beginning of the sample period, the exports mainly consisted of conveyer transmission belts (40.10), new and used tyres of rubber (40.11 and 40.12) with proportions 15, 62 and 6 percent respectively. However, the export pattern in 2000-01 shows that relative importance of all three sectors declined in total exports, as their respective trade proportions stood at 5, 55 and 2.86 percent respectively. Exports of inner tubes of rubber (40.13), hygienic or pharmaceutical articles (40.14) and articles of vulcanised rubber (40.16) have become more important in recent periods.

Analysing the direction of trade, it could be seen that, India is engaged in trade of rubber products with a number of countries at different stage of development. The major source of India's import are Canada, France, Germany, Japan, South Korea, Russia, US etc. The export destinations include developed countries like US, UK, Germany, Netherlands etc., the Indian rubber products are also widely appreciated in developing countries like Bangladesh, Egypt, Sri Lanka, Nigeria, Uganda, United Arab Emirates, Vietnam etc.

The trade dynamics in rubber industries shows that India's trade is predominantly vertical in nature. This trade pattern is dictated by availability of inputs in India. India mainly imports rubber in primary form (natural and synthetic) and exports the finished products. In 1987-88, India was mainly importing rubber in primary forms and exporting final commodities. The trend has changed slightly in the post-liberalisation period, when the proportionate import of intermediate commodities in total import has declined from 73 percent to 56 percent. On the other hand, the export of final products has declined only marginally from 97 percent to 93 percent over the sample period.

#### **Leather industry (HS-41 and HS-42)**

Over the sample period, the IIT index of the leather industry has registered an increase. The leather products are classified under two HS-sections, namely 41 and 42. Under HS-41, raw hides and skins, i.e., the primary and intermediate products are classified. HS-42 consists of the final commodities. Export share of HS-41 has declined proportionately in total export, although its proportionate import has increased over the sample period. In case of HS-42, both export and import of the industry has increased proportionately. The leather industry has traditionally been a surplus sector.

In 1987-88, the import of raw hides and skins of bovine (41.01), other raw hides and skins (41.03), leather of bovine and equine animals (41.04), goat or kid skin leather (41.06) were high and accounted for 90 percent of total import. It is seen from the import table of 2000-01 that the proportional import of 41.01, 41.03 and 41.06 has declined, and the importance of raw skins of sheep or lambs (41.02) and sheep or lamb skin leather has increased. The proportional import of bovine leather (41.04) has increased from 42 percent in 1987-88 to 51 percent in 2000-01. India's export of raw hide and skins has also increased substantially over the sample period, although the export basket is dominated by three main items, namely 41.04, 41.05, 41.06. The polarisation has intensified over the sample period as the proportional export of these three items increased from 97 to 99 percent over the period.

The final products classified under HS-42 also deserve attention. It is seen from the import figures that in 1987-88 trunk, suit-cases, vanity-cases (42.02) and article of clothing

and apparel (42.03) was nil. The import basket consisted of articles of leather (42.04) and other articles of leather (42.05), which accounted for 72 and 25 percent of total import respectively. However, in 2000-01, 42.02 and 42.03 accounts for 73 and 13 percent of total import respectively. Export basically consists of saddlery and harness (42.01) and 42.02, 42.03 and 42.04, and these 4 industries account for almost 98 percent of the total export for both terminal years of the sample.

The analysis of directional flow shows that India imports raw hide and skins from Germany, Italy, Netherlands, New Zealand, Saudi Arabia, UK etc. It also imports articles of leather from Argentina, Australia, Bangladesh, Germany, Italy, Saudi Arabia, UK, US etc. India's export basket consists of leather goods, leather garments, and footwear of leather and its components and goes mainly to Germany, Italy, Netherlands, Russia, Spain, UK, US etc.

The trade dynamics of leather sector shows the existence of both horizontal and vertical trade in this sector. For example, India simultaneously exports and imports the raw skins and hides. In case of final products, commodities like box and cases, wearing apparel etc. are simultaneously exported and imported.

### **Gems and Jewelry (HS-71)**

The IIT index of gems and jewelry sector (HS-71) has declined considerably during the sample period, although trade in this sector has expanded significantly. The precious stones and metals sector consists of eighteen HS 4-digit groups. Export share of this sector has been more or less constant, although the proportionate import has increased significantly over the sample period. The first twelve groups could be considered as primary and intermediate goods and the remaining six groups could be considered as finished products.

The analysis of export and import share of the HS 4-digit group reveals interesting results. In 1987-88, the trade pattern was predominantly intensive in diamonds (71.02), and the export and import share of it was 94 and 96 percent respectively. However, in 2000-01, the relative importance of this sector has declined and the relative export and import share stood at 83 and 48 percent respectively. Export of articles of jewelry (71.13) has become

particularly important and its proportional share stood at 12 percent. Apart from this, import of three precious primary metals silver (71.06), base metals clad with silver (71.07) and gold (71.08) became particularly significant.

India's trade with Belgium in gems and jewelry sector is very high and deserves particular attention.<sup>3</sup> India simultaneously exports and imports semi-finished and finished products to Belgium. Apart from it, India imports precious stones and metals from Congo, Ghana, Hong Kong, Israel, Switzerland, United Arab Emirates, UK, US etc. Gold and Silver is mainly imported from China, Hong Kong, South Africa, Switzerland, United Arab Emirates, UK and US. It exports gems and jewelry to Afghanistan, Canada, France, Germany, Hong Kong, Israel, Italy, Japan, Singapore, Switzerland, Thailand, UK, US etc.

The trade pattern of jewelry sector also shows presence of both horizontal and vertical trade. For example, diamonds is a major commodity group, simultaneously exported and imported by India, including both cut and uncut diamonds. However, in recent period, India's export of diamonds has gone down proportionately, although it still holds an important position. In addition, import of semi-finished precious stones other than diamond has increased in the post-liberalisation period. In the terminal year, it is seen that India's export of articles of jewelry registered an increase, which shows a shift towards final commodities.

### **Iron and Steel industry (HS-72 and HS-73)**

Over the sample period, the IIT index of iron and steel industry has shown a growing trend in the post-liberalisation period. The iron and steel products are classified under two HS-sections, namely 72 and 73. Under HS-72, iron and steel products, i.e., the primary and intermediate products as well as finished items are classified. HS-73 consists of the final commodities. Export share of both HS-72 and HS-73 has increased proportionately in total export, although the proportionate import of all these two sectors has declined over the sample period. Both of these two HS-industries were deficit sectors in 1987-88. However, it

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<sup>3</sup> In value terms, more than 10 percent of India's export is directed towards Belgium and approximately 50 percent of imports originate from Belgium.

is seen that in 2000-01, both of them are in surplus. HS-72 and HS-73 consists of 29 and 26 4-digit HS-groups respectively. Among these groups, 72.01 to 72.07 and 72.24 could be considered as intermediate products.

Within HS-72, it is seen that a large chunk of India's import consisted of raw materials and inputs, such as ferrous waste and ingots (72.04), and flat-rolled products of iron of different sizes and shapes (72.08, 72.09, 72.10, 72.25), which accounted for almost 70 percent of total import. It could be seen in 2000-01 that the import of intermediate products has increased within the group as import shares of Ferro-alloys (72.02), 72.04, and semi-finished products of iron (72.07) has increased from 33 percent to 48 percent. The export in 1987-88 mainly consisted of primary commodities, as Ferro-alloys accounted for 63 percent of total export. However, in 2000-01, it is seen that the export of Ferro-alloys has declined to a meager 8 percent. On the other hand, the export of flat-rolled products of iron (72.09 and 72.10), and other bars and rods of stainless steel (72.22) has become more important in recent years.

The trade pattern within HS-73 has also undergone major changes. In 1987-88, import of railway or tramway track (73.02) and tubes and pipes (73.04) accounted for more than 50 percent of total import. However, in 2000-01, it is seen that relative importance of these two sectors has declined, and import of other articles of iron (73.26) and tube and pipe fittings (73.07) has increased significantly. In case of exports, tubes and pipes (73.05, 73.06, 73.07) and structures (73.08), wire, ropes and cables (73.12), screw, bolts, nuts etc. (73.18) and tableware and kitchenware (73.23) were the major items in the initial period. It could be seen from the trade table of 2000-01 that although the importance of the other groups is still high, the proportion of tableware and kitchenware has increased from 8 percent to 32 percent.

The directional trade flow in iron and steel industry shows that inputs like primary steel and pig iron are imported from Bhutan, China, France, Russia, South Africa, UK etc. The final products of iron and steel are imported from Australia, Belgium, China, Germany, Japan, Russia, South Africa, UK, US etc. The export of primary and semi-finished iron and

steel products is made to Bangladesh, Canada, Ethiopia, Italy, Spain, United Arab Emirates, UK and US. The export of other iron and steel items goes to Australia, Canada, Germany, Hong Kong, Sri Lanka, United Arab Emirates, US, UK etc. It seems from the export table that India is mostly exporting final products to the developing countries.

The trade pattern in HS-72 suggests that from raw materials, India's import regime has gradually shifted towards intermediate products. At the same time, the export of final products is increasing in the recent period. In HS-73, it could be seen that import of intermediate and final products dominate over other groups. The export basket shows that India has been able to reap its comparative advantage in light manufactured final products of iron and steel.

#### **Machinery and Equipment (HS-84)**

The machinery and equipments sector consists of 85 4-digit industry groups which include various machinery products, computer softwares, electronic products etc. The IIT index of this sector has increased over the sample period. The precious stones and metals sector consists of eighteen HS 4-digit groups. Export share of this sector has been more or less constant in the total, although its proportionate import has increased significantly over the sample period.

The analysis of imports in 1987-88 reveal that important items within this sector were air or vacuum pumps (84.14), printing machinery (84.43), auxiliary machinery (84.48), parts and accessories (84.66, 84.73), machines with individual functions (84.79) etc. However, in 2000-01, the major importables were parts (84.09, 84.73), and computer items (84.71). The major exportables in 1987-88 were parts (84.09, 84.66), pumps (84.14), textile preparing machines (84.45), computer products (84.71), machinery for preparing rubber (84.77) etc. While the importance of other items in the export basket remained almost similar, the export of computer products (84.71) declined from 9.72 percent to 5.13 percent but export of parts and accessories for computer products and other office equipments (84.73) increased from 1.7 percent to 12.57 percent.

The directional composition of import did not change drastically over the sample period. The major sources of imports were US, UK, Germany, France, Netherlands, Korea. The top export market traditionally consists of a number of developed countries like US, UK, Germany, Japan etc. However, in the recent period, India is exporting final products to a number of developing and less developed countries like Bangladesh, Uganda, Thailand and others.

The trade pattern clearly shows that there exists significant vertical trade. For example, in the case of computer software and other products, India is mainly an exporter of intermediate products, and imports final commodities. However, the existence of horizontal trade is also worth mentioning. India simultaneously exports and imports commodity groups like parts (84.09), pumps (84.13, 84.14), machines with individual functions (84.79) etc. This trend at the aggregate level could be explained by India's trade with countries at different stages of development.

#### **Electrical Equipment (HS-85)**

The IIT index of the electrical equipments industry has shown a marginal fluctuation around 50 over the years, although a rising trend could be noticed in the later years. The electrical equipments sector consists of forty eight HS 4-digit groups. Export share of this sector has increased significantly over the sample period, although its proportionate import has been more or less constant. A number of groups consist of intermediate goods (parts and accessories) and the other groups could be classified as finished products.

In 1987-88, the major import items in this sector were parts and accessories (85.03), electrical apparatus (85.17), parts and accessories (85.29), thermionic, cold cathode (85.40), electronic integrated circuits (85.42) and waste and scrap of primary cells (85.48). In 2000-01, the main import items were electrical transformer (85.04), electrical apparatus (85.17), records, tapes (85.24), transmission apparatus (85.25), parts and accessories (85.29), electrical apparatus (85.36) etc. The exports in 1987-88 were mainly concentrated in electrical transformer (85.04), primary cells and accumulators (85.06 and 85.07), records, tapes (85.24), insulated wire (85.44) etc. In 2000-01, major export items were electric

motors and generators (85.01), electrical transformer (85.04), diodes, transistors, and semi-conductors (85.41), and carbon electrodes (85.45). In particular, records, tapes (85.24) should be mentioned, whose share has increased from 4.5 percent to 24.8 percent over the period.

The major sources of import are countries like Canada, China, France, Germany, Japan, Korea, Singapore, and US. The major export destinations are developed countries like US, UK, Germany etc. and several developing countries.

The trade pattern of this sector reveals sufficient magnitude of vertical and horizontal trade. The major imports have shifted from primary products like parts and residuals to intermediate products over the sample period. On the other hand, the export basket has also moved towards a number of intermediate and final products.

#### **Road vehicles and Parts (HS-87)**

The road vehicle industry experienced a fall in the JIT index in the post-liberalisation period, although in the recent years, the index has recorded an increase. It could be seen from Annexes 7 and 8 that exports and imports of this sector are falling in the post-liberalisation period. In spite of this, the sector was showing a trade deficit in 1987-88, but in 2000-01, has recorded a surplus.

In the initial year of the sample period, it was seen that parts and accessories of motor vehicle (87.08) and parts and accessories of vehicles (87.14) were the major import items and accounted for 65 and 26 percent of total import respectively. It could be clearly seen from the import figures in 2000-01 that although the relative share of 87.14 has declined to 4 percent, the import has been concentrated in 87.08, whose share has increased to 85 percent. In addition, the import share of motor cars (87.03) has increased in the post-liberalisation period from 2 percent to 5 percent. The major export items in 1987-88 were motor vehicles for the transport (87.02), 87.03, chassis fitted with engines (87.06), 87.08, bicycles and other cycles (87.12), and 87.14, with the respective import shares of 4, 4, 12, 25, 6 and 33 percent respectively. In 2000-01, the major export items were tractors (87.01),



87.02, 87.03, 87.04, 87.06, 87.08, motorcycles including mopeds (87.11), and 87.14 with the import shares of 2, 7, 10, 7, 5, 32, 7, and 21 percent respectively.

The directional trade flow shows that India mainly imports from Belgium, France, Germany, Korea, Netherlands, Russia, UK, US and other developed countries. The prime export destinations are Bangladesh, Belgium, Egypt, France, Germany, Italy, Nepal, Netherlands, Nigeria, UK and US.

The trend in export and import patterns clearly suggests that India has started exporting final commodities instead of intermediate goods. The import of the sector consists of significant amounts of intermediate products in the form of parts and accessories. On the other hand, several light manufacturing items like, bikes, mopeds, motorcycles, tractors are being exported at an increasing rate.

The detailed statistics of the export and import share of the above mentioned HS-industries are provided in Annex 11.

**Table 4A: Horizontal and Vertical Specialisation trend for 1988-89**

HS-digit	No. of industries at 6-digit level	Both way trade	No. of industries with Vertical trade at 15%	% of total trade vertical (15%)	% of total trade horizontal (15%)	No. of industries with Vertical trade at 25%	% of total trade vertical (25%)	% of total trade horizontal (25%)
28	62	44	39	88.64	11.36	34	77.27	22.73
29	98	76	65	85.53	14.47	59	77.63	22.37
30	-	-	-	-	-	-	-	-
39	42	39	31	79.49	20.51	27	69.23	30.77
40	23	20	20	100	0	20	100	0
42	-	-	-	-	-	-	-	-
71	13	6	5	83.33	16.67	5	83.33	16.67
72	96	61	54	88.52	11.48	48	78.69	21.31
73	49	33	32	96.97	3.03	29	87.88	12.12
84	184	167	163	97.6	2.4	161	96.4	3.6
85	83	78	75	96.15	3.85	73	93.59	6.41
87	29	19	18	94.74	5.26	17	89.47	10.53

**Table 4B: Horizontal and Vertical Specialisation trend for 1992-93**

HS-digit	No. of industries at 6-digit level	Both way trade	No. of industries with Vertical trade at 15%	% of total trade vertical (15%)	% of total trade horizontal (15%)	No. of industries with Vertical trade at 25%	% of total trade vertical (25%)	% of total trade horizontal (25%)
28	66	50	46	92	8	42	84	16
29	109	93	83	89.25	10.75	78	83.87	16.13
30	-	-	-	-	-	-	-	-
39	42	40	35	87.5	12.5	32	80	20
40	24	24	24	100	0	21	87.5	12.5
42	13	4	4	100	0	4	100	0
71	16	10	10	100	0	10	100	0
72	94	80	70	87.5	12.5	63	78.75	21.25
73	52	40	39	97.5	2.5	36	90	10
84	195	182	178	97.8	2.2	177	97.25	2.75
85	99	96	90	93.75	6.25	87	90.625	9.375
87	27	19	19	100	0	18	94.74	5.26

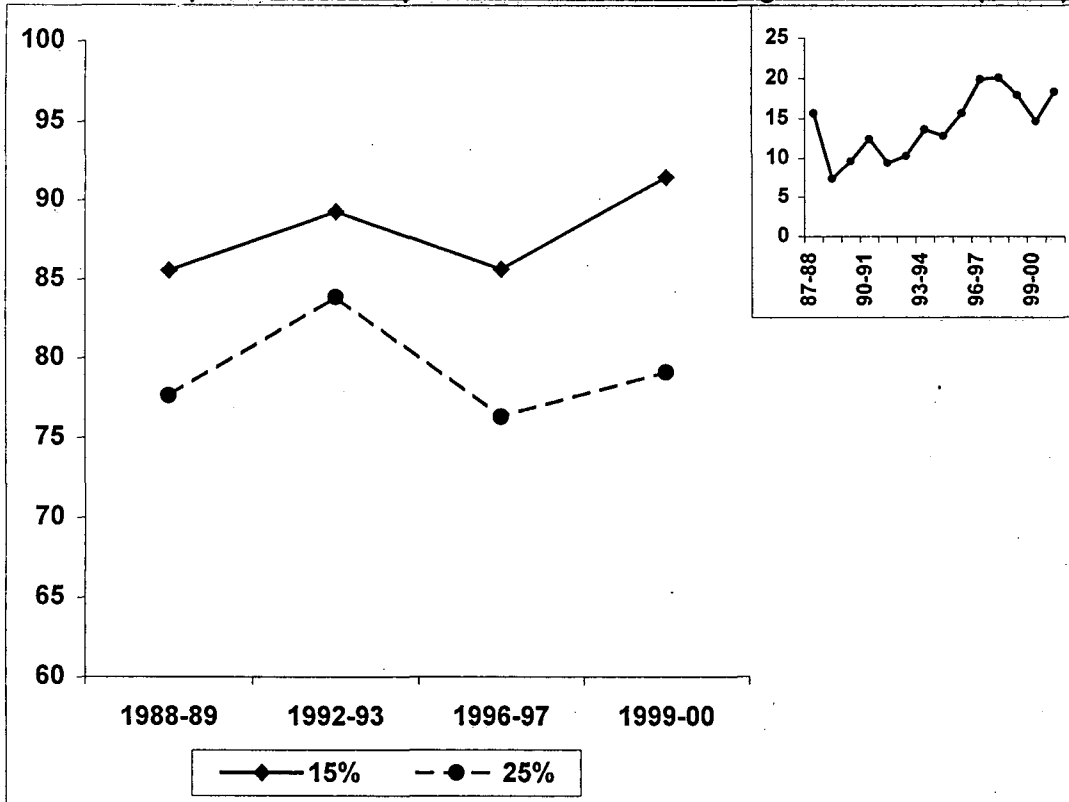
**Table 4C: Horizontal and Vertical Specialisation trend for 1996-97**

HS-digit	No. of industries at 6-digit level	Both way trade	No. of industries with Vertical trade at 15%	% of total trade vertical (15%)	% of total trade horizontal (15%)	No. of industries with Vertical trade at 25%	% of total trade vertical (25%)	% of total trade horizontal (25%)
28	63	56	49	87.5	12.5	45	80.36	19.64
29	124	118	101	85.6	14.4	90	76.27	23.73
30	16	16	16	100	0	14	87.5	12.5
39	47	47	42	89.36	10.64	39	82.98	17.02
40	24	24	19	79.17	20.83	18	75	25
42	13	9	8	88.89	11.11	7	77.78	22.22
71	16	13	11	84.62	15.38	11	84.61	15.39
72	67	64	55	85.94	14.06	53	82.81	17.19
73	52	46	42	91.3	8.7	40	86.96	13.04
84	201	198	194	97.98	2.02	188	94.95	5.05
85	96	93	83	89.25	10.75	79	84.95	15.05
87	28	25	23	92	8	22	88	12

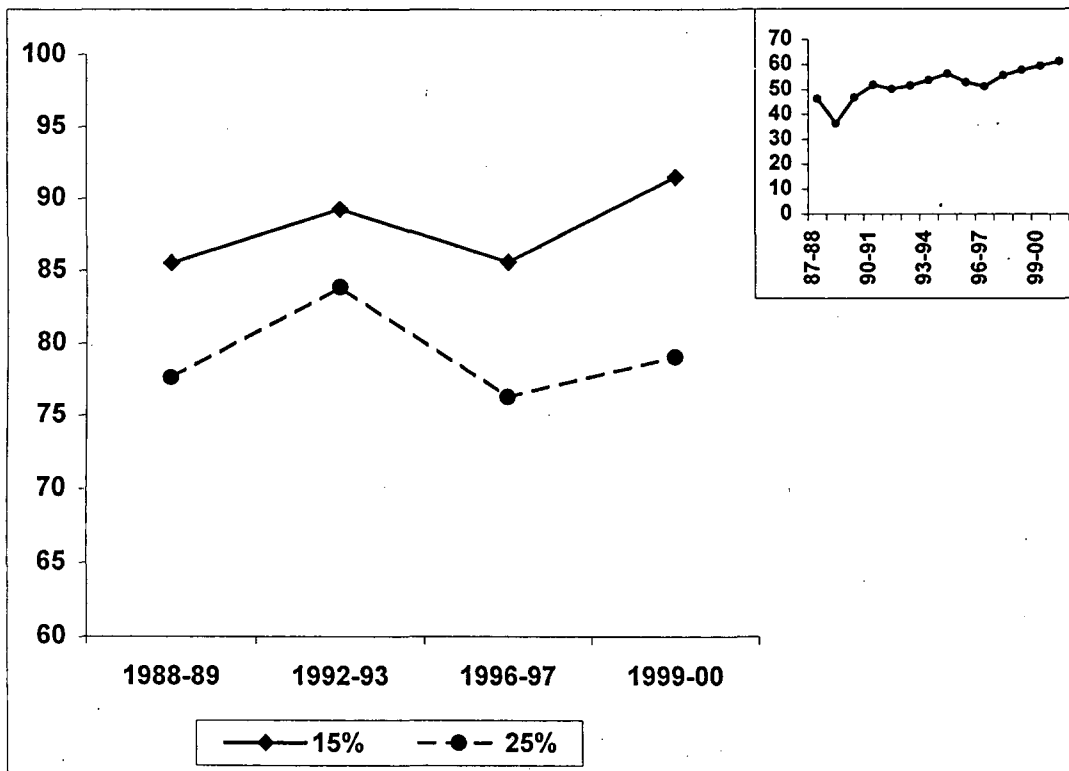
**Table 4D: Horizontal and Vertical Specialisation trend for 1999-2000**

HS-digit	No. of industries at 6-digit level	Both way trade	No. of industries with Vertical trade at 15%	% of total trade vertical (15%)	% of total trade horizontal (15%)	No. of industries with Vertical trade at 25%	% of total trade vertical (25%)	% of total trade horizontal (25%)
28	64	61	53	86.89	13.11	49	80.33	19.67
29	131	129	118	91.47	8.53	102	70.07	20.93
30	16	16	13	81.25	18.75	12	75	25
39	47	47	44	93.62	6.38	38	80.85	19.15
40	24	24	22	91.67	8.33	21	87.5	12.5
42	13	12	11	91.67	8.33	11	91.67	8.33
71	18	14	12	85.71	14.29	9	64.29	35.71
72	67	63	57	90.48	9.52	51	80.95	19.05
73	52	50	47	94	6	44	88	12
84	202	198	193	97.47	2.53	190	95.96	4.04
85	100	99	92	92.93	7.07	87	87.88	12.12
87	28	27	26	96.3	3.7	22	81.48	18.52

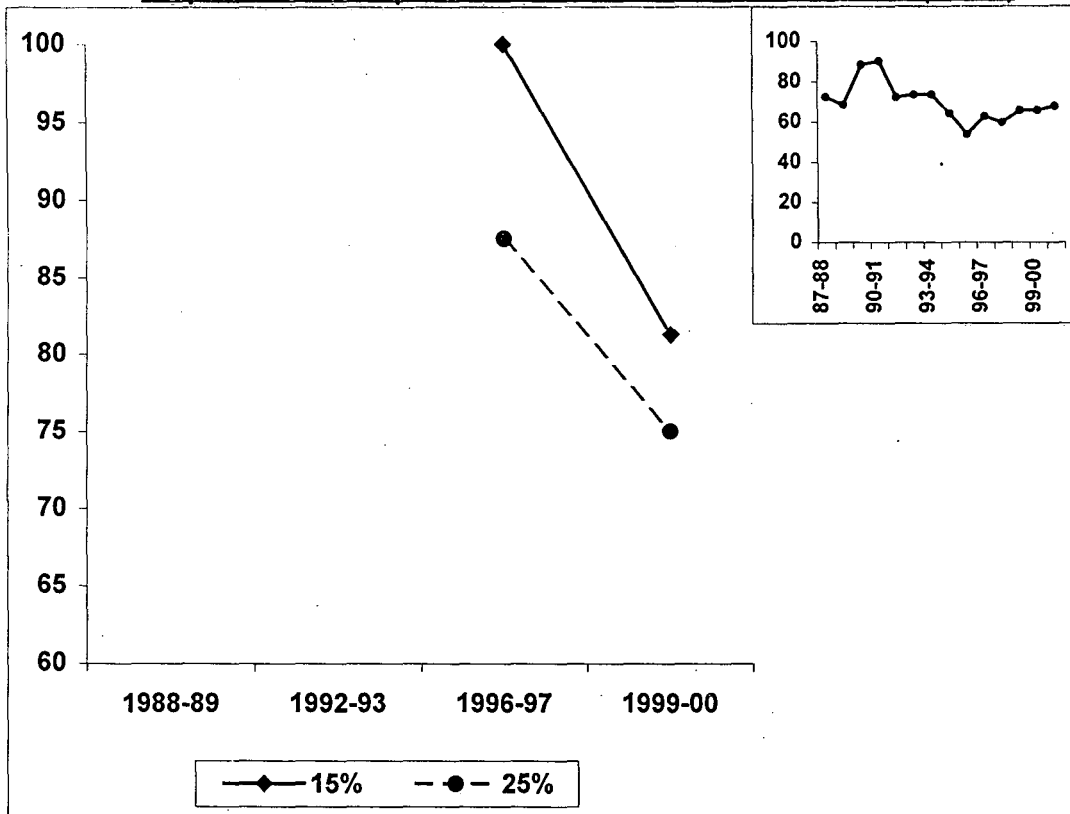
**Graph 4.1: Vertical Specialisation Pattern for Inorganic Chemicals (HS-28)**



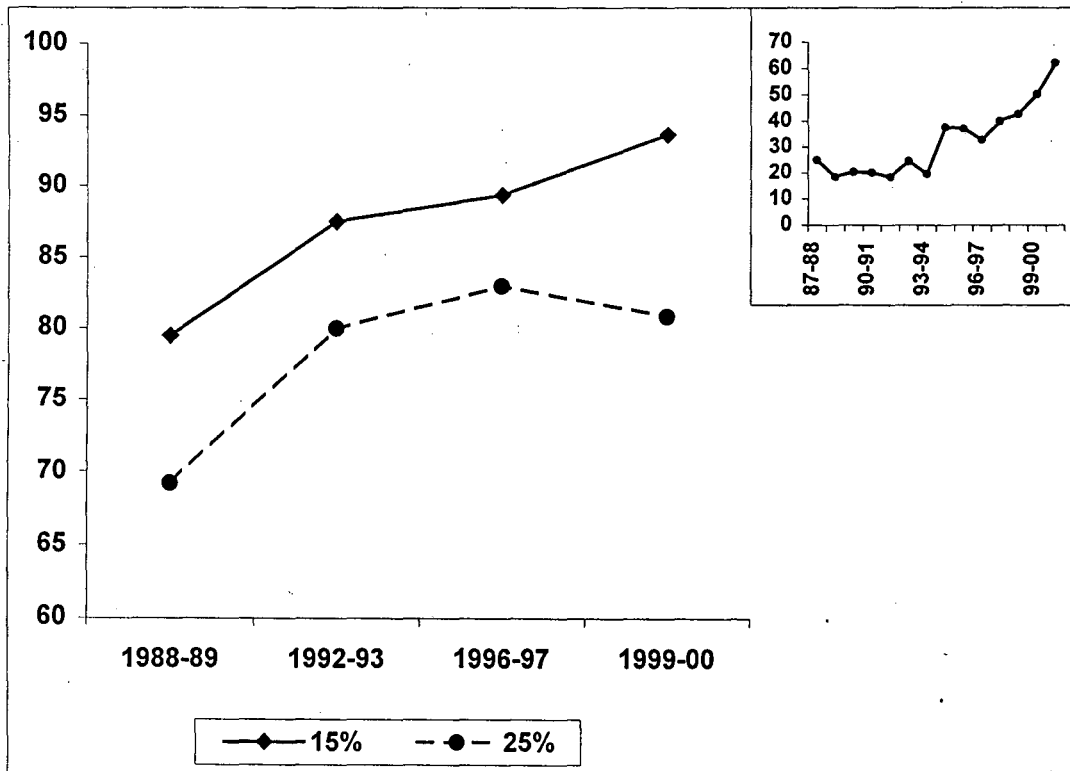
**Graph 4.2: Vertical Specialisation Pattern for Organic Chemicals (HS-29)**



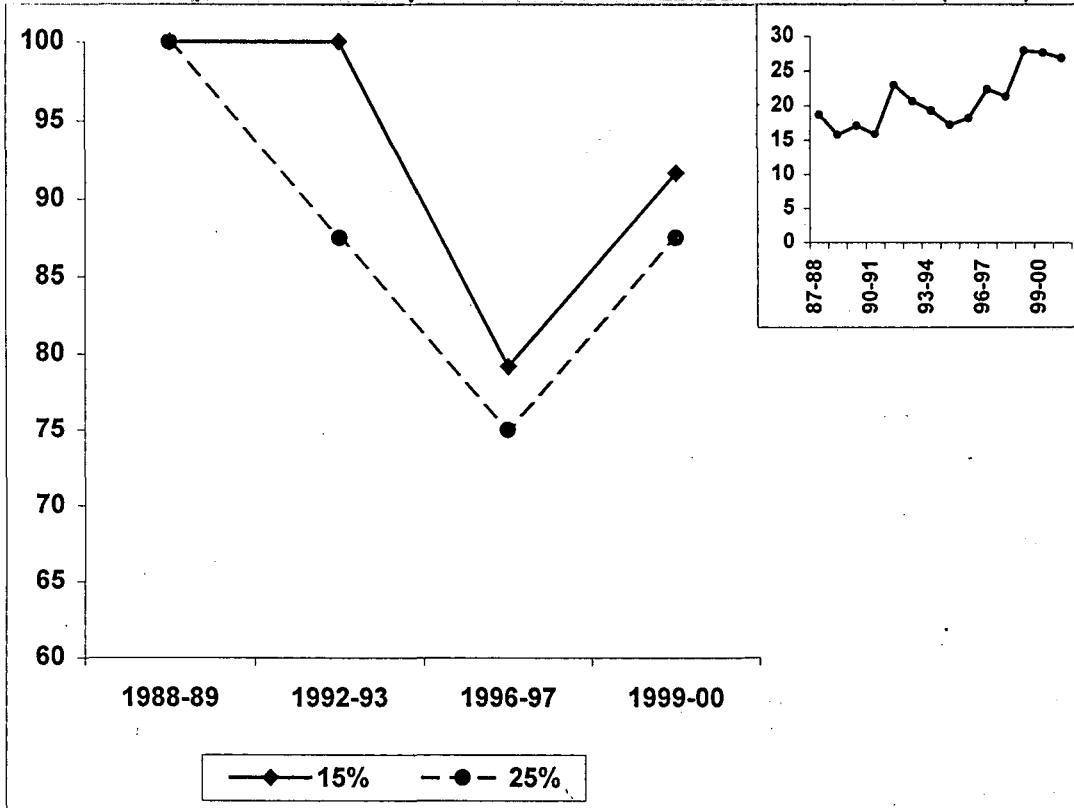
**Graph 4.3: Vertical Specialisation Pattern for Pharmaceuticals (HS-30)**



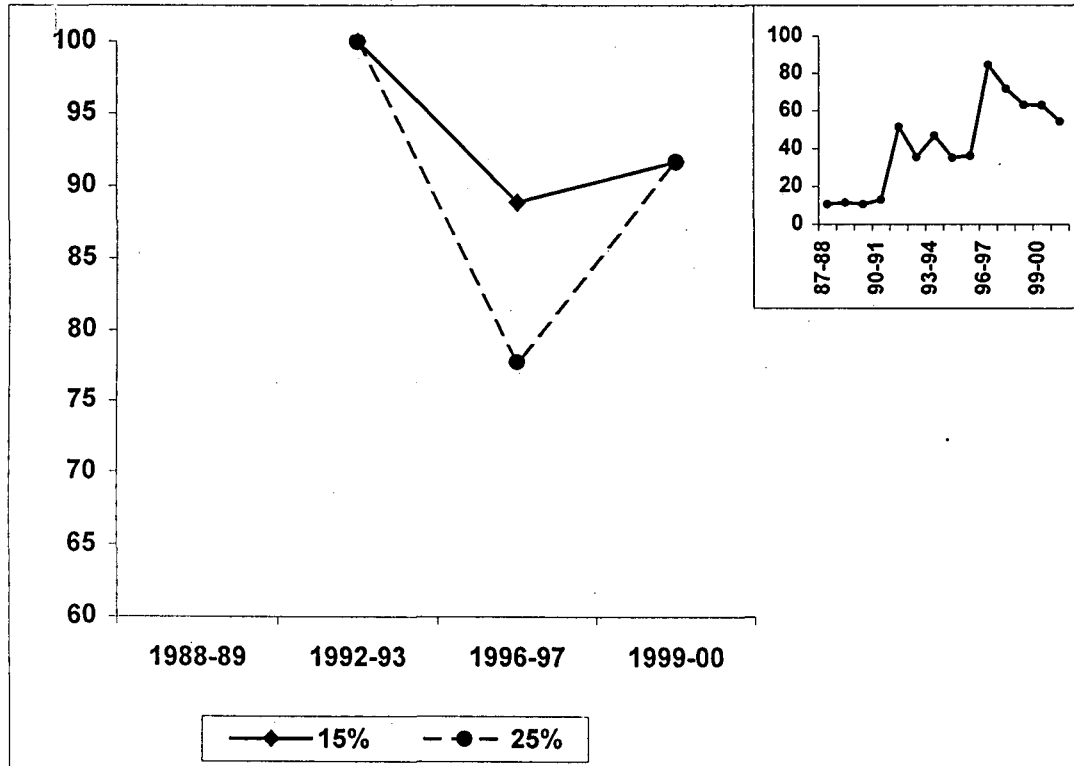
**Graph 4.4: Vertical Specialisation Pattern for Plastic Products (HS-39)**



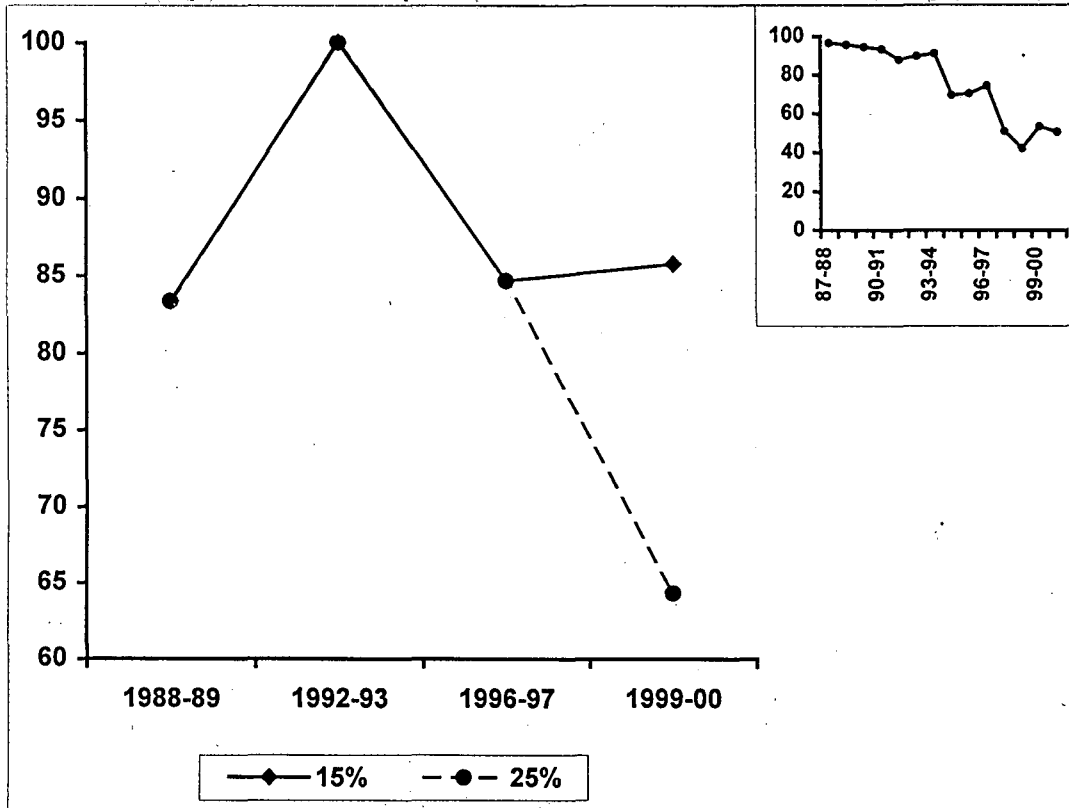
**Graph 4.5: Vertical Specialisation Pattern for Rubber Products (HS-40)**



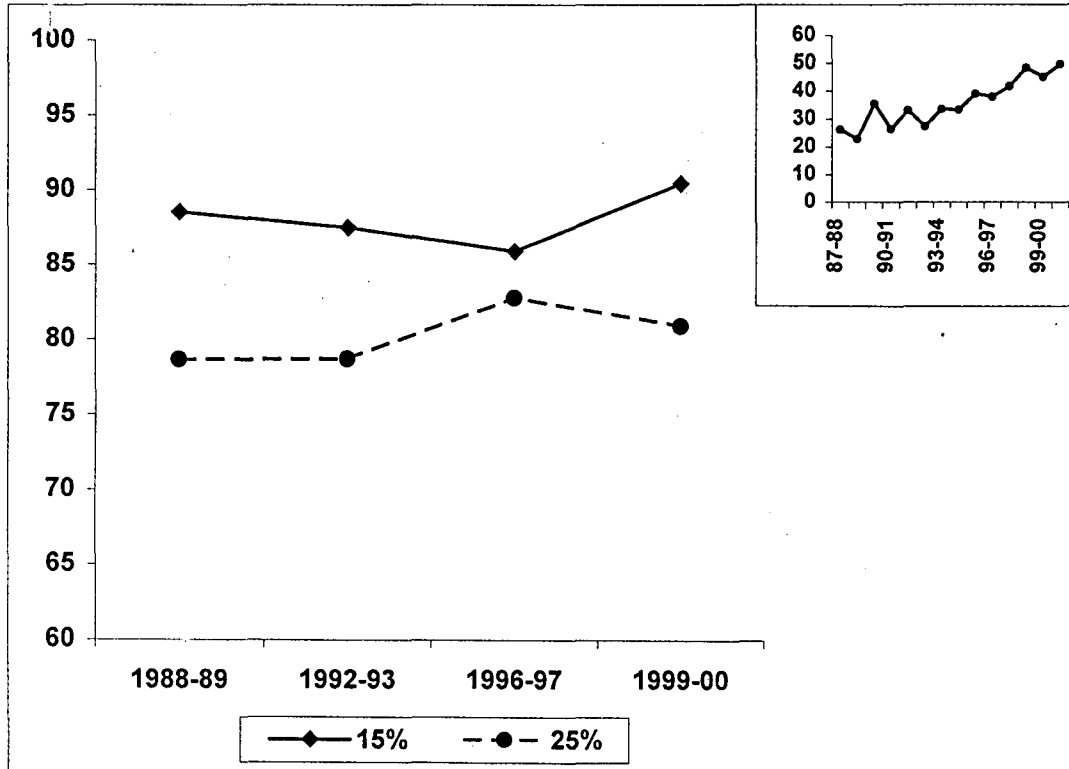
**Graph 4.6: Vertical Specialisation Pattern for Leather Products (HS-42)**



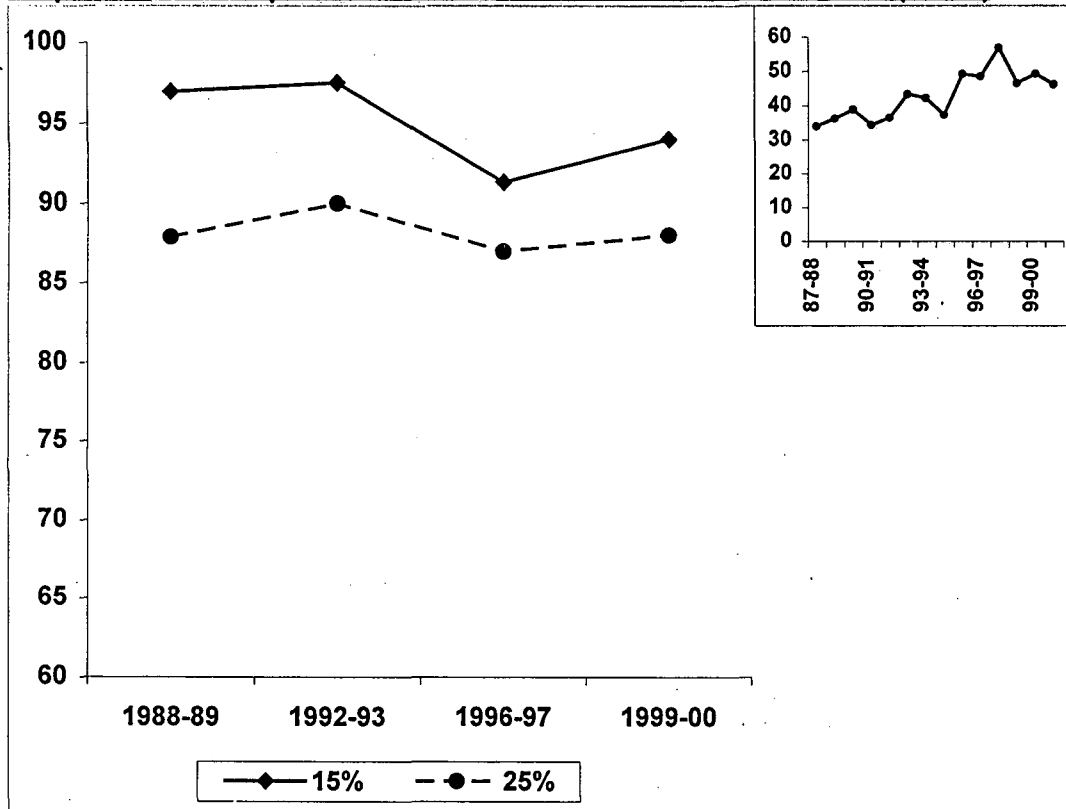
**Graph 4.7: Vertical Specialisation Pattern for Gems and Jewelry (HS-71)**



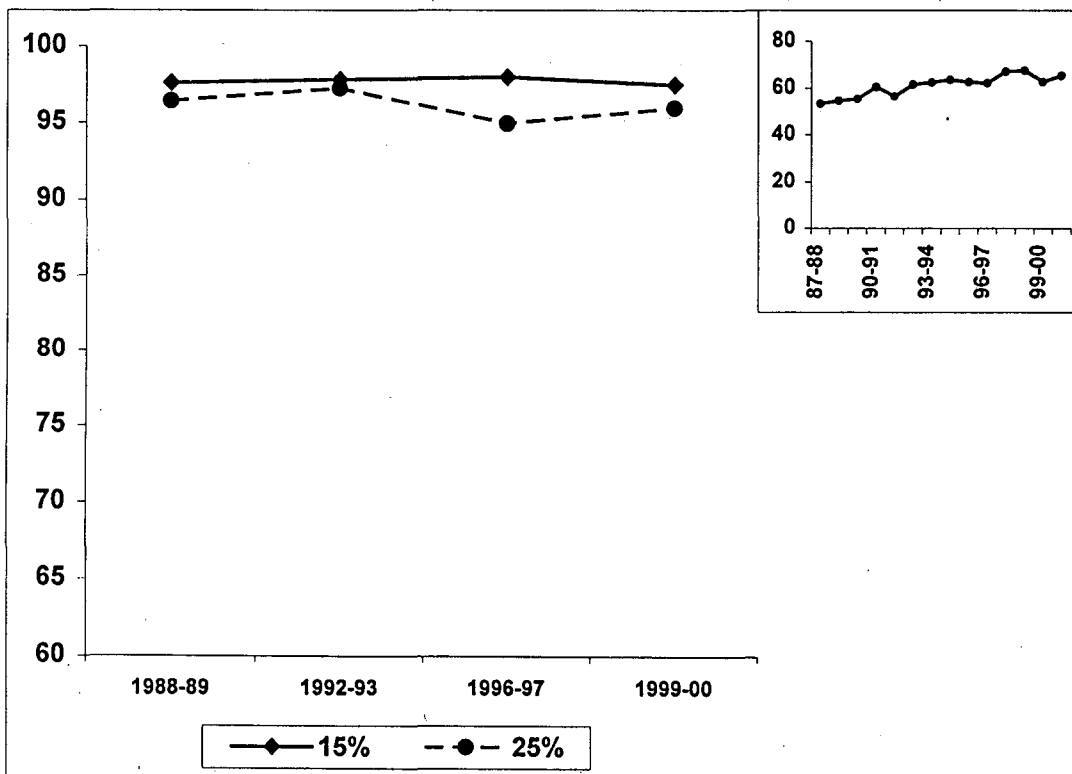
**Graph 4.8: Vertical Specialisation Pattern for Iron and Steel (HS-72)**



**Graph 4.9: Vertical Specialisation Pattern for Articles of Iron and Steel (HS-73)**

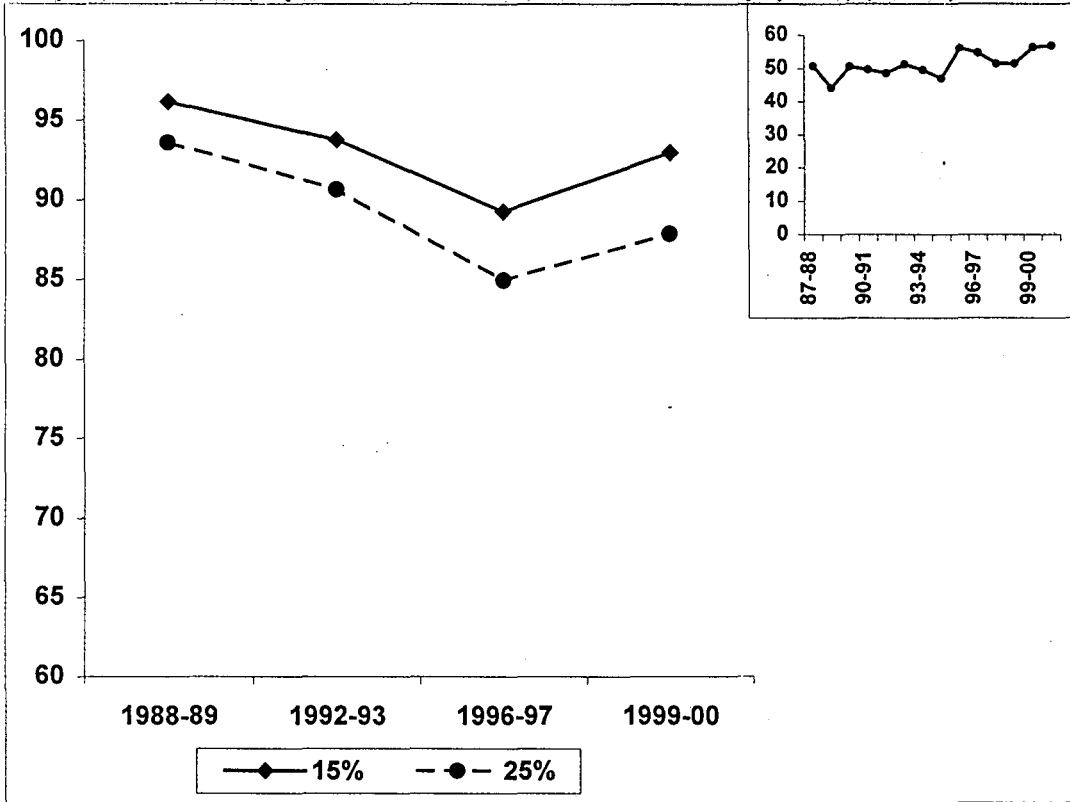


**Graph 4.10: Vertical Specialisation Pattern for Machinery and Equipment (HS-84)**

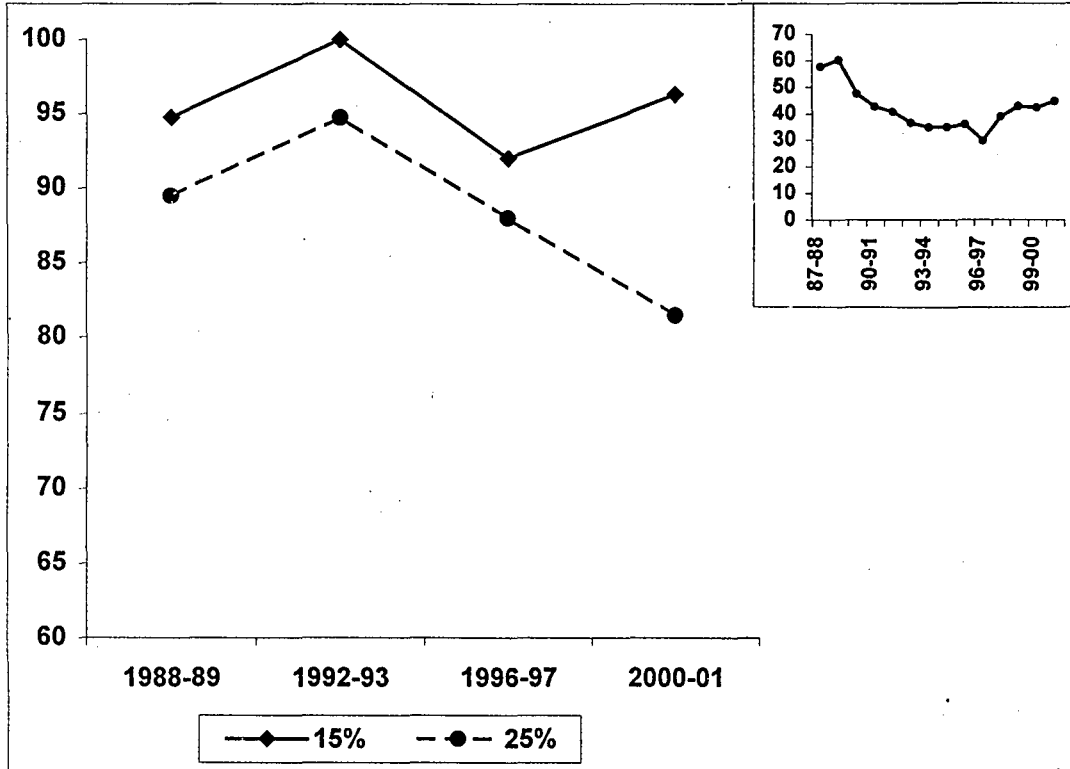




**Graph 4.11: Vertical Specialisation Pattern for Electrical Equipment (HS-85)**



**Graph 4.12: Vertical Specialisation Pattern for Road Vehicle and parts (HS-87)**



## Chapter 5

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### Policy Implications

So far, the dissertation concentrated on the existence, extent and the nature of IIT in India. In the current chapter, the policy implication of the phenomenon of IIT in the Indian context is analysed with respect to two particular aspects, production efficiency and employment scenario. As already noted under welfare impact of IIT in chapter 1 (Krugman, 1981), IIT is viewed as a better option in comparison to conventional inter-industry trade from the point of view of distribution because of two policy aspects. First, when countries trade in the similar industry groups, the firms specialise in narrow product lines. In other words, the firms will decide to produce those product items in which they possess certain cost advantage. This specialisation is expected to give rise to increased scale efficiency, as the firms would utilise the factors of production more efficiently and increase their scale of production in order to reduce costs. The introduction of increasing returns to scale instead of the traditional CRS assumption makes this option feasible. Apart from this, it is also expected that in order to increase production, producers will increase usage of factors of production. This could be implemented in two forms, either by employing more labour, or by using labour-saving technologies, both of which could bear important policy impact. Second, as compared with inter-industry trade, the IIT type of trade does not require a painful structural adjustment. Whereas the relatively scarce factor of production suffers in the traditional model as a result of opening up of the economy, there is no such adjustment problem in the case of IIT type of trade. The introduction of differentiated products makes this feasible. Hence, IIT type of trade is better from the point of view of the developing countries, where, unemployment is a stark reality.

An evident policy outcome follows directly. Countries with predominance of IIT in their trade pattern, could expect to face less opposition in undertaking a liberalization programme in comparison with countries where inter-industry trade (and thereby the consequent adjustment problem) is more significant. This could explain the fact that trade liberalization is opposed more in developing and less developed countries with relatively lower IIT levels, whose exports traditionally consist of primary goods and imports of

manufacturing items. On the contrary, IIT level is significantly higher in developed countries, since they are engaged predominantly in trading of manufactured products and services, and hence trade liberalization is accepted in those regions with much more tolerance.

However, contrary to the theoretical argument suggested in the trade theory, the real world situation has shown a somewhat different trend. Although global trade in manufactures has been increasing over the years (mostly in the form of IIT), manufacturing employment has been relatively static in the industrialised nations as a whole, with some nations even recording an absolute decline. It was also observed that in almost every major industrial nation (barring the exception of Japan), manufacturing employment as a share of total employment has declined between 1960 and 1980, although the IIT level consistently increased during this period.<sup>1</sup> To some extent, the decline in manufacturing sector employment as a percentage of total employment could be explained by the relatively high growth rate of service sector during this period. However, the changes in employment strategy within the manufacturing industries itself are also worth mentioning.

The puzzling stagnation in the employment scenario could be rationalised in the following lines. The options of gains from trade urge the firms to specialise in major products at the plant level along with increased contracting-out of production of minor products and components to foreign suppliers. At the same time, the volume of major products manufactured has registered an increase as evident from the export sales. As a result, two-way trade for the same industry group increased on worldwide basis. In order to retain competitiveness, producers try to improve productivity by enhancing efficiency and reducing unit cost. Now, in general this increased efficiency is achieved through usage of relatively less labour. Therefore, it could be seen that whereas on one hand increased IIT has been associated with increased scale efficiency, increase in employment has not been fulfilled to the expected extent. In this context, an analysis for a developing country like India will not be inappropriate.

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<sup>1</sup> MacCharles (1986), in Greenaway and Tharakan, pp. 149

## Indian Scenario

Before going into the analysis, a brief account of the liberalisation that has taken place in Indian Industrial sector must be mentioned. For a long period, the industrial policy relied excessively on prohibitive measures like industrial licensing, Monopolies and Trade Restrictive Practices Act (MRTP) and other similar instruments, which created procedural hassles and other similar obstacles thereby weakening the industry sector. Procedures to allow inflow of foreign capital were also not very smooth. The cumulative effect of all these policies affected the efficiency of the manufacturing industry significantly. The problems of this system were felt during mid-eighties and since then attempts to liberalise the system were undertaken through implementation of industrial policy of 1980 and 1985, delicensing of several industries, and delicensing of non-EFRA and non-MRTP companies etc. However, the stronger impetus came after 1991, when the liberalisation procedure was initiated.

Several studies were undertaken in the subsequent period, investigating India's factory sector in the post-liberalisation era. The main concern area was the total factor productivity growth in post-liberalisation period. Krishna and Mitra (1998) found that although the rate of growth of productivity has increased weakly in the post-liberalisation period, the returns to scale expressed as a sum of factor shares has actually declined. However, the authors believed that the reduction does not necessarily mean lower scale efficiency but may indicate an increased exploitation of returns to scale by firms, which may have been operating at too small a scale before initiation of reforms. It could also reflect the relatively inflexible capacity constraints in the industries. Several other studies concentrating on the manufacturing sector in the post-liberalisation period has also reported a growth in total factor productivity. Srivastava (2001) has also noted an increase in total factor productivity growth in India in the post-liberalisation period.

Now a close insight in the Indian employment dynamics, especially in the post-liberalisation scenario, could show interesting results. Several studies undertaken in the recent period on the employment trends in the Indian economy in the 90s has expressed concern for the distressing result. In the pre-liberalisation period, it was hoped that once the

economy is freed from the regimes of controls, a high growth rate of GDP would take place along with an increase in employment. Although the GDP growth rate has showed a moderate improvement in the post-liberalisation period, it has not been associated with a corresponding increase in employment. The basic argument floated in the pre-liberalisation era was that the manufacturing sector, long shackled by various burdening procedural regulations, redtapeism, and other government rulings, would act more efficiently in the post-liberalisation period, which will be achieved through a massive employment generation at the firm and industry level. However, this contention has not been fruitful to the desired extent. The present employment scenario is illustrated with help of the tables 5A-5D.

It is clearly seen from tables 5A and 5B that employment trend in the public and private sectors have not increased in general. However, since the dissertation is more concerned about the impact of economic reform in the factory sector, the relevant employment trend is of more importance. In table 5C and 5D the break-up of employment trend in NIC 2-digit level in the factory sector for workers and employees has been provided. Although it is evident from the table that there had been a growth in employment over the years, it does not seem very impressive. In addition, the growth rate in employment has fluctuated and was negative for a couple of years during the sample period.

One possible reason for the stagnation in employment is probably that although external sector reform has been undertaken to a major extent, domestic policies has not yet been implemented accordingly in order to promote employment in the organised sector. For example, a recent study by Hazra (2001) shows that chapter V(B) of Industrial Dispute Act (1976 amendment)<sup>2</sup>, which was enacted to help labours, is actually working against them. The employers cannot retrench the labours hired in the peak period (when demand is high) during the lean period (when demand is low) due to lack of required flexibility. Comparing the pre-1982 and post-1982 trend in capital-labour ratio, the study concludes that the difference in capital-labour ratio across industries is increasing fast. In other words, there

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<sup>2</sup> Chapter V(B) was introduced to mitigate the hardship caused by large-scale lay-off, retrenchment, transfer and closure. Initially 'large' was identified as enterprises employing more than 300 workers, but the benchmark was later reduced to 100 in 1982 amendment. A prior permission by the Government is necessary before retrenching a worker. However, the permission is not given due to populist reasons.

seems to be a clear case of substitution of labour, the cheaper input by capital since the mid-eighties, leading to inefficiency in production.

In the light of these findings, an analysis on the scale impact and the employment effect could bear important policy implications. The dissertation focuses whether there has been any appreciable change in the post-liberalisation period with respect to IIT. Through a formal model, such an analysis is attempted in the remaining portion of this chapter.

### **Objective**

The central theme of the chapter is to correlate the IIT trend in the post-liberalisation period with the growth of the industry. To do this, first the scale efficiency of the industry in general and across sectors is considered and it is checked whether there has been a marked improvement in the post-liberalisation period in this regard. Then the employment elasticity of output for the industries is calculated. To get a fair notion about the qualitative change within the industry, the time trend in capital-labour ratio and proportion of skilled labour is calculated. Now, to link up the changes in the output, capital-labour ratio and skill formation with IIT, the consequent relation is explored with a formal model specification.

### **The Scale Efficiency**

In the light of the reforms undertaken since 1991, it will be an interesting exercise to examine the scale efficiency in the factory sector, both at the aggregate level and at sectoral level. In addition, the trend in scale efficiency in pre-liberalisation and post-liberalisation period deserves attention. The dissertation assumes a Cobb-Douglas type of production function for the factory sector, and the estimation is performed along these lines.<sup>3</sup>

The results of production function estimation are summarised in table 5E. It could be seen from the table that the overall scale efficiency of the factory sector has increased marginally in the post-liberalisation period. However, the scale efficiency does not show a uniform trend at the 2-digit level. Certain sectors show a marginal increase in scale

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<sup>3</sup> The methodology of the production function estimation has been discussed in details in chapter 2.

efficiency and in the remaining sectors the efficiency has declined. For a number of sectors, the liberalization dummy has been found negative and significant.

Through the concordance developed earlier, the scale efficiencies of the manufacturing industries at 2-digit NIC level and the trade balances of the corresponding HS-industries at 2-digit level are compared. The summary of the finding is presented in table 5F. The observation reveals that, in general, the NIC-industries with decrease in scale efficiency are associated with a declining trend in net trade of the corresponding HS-industries over the sample period. The observation suggests that import-competing sector in the post-liberalisation period has suffered to certain extent. However, no clear-cut conclusion regarding the effect of liberalisation could be obtained from this analysis.

### **Employment response**

In a country like India, where unemployment is a stark reality, the adoption of employment generating policies should be given high priority. For this purpose, the sectors with high employment growth potential should be identified. With this goal in mind, the relation between output and employment in the manufacturing sector is explored. In addition, the significance of liberalisation, if any, is analysed.

The regression coefficients are reported in table 5G. It could clearly be seen from the table that employment in the manufacturing sector is responsive to changes in output both at aggregate and sectional level. In the model, logarithm of employment has been regressed on logarithm of output. Hence, the reported coefficient of the dependent variable represents the output elasticity of employment. The aggregate output elasticity clearly shows that the employment is responsive to changes in output. The liberalisation dummy is highly significant, showing that liberalisation has actually facilitated employment formation in the post-liberalisation period. A similar trend is portrayed by almost all industries at 2-digit level, and the liberalisation dummy is significant in a number of cases. Only four industries show a coefficient lower than one, i.e., the output is employment inelastic in these sectors. These sectors are 20-21 (Manufacture of Food Products), 29 (Manufacture of Leather and Fur products), 30 (manufacture of chemical products) and 31 (manufacture of rubber and

plastic products). In particular, the case of chemical industries deserves more attention as compared to the other sectors, as in this sector employment is far more output inelastic as compared to other sectors.

### **Capital-labour ratio in Factory sector**

In Annex 12, the time series trend of capital-labour ratio of factory sector at 3-digit level of industry classification has been reported. The result clearly suggests that barring a few exceptions, where the ratio has registered a sharp fall, or a steep increase, the ratio has increased with a linear trend over the period. The cases showing an unusual increase in the capital-labour ratio does not arise because of concentration of capital stock in the sector, but due to rapid fall in employment.

In table 5H, the rank correlation coefficient between capital-labour ratio in NIC industries at 2-digit level in 1987-88 and 1997-98 has been reported. The result clearly suggests that the relative capital-intensity of the industries remains unchanged over the period. The result also shows that the sectors with high capital intensity are basic metal and alloy industries (NIC-33), chemicals (NIC-30), manufacture of rubber, plastic, petroleum and coal products (NIC-31), non-metallic mineral products (NIC-32) etc. It was also observed that the sectors with lowest capital intensities are manufactures of beverages (NIC-22), manufactures of jute and other vegetable textile (NIC-25), and manufactures of textile products (NIC-26).

The relation between the capital-labour ratio and the IIT in the corresponding HS-industries could reveal an interesting result. It could be seen from the table that IIT index is fairly high in the manufacturing sector, i.e., specifically in NIC 31, 32, 33, 34, 35-36 and 37. Instead of an exhaustive analysis concerning all industries, the relations between capital-labour ratio of these industries and the IIT index of corresponding HS-industries are analysed.

The regression analysis suggests that although coefficient of IIT is positive in case of 33 (metal and alloys), 35-36 (machinery and equipment), and 37 (transport equipment), it is



negative in case of transport equipments. In addition, the coefficients are not significant in a number of occasions. Therefore, it seems that IIT in the post-liberalisation period does not bear a notable relationship with the capital-labour ratio.

### **Skill formation in Factory sector**

The extent of skill formation in the factory sector over the period is measured by expressing the proportion skilled labour as a percentage of total labourforce. The result of the analysis is presented in Annexes 13 and 14. It could be clearly seen from the tables that in general, across all the sectors skill formation has taken place along a moderate trend line. In almost all the sectors, the proportion of skilled workers has increased signifying accumulation of knowledge in the factory sector.

The rank correlation coefficient between the proportion of skilled workers as a percentage of total labourforce in NIC industries at 2-digit level in 1987-88 and 1997-98 has been reported. It could be seen from the table 5I that there is a high correlation between the skill augmentation of the industries in the initial and the terminal year. The industries with high skill formation ratio are, manufactures of machinery and equipment (NIC-35-36), chemicals (NIC-30), manufactures of rubber, plastic, petroleum and coal products (NIC-31) etc. The industries with low skill formation ratio are manufactures of beverages (NIC-22), manufactures of jute and other vegetable textiles (NIC-25), manufacture of cotton textiles (NIC-23) etc.

A relation between the skill-formation ratio and the IIT in the corresponding traded HS-sections is attempted for metals and machinery sector, i.e., NIC 31, 32, 33, 34, 35-36 and 37. The regression suggests that that there is no significant relation between skill formation and IIT and the coefficients alternate in sign. Hence, the conclusion is that the increase in IIT in the post-liberalisation period has not influenced skill formation in the factory sector in a significant manner.

### **Output and IIT**

Lastly, the relationship between output and IIT for the metals and machinery sector is explored. The regression analysis reveals that although the coefficient is positive for 32 (Non-Metallic Mineral Products) and 33 (metal and alloys), the other industries bear a negative sign. Besides, the coefficients are not significant at the observed level of confidence. Therefore, no significant relationship between output growth and IIT could be established.

### **Conclusion**

The findings in the chapter on the relation between trade and industry sector suggest the following conclusions:

- i. The scale efficiency of the factory sector has increased marginally in the post-liberalisation period as a whole, but at the sectoral level, it has gone down in a number of instances. However, the extent of changes in scale efficiency across all the sectors are not very high. The liberalization dummy has also been negative in most of the cases. In addition, a deteriorating trend has been noticed in a number of import-competing sectors, although no definite conclusion on net impact should be drawn. However, the post-liberalisation time period considered in the dissertation is also too small. If a longer sample is considered in a later analysis, the directional change in scale efficiency may produce a different result.
- ii. The output of the industries expressed as the gross value added deflated by price index has shown an increasing trend over the period in general, barring a few exceptions. An analysis of the relation between output and employment over the sample period shows that employment is highly output elastic. In addition, the high significance of liberalisation dummy suggests that in post-liberalisation period, employment growth have been accentuated in case of output growth. However, the output growth does not bear a uniform relation with IIT indices in the corresponding trade sectors.

- iii. The capital intensity of the industries has increased consistently over the sample period. It is observed from the results that capital intensity does not bear any relation with the IIT indices in the corresponding sectors.
- iv. The proportion of skilled workers at the 2-digit industry level is calculated which provides an indication of skill formation over the years. An analysis reveals that the skill formation and IIT does not have any significant relationship.
- v. In the light of these findings, the dissertation concludes that although the existence of scale economies is obvious from the analysis, there is no reason to believe that the scale efficiency has been influenced by intra-industry type of trade. In other words, the Indian experience contradicts the possibility suggested by the theoretical literature on IIT.

**Table 5A: Employment in Public sector by Industry**

(Lakh Persons)

Code	Industry	1991	1994	1997	2000
0	Agriculture, Hunting etc.	5.56	5.45	5.33	5.14
1	Mining, Quarrying	9.99	10.15	9.78	9.24
2+3	Manufacturing	18.52	17.84	16.61	15.31
4	Electricity, gas and water	9.05	9.38	9.56	9.46
5	Construction	11.49	11.67	11.34	10.92
6	Wholesale and retail trade	1.5	1.61	1.64	1.63
7	Transport, storage and communication	30.26	30.84	30.92	30.77
8	Finance insurance, real estate etc.	11.94	12.73	12.94	12.96
9	Community, social and personal services	92.27	94.78	97.47	97.71
	Total	190.58	194.45	195.59	193.14

**Table 5B: Employment in Private sector by Industry**

(Lakh Persons)

Code	Industry	1991	1994	1997	2000
0	Agriculture, Hunting etc.	8.91	8.83	9.12	9.04
1	Mining, Quarrying	1	1.01	0.92	0.81
2+3	Manufacturing	44.81	46.3	52.39	50.85
4	Electricity, gas and water	0.4	0.4	0.41	0.41
5	Construction	0.73	0.51	0.54	0.57
6	Wholesale and retail trade	3	3.02	3.17	3.3
7	Transport, storage and communication	0.53	0.56	0.63	0.7
8	Finance insurance, real estate etc.	2.54	2.82	3.22	3.58
9	Community, social and personal services	14.85	15.85	16.44	17.23
	Total	76.77	79.3	86.86	86.46

(Source: Economic Survey 2001-02)

Table 5C: The Worker (unskilled) Employment Trend in 2-digit level

Year/Industry	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98
20-21	794920	788777	863825	871935	864225	942390	927274	943171	1011556	978031	1050874
22	401183	392594	484181	445548	479181	511131	468771	538375	495128	521805	561126
23	734898	706499	753308	728334	684297	700657	705817	680574	743846	711555	738116
24	255858	222945	232787	237769	228713	239960	257407	259856	288843	273469	282567
25	179372	191345	191790	183990	184338	187189	160059	172182	241832	187357	200678
26	105382	110771	135712	141542	146933	165391	231054	270297	278345	282532	310279
27	57965	58460	58825	53018	51244	56244	56743	56795	61622	61896	61619
28	217837	204400	204447	213729	218330	226269	224476	235434	260842	257992	248473
29	64448	77836	87565	86506	90270	91329	96362	109926	109876	103669	101112
30	155490	166321	392121	379218	399771	434474	437455	458814	511335	507398	542106
31	378178	393161	175792	186661	188337	205199	212552	224472	243483	257612	256073
32	349525	352510	354790	353433	368487	369014	351868	356546	383164	357497	352038
33	481243	476626	451162	466258	447651	497771	469273	477157	554138	474868	502647
34	155180	165939	167855	171793	169759	175413	171588	180693	208928	214000	205359
35-36	542992	537210	543123	557307	555312	572733	565508	583020	645980	602286	591329
37	365919	384509	354568	355876	365339	366459	374852	398604	458265	444786	407089
38	57451	64651	65794	67990	71374	74732	86043	87753	106607	103686	110049
Total	5297841	5294554	5517645	5500907	5513561	5816355	5797102	6033669	6603790	6340439	6521534

(Labour in Number)

Table 5D: The Total Employment Trend in 2-digit level

Year/Industry	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98
20-21	997483	994182	1084102	1094592	1095870	1189612	1188975	1205770	1285885	1250605	1333822
22	436442	429579	517929	487184	514788	549559	511707	580824	541155	562182	599345
23	834922	805213	856906	824921	782037	806839	811381	787987	860893	823805	860690
24	307606	267902	285394	292678	281239	298780	320039	324773	363153	340551	354049
25	196008	208709	211924	200685	200838	205225	174137	186620	261990	203348	215986
26	128815	133866	162042	171454	178321	200708	276271	321414	340038	336947	369639
27	70490	71782	72329	65388	63696	69134	69809	70094	75274	76896	75502
28	290419	270634	272810	284641	288789	301576	301184	319362	355928	352725	336664
29	76389	91002	102902	103892	108797	112233	117007	131601	134654	124353	122015
30	209483	224000	562196	547012	575861	635462	639026	672149	758501	748275	785571
31	549697	567724	235292	248942	253951	279343	292495	304756	329189	346186	347792
32	422720	427990	434823	431006	454049	455944	440783	444396	481267	451497	442791
33	617278	617298	590461	622372	595799	661886	625355	631304	736457	628187	666591
34	201214	214149	216357	224808	223002	233977	231167	244139	277654	280104	278780
35-36	810488	813541	818222	846610	850170	889483	864669	884404	979722	910118	899492
37	481482	507853	472847	475063	490935	503746	504720	539570	619358	602839	551705
38	77357	85315	88047	90461	94753	102995	116454	120141	144068	138497	148383
Total	6708293	6730739	6984583	7011709	7052895	7496502	7485179	7769304	8545186	8177115	8388817

(Labour in Number)

**Table 5E: Regression Results of India's Production Function Estimation**

Sectors	Capital ( $\alpha$ )	Labour ( $\beta$ )	Scale efficiency ( $\alpha+\beta$ )	Liberalisation Dummy	Constant	Scale efficiency
<b>Total</b>						
Total	.5597289	.5050443	1.064773	-.1944552	-5.673771	Increasing
	47.331	36.691		-6.318	-75.545	
Pre-reform	.4990512	.5663224	1.065374		-5.663656	
	47.597	46.854			-97.218	
Post-reform	.5622627	.515672	1.077935		-6.012335	
	42.684	32.073			-89.379	
<b>20-21: Manufacture of Food Products</b>						
Total	.5449221	.4975398	1.042462	-.1445382	-5.512486	Decreasing
	19.715	13.822		-2.942	-18.267	
Pre-reform	.4896164	.5646033	1.05422		-5.629704	
	15.062	13.301			-23.243	
Post-reform	.6066773	.4156489	1.022326		-5.53445	
	13.649	8.040			-16.181	
<b>22: Manufacture of Beverages, Tobacco and Related Products</b>						
Total	.5854983	.4690057	1.054504	-.1406059	-5.20351	Decreasing
	17.761	16.017		-1.329	-13.006	
Pre-reform	.6085084	.5100467	1.118555		-5.803857	
	12.111	10.920			-9.527	
Post-reform	.5696008	.4402234	1.009824		-4.897064	
	12.911	11.654			-8.666	
<b>23: Manufacture of Cotton Textiles</b>						
Total	.3021259	.8143329	1.116459	.0245925	-6.830925	Decreasing
	3.356	7.544		0.226	-19.363	
Pre-reform	.3362948	.8636863	1.199981		-7.722524	
	2.184	5.112			-16.843	
Post-reform	.3134332	.7823139	1.095747		-6.600082	
	5.598	10.934			-28.537	
<b>24: Manufacture of Wool, Silk and Man-made Fibre Textiles</b>						
Total	.3001067	.8106303	1.110737	-.0032821	-6.216942	Increasing
	5.565	13.247		-0.043	-36.172	
Pre-reform	.1301658	1.007829	1.137995		-6.433781	
	1.615	10.600			-29.155	
Post-reform	.2491718	.9117785	1.16095		-6.6783	
	2.731	8.158			-44.611	
<b>25: Manufacture of Jute and Other Vegetable Fibre Textiles (Except Cotton)</b>						
Total	.2171643	.8458836	1.063048	-.5935478	-5.654489	Decreasing
	3.569	16.110		-7.190	-33.270	
Pre-reform	.2310036	.8292675	1.060271		-5.648021	
	2.482	9.465			-22.861	
Post-reform	.0676072	.9648652	1.032472		-5.944293	
	1.143	19.472			-27.266	
<b>26: Manufacture of Textile products (including Wearing Apparel)</b>						
Total	.0865365	.9845787	1.071115	.0224247	-5.606962	Decreasing
	2.437	24.564		0.388	-37.208	
Pre-reform	.099393	.9757623	1.075155		-5.587394	
	3.950	43.161			-34.216	
Post-reform	.0757078	.9730427	1.048751		-5.27437	

	0.960	12.410			-15.439		
<b>27: Manufacture of Wood and Wood Products; Furniture and Fixtures</b>							
Total	.3763715	.590969	0.967341		-.2125089	-5.047449	Increasing
	5.316	7.918			-2.987	-23.715	
Pre-reform	.0891192	.8735303	0.9626495			-5.179278	
	1.172	9.665				-12.820	
Post-reform	.3953983	.5943654	0.9897637			-5.38121	
	5.823	6.839				-16.397	
<b>28: Manufacture of Paper and Paper Products and Printing, Publishing and Allied Industries</b>							
Total	.2646125	.8024102	1.067023		-.1201694	-5.592661	Decreasing
	6.503	16.592			-2.117	-30.834	
Pre-reform	.2082237	.8641993	1.072423			-5.594507	
	4.986	16.624				-26.372	
Post-reform	.3952656	.6765156	1.071781			-5.854487	
	7.606	14.883				-27.602	
<b>30: : Manufacture of Basic Chemicals and Chemical Products (Except Products of Petroleum and Coal)</b>							
Total	.8069862	.2329755	1.039962		.065414	-5.800924	Decreasing
	25.500	4.221			1.063	-9.983	
Pre-reform	.7847003	.3250036	1.109704			-6.53684	
	25.837	6.789				-14.175	
Post-reform	.737122	.1267392	0.863861			-3.653866	
	16.373	1.428				-3.587	
<b>31: : Manufacture of Rubber, Plastic, Petroleum and Coal Products; Processing of Nuclear Fuels</b>							
Total	.6566968	.4933092	1.150006		-.0923625	-6.737332	Decreasing
	12.249	6.619			-1.338	-11.877	
Pre-reform	.5863889	.7233954	1.309784			-8.374595	
	10.044	8.354				-13.498	
Post-reform	.8224684	.2084108	1.030879			-5.871088	
	14.913	2.115				-6.764	
<b>32: Manufacture of Non-Metallic Mineral Products</b>							
Total	.4932305	.5369445	1.030175		-.1372339	-5.390638	Increasing
	11.472	8.359			-2.552	-15.677	
Pre-reform	.4866514	.481811	0.968462			-4.762754	
	10.100	6.532				-10.240	
Post-reform	.4729376	.6010036	1.073941			-6.031909	
	8.587	8.415				-25.238	
<b>33: Basic Metal and Alloys Industries</b>							
Total	.5809964	.3701059	0.951102		-.3297675	-4.547712	Increasing
	17.297	8.489			-5.869	-27.381	
Pre-reform	.4487623	.4614077	0.91017			-4.068825	
	12.432	10.245				-19.756	
Post-reform	.5240129	.4666154	0.990628			-5.222528	
	10.213	9.242				-18.931	
<b>34: Manufacture of Metal Products and Parts, Except Machinery and Equipment</b>							
Total	.4294794	.6078075	1.037287		.0382929	-5.471911	Decreasing
	7.331	8.749			0.551	-13.209	
Pre-reform	.4817747	.612715	1.09449			-6.090864	
	9.923	11.418				-19.392	
Post-reform	.4765956	.473161	0.949757			-4.585998	
	7.964	6.065				-8.014	
<b>36-36: Manufacture of Machinery and Equipment Other than Transport Equipment (Manufacture of Scientific Equipment, Photographic/ Cinematographic Equipment and Watches &amp; Clocks is classified in Division 38)</b>							
Total	.417983	.6170629	1.035046		-.0362236	-5.163857	Decreasing

	8.784	12.059		-0.705	-21.111	
Pre-reform	.2560055	.8780252	1.134031		-6.085265	
	7.451	18.814			-19.811	
Post-reform	.6262035	.4099555	1.036159		-5.450897	
	9.961	5.959			-14.134	
<b>37: Manufacture of Transport Equipment and Parts</b>						
Total	.6484478	.4356528	1.084101	-1.173482	-6.101534	Decreasing
	13.393	7.356		-1.335	-25.135	
Pre-reform	.4219426	.7295037	1.151446		-6.694714	
	9.432	13.984			-23.289	
Post-reform	.7968575	.2785591	1.075417		-6.269986	
	12.054	3.639			-21.603	
<b>38: Other Manufacturing Industries</b>						
Total	.2327733	.7772004	1.009974	.4446679	-5.084214	Decreasing
	3.968	13.106		4.415	-22.077	
Pre-reform	.266493	.7762551	1.042748		-5.325745	
	8.089	19.943			-37.426	
Post-reform	.092594	.8230263	0.91562		-3.668792	
	0.755	6.599			-6.114	



**Table 5F: Analysis of relation between Returns to Scale and Net Trade (1987-98)**

Scale Efficiency	HS	Description
<b>20-21: Manufacture of Food Products</b>		
Decreasing	2	The trade balance has always been positive and gradually increasing over the sample period.
	4	For the initial years, the trade balance was negative. In 1996-97, trade balance become positive. It remained so in 1997-98, although the magnitude declined.
	9	The trade balance has always been positive and gradually increasing over the sample period, with minor fluctuations.
	11	The trade balance was insignificant upto 1994-95. It increased sharply for the next to years, but again declined during 1997-98 at a high rate.
	15	The trade balance has always been negative and gradually increasing over the sample period.
	16	The trade balance has always been positive and gradually increasing over the sample period.
	17	The trade balance has fluctuated (positive and negative) and most of the time it was negative.
	18	The trade balance has mostly been negative (positive for a couple of initial years) and gradually increasing over the sample period.
	19	The trade balance was negative for almost entire period, barring the last three years.
	20	The trade balance has always been positive and gradually increasing over the sample period.
	22	In the initial period, trade balance was negative. Although it became positive in the following period, it didn't have a high value except 1996-97 and fallen sharply in the following period.
	23	The trade balance has always been positive and gradually increasing over the sample period.
	25	The trade balance has always been negative and fluctuated over the sample period.
<b>22: Manufacture of Beverages, Tobacco and Related Products</b>		
Decreasing	21	The trade balance has mostly been positive and gradually increasing over the sample period.
	22	In the initial period, trade balance was negative. Although it became positive in the following period, it didn't have a high value except 1996-97 and fallen sharply in the following period.
	24	The trade balance has always been positive and gradually increasing over the sample period.
<b>23: Manufacture of Cotton Textiles</b>		
Decreasing	52	The trade balance has always been positive and gradually increasing over the sample period.

<b>24: Manufacture of Wool, Silk and Man-made Fibre Textiles</b>		
Increasing	50	The trade balance has always been positive, but fluctuated over the sample period. For the last three years, it increased gradually.
	51	The trade balance has mostly been negative (positive in 1994-95), and fluctuated over the sample period.
	54	The trade balance has mostly been positive (negative in 1988-89), and increased gradually over the sample period.
<b>25: Manufacture of Jute and Other Vegetable Fibre Textiles (Except Cotton)</b>		
Decreasing	53	The trade balance has always been positive and gradually increasing over the sample period.
<b>26: Manufacture of Textile products (including Wearing Apparel)</b>		
Decreasing	57	The trade balance has always been positive and gradually increasing over the sample period.
	58	The trade balance was at a low level in the initial years. It increased in the last two years of the sample.
	59	The trade balance was positive only for two years in the sample and the fall in it was intensified in the last couple of years.
	62	The trade balance has always been positive and gradually increasing over the sample period.
	63	The trade balance has always been positive and gradually increasing over the sample period.
<b>27: Manufacture of Wood and Wood Products; Furniture and Fixtures</b>		
Increasing	44	The trade balance has always been negative and gradually increasing over the sample period.
	45	The trade balance has always been negative and gradually increasing over the sample period.
	94	The trade balance was positive in initial years but became negative in 1995-96 and 1997-98.
<b>28: Manufacture of Paper and Paper Products and Printing, Publishing and Allied Industries</b>		
Decreasing	48	The trade balance has always been negative and gradually increasing over the sample period.
	49	The trade balance has mostly been negative (positive only in 1993-94) and fluctuated. However it increased gradually over the sample period.
<b>30: Manufacture of Basic Chemicals and Chemical Products (Except Products of Petroleum and Coal)</b>		
Decreasing	28	The trade balance has always been negative and gradually increasing over the sample period.
	29	The trade balance has always been negative and gradually increased over most the sample period. However, in the last two years, there was a slight improvement.
	31	The trade balance has always been negative and gradually increased over most the sample period. However, in the last couple of years, there was a fluctuating trend.

	32	The trade balance has always been positive and gradually increasing over the sample period.
	33	The trade balance has always been positive and gradually increasing over the sample period.
	36	The trade balance has always been positive and gradually increasing over the sample period.
	38	The trade balance has always been negative and gradually increased over most the sample period with minor fluctuations from time to time.
	39	The trade balance has always been negative and gradually increased over most the sample period with minor fluctuations from time to time.
	55	The trade balance was low in the initial period and fluctuated, but increased steadily since 1995-96 onwards.
	93	The trade balance remained low and was negative for a considerable period of time. However, from 1996-97 onwards, it increased gradually.
<b>31: Manufacture of Rubber, Plastic, Petroleum and Coal Products; Processing of Nuclear Fuels</b>		
Decreasing	27	The trade balance has always been negative and gradually increasing over the sample period.
	39	The trade balance has always been negative and gradually increased over most the sample period with minor fluctuations from time to time.
	40	The trade balance fluctuated highly over the sample period, and in the initial years it was negative. Only from 1992-93 onwards, the sector became a net exporter one. However, trade balance has fluctuated highly in the subsequent period.
	64	The trade balance has always been positive and gradually increasing over the sample period.
<b>32: Manufacture of Non-Metallic Mineral Products</b>		
Increasing	25	The trade balance has always been negative and fluctuated over the sample period.
	68	The trade balance has always been positive and gradually increasing over the sample period.
	69	The sector broadly remained a net importer sector over the sample period. Only for three years following the liberalization (92-93, 93-94, 94-95) and in 1996-97, it was positive.
	70	The sector broadly remained a net importer sector over the sample period, barring the exception of 1993-94 and 1996-97.
<b>33: Basic Metal and Alloys Industries</b>		
Increasing	72	The trade balance has always been negative and fluctuated over the sample period.
	74	The trade balance has always been negative and gradually increasing over the sample period.

	76	The trade balance has fluctuated over the sample period, and for a considerable period of time it was negative.
	79	The trade balance has always been negative and gradually increasing over the sample period.
	81	The trade balance has always been negative and gradually increasing over the sample period.
<b>34: Manufacture of Metal Products and Parts, Except Machinery and Equipment</b>		
Decreasing	73	The sector was a net importer upto 1992-93, and became a net exporter after that.
	82	The trade balance has always been positive and gradually increasing over the sample period.
	83	The trade balance has always been positive and gradually increasing over the sample period.
	94	The trade balance was positive in initial years but became negative in 1995-96 and 1997-98.
<b>35-36: Manufacture of Machinery and Equipment Other than Transport Equipment (Manufacture of Scientific Equipment, Photographic/ Cinematographic Equipment and Watches &amp; Clocks is classified in Division 38)</b>		
Decreasing	84	The trade balance has always been negative and gradually increasing over the sample period.
	85	The trade balance has always been negative and gradually increasing over the sample period.
<b>37: Manufacture of Transport Equipment and Parts</b>		
Decreasing	84	The trade balance has always been negative and gradually increasing over the sample period.
	86	The trade balance has always been negative and gradually increasing over the sample period.
	87	The trade balance has mostly been positive (net importer in the pre-reform period) and gradually increasing over the sample period.
	88	The trade balance has always been negative and gradually increasing over the sample period. Only in the last couple of years, net exports have shown a slight increasing trend.
	89	The trade balance has always been negative and gradually increasing over the sample period.
<b>38: Other Manufacturing Industries</b>		
Decreasing	48	The trade balance has always been negative and gradually increasing over the sample period.
	71	The trade balance was low, but positive in the initial period. But in 1997-98, it became negative.
	84	The trade balance has always been negative and gradually increasing over the sample period.
	90	The trade balance has always been negative and gradually increasing over the sample period.
	91	The trade balance was at a low level upto 1992-93. Although it became positive since 1993-94, a fluctuating trend is noticed.

	92	The trade balance has always been positive and gradually increasing over the sample period.
	95	The trade balance has always been positive and gradually increasing over the sample period.
	96	India was a net importer upto 1989-90, and became a net exporter from the following year, and trade balance increased gradually.

**Table 5G: Regression result for Output-Employment Relationship**

Characteristic	Log L	Liberalisation dummy	Constant	R <sup>2</sup>	Hausman Test Statistic
Total	1.03	0.24	-5.30	0.82	0.26
t-value	54.60	11.93	-27.94		
p-value	0.000	0.000	0.000		
20-21	0.84	0.29	-3.77	0.69	0.94
t-value	16.89	5.88	-7.09		
p-value	0.000	0.000	0.000		
22	1.31	0.35	-7.95	0.45	0.001
t-value	8.00	5.13	-5.05		
p-value	0.000	0.000	0.000		
23	1.07	0.33	-6.63	0.90	0.98
t-value	15.49	2.65	-8.99		
p-value	0.000	0.008	0.000		
24	1.16	0.29	-6.7	0.94	0.81
t-value	23.34	3.38	-14.5		
p-value	0.000	0.001	0.000		
25	1.06	0.16	-6.43	0.93	0.85
t-value	19.62	1.43	-14.30		
p-value	0.000	0.151	0.000		
26	1.04	0.22	-5.45	0.96	0.92
t-value	34.2	3.79	-20.17		
p-value	0.000	0.000	0.000		
27	1.53	0.06	-10.05	0.91	0.00
t-value	11.78	1.06	-9.32		
p-value	0.000	0.29	0.000		
28	1.06	0.17	-5.66	0.94	0.76
t-value	21.81	3.45	-12.06		
p-value	0.000	0.001	0.000		
29	0.96	0.22	-4.91	0.96	0.24
t-value	34.65	2.7	-19.00		
p-value	0.000	0.006	0.000		
30	0.44	0.54	1.64	0.27	0.43
t-value	4.13	4.70	1.42		
p-value	0.000	0.000	0.153		
31	0.90	0.19	-3.31	0.43	0.99
t-value	8.40	1.91	-2.89		
p-value	0.000	0.056	0.004		
32	1.03	0.26	-5.46	0.90	0.99
t-value	16.05	3.63	-8.16		
p-value	0.000	0.000	0.000		
33	1.04	0.074	-4.86	0.89	0.53
t-value	12.34	0.89	-5.77		
p-value	0.000	0.369	0.000		
34	1.46	0.12	-9.56	0.79	0.02
t-value	10.60	1.93	-6.91		
p-value	0.000	0.057	0.000		
35-36	1.07	0.27	-5.32	0.85	0.45
t-value	27.13	8.9	-12.78		
p-value	0.000	0.000	0.000		
37	1.19	0.25	-6.89	0.89	0.91
t-value	16.43	3.5	-9.14		
p-value	0.000	0.000	0.000		
38	1.02	0.29	-5.05	0.72	0.50
t-value	15.75	1.72	-8.81		
p-value	0.000	0.084	0.000		

**Table 5H: Rank Correlation coefficient between capital-labour ratio**

<b>Characteristic</b>	<b>Rank correlation coefficient</b>	<b>Constant</b>	<b>R-square</b>
Capital-labour ratio	0.897	0.926	0.8047
t-value	7.862	0.792	
p-value	0.000	0.44	

**Table 5I: Rank Correlation coefficient between Skill Formation**

<b>Characteristic</b>	<b>Rank correlation coefficient</b>	<b>Constant</b>	<b>R-square</b>
Proportion of skilled workers	0.941	0.529	0.8858
t-value	10.787	0.592	
p-value	0.000	0.563	

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## Chapter 6

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In the first chapter, the objective of the dissertation was stated as to gauge the impact of the economic liberalisation exercise in India with respect to two particular phenomena, namely, IIT and the consequent impact on industry. In the present chapter, the findings of the dissertation are summarised. In the following section 6.1, the conclusion drawn are outlined in brief. In section 6.2, a policy prescription is attempted.

### 6.1 The Findings

The trade reform exercise in opening Indian economy has broadly been successful, since the total trade, as a percentage of GDP has increased consistently and considerably over the years. Although the liberalisation has been successful in boosting exports to a considerable extent, the import growth rate has always been stronger than it. As a result, instead of deterioration, the trade balance has increased to a staggering level. To get rid of this problem, a consolidated export strategy is required.

The analysis of composition of trade reveals that the liberalisation has not been significantly effective in changing the relative importance of the sectors. The rank correlation coefficients between export and import shares for the initial and terminal year (1987-88 and 2000-01 respectively) clearly indicate that the sections have, on the whole, maintained their positions in the trade basket. It could also be seen from the analysis that the major export items are largely labour intensive in character. On the other hand, the import requirements of products groups like petroleum and fuels are dictated by the need of the domestic economy. However, the import of metal products, machinery and equipment also holds an important position. In addition, India's trade pattern is predominantly higher with developed countries in comparison with developing countries.

An insight into the IIT trend clearly suggests that in the aftermath of the liberalisation, the level of IIT in Indian economy has increased, although the extent of the increment is considerably moderate in comparison with the experience from other countries. However, this does not necessarily reflect slackness in undertaking economic reform on



India's part. Rather, the differential condition prevailing in the other countries with which the Indian scenario is being compared should be borne in mind. For example, both in the case of NAFTA and EEC, where IIT index increased sharply in the post-reform period, liberalisation was actually not fostered as a multilateral process, but as an intra-bloc trade, where the members of the bloc were quite homogeneous endowment-wise. In contrast, India has relied entirely on multilateral trade liberalisation process, which takes a longer time. The predominance of multilateral character of India's IIT over bilateral IIT could be one justification for its somewhat placid response to the liberalisation.

Another point should be given due attention. While in most of the cases mentioned in the literature survey concern trade among countries at a similar level of development, the Indian scenario is again completely different. India trades predominantly with the developed countries, who traditionally consider the developing countries as a source of raw materials. In the light of these two facts, the above result definitely seems less puzzling. In other words, the growth in IIT indices actually originates from country aggregation. A detailed analysis of India's bilateral IIT could produce interesting results.

As far as the determinants of IIT are concerned, it has been established through a model that the IIT growth has purely been export-driven. An analysis at the sectional level clearly shows the IIT is positively correlated with the export share of the sections in total export and negatively correlated with import shares. The classic example of section XIV could be provided where the rapid expansion of import share in the post-liberalisation period has actually resulted in a sharp fall in the IIT index. This conclusion promptly draws attention to two more issues. On the one hand the low growth of India's IIT fits into the line in a perfect manner since in the post-liberalisation period imports has increased across all sectors. On the other hand, the importance of boosting the export is further strengthened.

The insight into the nature of trade considering a few key sectors reveals that the trade pattern of India is predominantly vertical in nature. The unit price method clearly shows that the unit price of import items is significantly higher than those of export items in almost all cases. The end use method also shows that India imports a number of finished

products from abroad, while exporting the raw material and semi-finished commodities. However, in recent period, the proportion of export of final commodities has increased in comparison with earlier times. It supports the plea that Indian IIT pattern could be explained in terms of the H-O-S (i.e., the conventional factor proportions theory) theorem, where India import technologically sophisticated goods from developed countries, and export the domestic variety to developed as well as developing countries, that lie lower to it on the technological plane.

The trade industry interaction shows that in the post-liberalisation period, the scale efficiency of the factory sector as a whole has increased marginally. At the sectional level, however, a mixed trend was observed. However, the result does not necessarily show the ill effects of liberalisation per se. Since data is available upto 1997-98, i.e., only 6 years after the initiation of reform could be considered in the analysis. Probably, the process of structural adjustment is still going on in the factory sector. The conclusion may differ with a larger sample period. Two more industry characteristics, namely capital-labour ration and proportion of skilled labours are considered, both of which portray an increasing trend over the sample period. However, the change in proportion of skilled labour lags behind the expected level. The employment repercussions of output suggest that employment in India has been quite significantly output elastic. However, IIT indices do not bear a uniform relationship with capital-labour ratio, skill formation, and output. Also, the result suggests that the import competing sectors are, in general, losing in the post-liberalisation period, and production rationalisation policies should be directed to these sectors in future. However, no definite conclusion could be drawn regarding the net welfare from the current analysis, for which a general equilibrium framework is required.

## 6.2. Policy Prescription

In the light of the above findings mentioned in the paper, the dissertation plans to chalk out certain policy prescriptions, which are likely to help India to boost her exports. A notable difference between the developed world and India is that here primary products play an important role in determining the overall IIT level unlike the developed world, where trade in manufacturing is predominant.

The IIT dynamics in the recent period shows a marginal increasing trend but from India's point of view, it seems to be of little consequence. The results from chapter 5 clearly show that the increase in IIT could not be corresponded with the changes in the factory sector, namely, output, capital-labour ratio or skill formation. In other words, the gains realized by the factory sector originates from the liberalisation of several policy aspects, but in most of the cases, no direct link with IIT trends could be drawn.

It is also observed from the export shares of Indian economy that the main export items are section XI (textile products), XIV (gems and jewelry), VI (chemical industry), II (vegetable products). All these products represent primary commodities and labour-intensive light manufacturing products. However the export shares of XV (base metal and parts) and XVI (machinery and equipments) have significantly increased over time. The result obtained from chapter 4 clearly shows that the IIT in these sectors is vertical in nature, i.e., India is situated at the lower end of the technology scale, exporting the lower quality product to the developed partners.

The prevalence of IIT is more pronounced in the manufacturing sectors. In case of primary and intermediate commodities, the trade is still dictated by H-O-S theorem, where exports are much higher than the imports, barring a few exceptions. It could be ascertained that India exports high quality products in the traditional sectors, while exporting low quality products in the manufacturing sector. In other words, the vertical IIT in manufacturing sector could easily be explained in terms of factor proportion theory. However, a country exporting low quality products is always exposed to competition from countries able to produce low-quality goods at a lower price.

The result obtained clearly suggests that the India's trade pattern is grossly dictated by the comparative advantage theory, and H-O-S type of trade model is quite capable in explaining the trade pattern of India. Hence, any strategy to foster export growth must keep this in mind and concentrate on those sectors, where the growth in export will contribute

positively to the economy. The benefits will include employment generation in those sectors.

The analysis at the 4-digit level undertaken in chapter 4 suggests that, the commodities with high export potential actually consist of labour intensive light manufacturing items. For instance, rapid growth of exports of tableware and kitchenware (73.23) within the iron and steel industry, exports of diamonds (71.02) and articles of jewelry (71.13) within the gems and jewelry industry, light vehicles like bikes and motorcycles reinforces the belief. Further, export growth of finished clothing and apparel industry, seafood and other prepared items, chemical and pharmaceutical products suggest that India should concentrate on these sectors.

Therefore, the dissertation concludes with two following policy prescriptions. Firstly, any export growth strategy in future must concentrate on the labour-intensive light manufacturing items, instead of opting for highly capital-intensive products. In addition, concentrating on any specific sector may not result in the desired outcome, as India's comparative advantage is not uniformly distributed across all the industries within the sector. Therefore, any export growth strategy in future must focus on particular sub-industries within the industry group, which show a consistent expanding trend over the years. Secondly, the export basket of India is too heavily reliant on the developed world. Since India is situated at the lower side of the technological scale, there is always a theoretical possibility that the lower quality Indian products could be replaced by foreign producers, who could service the market at a lower price. Specifically, the competition from China is worth mentioning, whose export items are also primarily labour-intensive light manufacturing items. In the light of this, any future export growth strategy should concentrate on diversifying the export market. Apart from looking for new potential markets, policies to promote regional trade agreements with countries at similar level of development should be given its due priority.

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**Annex 1: Industries at HS 2-digit level**

<b>HS Code</b>	<b>Product description</b>
1	Live animals
2	Meat & edible meat offal
3	Fish and crustaceans, molluscs & other aquatic invertibrates
4	Dairy products; birds' eggs; natural honey; edible products of animal origin n.e.s.
5	Products of animal origin n.e.s. or included
6	Live trees or other plants; bulbs; roots and the like; cutflowers and ornamental foliage
7	Edible vegetables & certain roots & tubers
8	Edible fruits & nuts; peel of citrus fruit or melons
9	Coffee, tea. Mate & spices
10	Cereals
11	Products of the milling industry; malt; starches; inulin; wheat gluten
12	Oilseeds & oleaginous fruits; misc. grains, seeds & fruits; industrial & medicinal plants, straw & fodder
13	Lac; gums, resins & other vegetable saps & extracts
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included
15	Animal or vegetable fats & oils and there cleavage products; animal or vegetable waxes
16	Preparations of meat of fish or of crustaceans, molluses of other aquatic invertibrates
17	Sugars and sugar confectionery
18	Cocoa & cocoa preparations
19	Preparations of cereals, flower, starch or milk, pastry – cooked products
20	Preparation of vegetables, fruits, nuts or other parts of plants
21	Misc. edible preparations
22	Beverages, spirits & vinegar
23	Residues & wastes from the food industries; prepares animal fodder
24	Tobacco & manufactured tobacco substitutes
25	Salt; sulphur; earths & stone; plastering materials, lime & cement
26	Ores, slag & ash
27	Mineral fuels, mineral oils & products; bituminous substances; mineral waxes
28	Inorganic chemicals; compounds of precious metals, of rare earth metals, of radio-active elements, or of isotopes
29	Organic chemicals
30	Pharmaceutical products
31	Fertilisers
32	Dyeing, tanning and colouring matter
33	Essential oils and resinoids; cosmetic & other similar preparations
34	Soap & other similar preparations; polishes & creams; candles & the like, dental waxes & preparations
35	Albuminoidal substances; modified starches; glues; enzymes
36	Explosives; matches; certain combustible preparations
37	Photographic or cinematographic goods
38	Misc. chemical products
39	Plastics & articles thereof
40	Rubber & articles thereof
41	Raw hides & skins (other than furskins) and leather
42	Articles of leather, saddliry harness and animal gut

43	Furskins & artificial fur, manufactures thereof
44	Wood & articles of wood; wood charcoal
45	Cork & articles of cork
46	Manufactures of plaiting materials; basketware and wickerwork
47	Pulp of wood or of other materials; waste & scrap of paper or paper-board
48	Paper & paper-board; articles of paper pulp, of paper and paper-board
49	Printed books & other products of printing industry
50	Silk
51	Wool, fine or coarse animal hair
52	Cotton
53	Other vegetable textile fibres; paper yarns & fabrics
54	Man-made filaments
55	Man-made staple fibres
56	Wadding, felt & non-wovens special yarns; twine, cordage, ropes & cables, & articles thereof
57	Carpets & other textile floor coverings
58	Special woven fabrics; tufted textile fabrics; less; tapestries; trimmings; embroidery
59	Impregnated, coated & laminated textile fabrics; textile articles for industrial use
60	Knitted or crocheted fabric
61	Articles of apparel and clothing accessories, knitted or crocheted
62	Articles of apparel and clothing accessories, not knitted or crocheted
63	Other made-up textile articles; **
64	Footwear, gaiters & the like; parts of such articles
65	Headgears & parts thereof
66	Umbrellas, walking & * sticks; whips, riding crops & parts thereof
67	Prepared feathers & down with articles, artificial flowers, articles of human hair
68	Articles of stone, plaster, cement, asbestos, mica or similar materials
69	Ceramic products
70	Glass & glassware
71	Pearls, precious and semi-precious stones/ metals & articles thereof; imitation jewellery & coin
72	Iron & steel
73	Articles of Iron & steel
74	Copper & articles thereof
75	Nickel & articles thereof
76	Aluminium & articles thereof
78	Lead & articles thereof
79	Zinc & articles thereof
80	Tin & articles thereof
81	Other base metals; cements; articles thereof
82	Tools & their parts of base metal
83	Miscellaneous articles of base metal
84	Nuclear reactors, boilers, machinery & mechanical appliances; parts thereof
85	Electrical machinery & equipment & parts thereof; sound & TV recorders & reproducers & parts thereof
86	Railway / Tramway locomotives, truck etc. equipment & parts thereof
87	Road vehicles and parts
88	Aircraft, spacecraft & parts
89	Ship, boat & floating structure

90	Optical, measuring, medical & similar instruments & parts thereof
91	Clocks and watches & their parts
92	Musical instruments; parts & accessories
93	Arms & ammunition; parts & accessories thereof
94	Furniture, bedding and allied articles, lighting, fittings; illuminated articles; prefabricated buildings
95	Toys, games & sports requisites; parts & accessories thereof
96	Miscellaneous manufactured articles
97	Works of art, collector's pieces and antiques
98	Project goods; some special uses
99	Miscellaneous goods

Annex 2: HS sections

HS Section	Product description
I	Live animals, animal products
II	Vegetable products
III	Animal or vegetable fats & oils & their cleavage products: animal or vegetable waxes
IV	Prepared foodstuffs, beverages and tobacco
V	Mineral products
VI	Products of the chemical and the allied industries
VII	Plastics & rubber
VIII	Hides & skins; leather products, furskins and articles thereof
IX	Wood, cork & articles thereof: manufacture of plaiting materials; basketware & wickerwork
X	Paper & paper-board & articles thereof
XI	Textile & textile articles
XII	Footwear, headgear, umbrellas; prepared feathers & articles thereof
XIII	Stone, cement and similar materials; ceramic products; glass & glassware
XIV	Pearls, precious and semi-precious stones/ metals & articles thereof; imitation jewellery & coin
XV	Base metals & articles of base metals
XVI	Machinery & their parts, electrical & electronic equipment, parts thereof
XVII	Transport equipment
XVIII	Instrument & apparatus; clocks & watches; parts & accessories thereof
XIX	Arms & ammunition; parts & accessories thereof
XX	Miscellaneous manufactured articles
XXI	Works of art, collectors' pieces and antiques

**Annex 3: Tariff rate for selected HS-industries**

Description	1988-89		1998-99	
	Average tariff	Tariff peak	Average tariff	Tariff peak
1	58.33	100	40	40
2	100	100	10	10
3	65.51	100	10.57	60
4	66.28	100	26.75	30
5	52.69	60	10	10
6	60	60	10	10
7	100	100	9.23	10
8	105.15	200	40.9	50
9	97.47	133.05	21.21	30
11	63.52	100	30	30
12	72.06	200	33.09	50
13	60	60	34.28	40
14	57.14	60	10	10
15	104.88	200	30.78	40
16	100	100	40	40
17	78	100	33.75	40
18	108.33	200	39.09	40
19	100	100	38.23	40
20	100	100	40	40
21	100	100	49.06	185
22	94.28	100	57.14	100
23	60	60	38.57	40
25	67.98	100	29.51	50
26	46.02	100	7.2	30
27	49.53	100	18.91	30
30	64.7	100	29.13	35
31	48	60	19.03	30
32	165.12	188.3	30	30
33	98.57	228.78	44.14	185
34	110.71	245.99	40	40
35	60	60	30.33	35
36	64.44	100	30	30
37	96.66	100	24.44	30
40	87.87	100	38.53	50
41	38.82	60	12.94	20
42	100	100	40	40
43	50	100	13.88	40
44	47.42	60	25.36	40
45	60	60	30	30
46	60	60	40	40
47	52.63	100	5	5
49	42.1	100	12.63	20
50	70.11	134.63	30	30
51	62.22	100	32.5	40
52	83.46	100	36.15	40
53	56.36	100	34.54	40
54	98.46	175	36.21	40
55	105.79	175	38.34	40
56	100	100	40	40
57	100	100	40	40

58	100	100	39.26	40
59	90.49	197.35	40	40
60	100	100	40	40
61	100	100	40	40
62	100	100	40	40
63	98.09	100	39.53	40
64	98.07	100	40	40
65	100	100	40	40
67	100	100	40	40
68	100	100	40	40
69	72.85	100	37.93	40
70	92.28	100	40	40
71	76.15	100	40	40
73	139.92	300	30	30
74	100	100	33.98	35
75	52.5	60	11.17	20
76	59.11	60	20.13	25
78	85	85	30	30
79	85	85	30	30
80	54.44	60	20	20
81	54.59	60	30.27	40
82	64.77	100	27.5	40
83	95.55	100	40	40
84	60.51	300	22.59	40
85	78.61	110	30.63	40
86	42.22	60	26.5	40
87	87.64	150	39.51	40
90	57.86	100	26.20	40
91	100	100	32.90	40
92	100	100	30	30
93	100	100	40	40
94	100	100	40	40
95	98.6	100	25	25
96	105.45	200	40	40

(Source: ICRIER)

**Annex 4: Tariff reduction in Partners countries**

Country		Primary products		Manufactured products	
		Mean tariff	Weighted mean tariff	Mean tariff	Weighted mean tariff
Australia	1993	2.5	1.3	11.7	9.7
	1999	1.2	0.7	6.0	4.2
Canada	1993	4.7	2.7	9.7	8.0
	1999	15.6	6.4	4.9	2.9
China	1993	33.3	20.9	41.8	44.0
	1998	17.9	20.0	17.4	18.5
EU	1994	10.3	4.9	6.9	7.0
	1999	9.8	3.3	4.1	3.2
Japan	1998	8.9	4.5	4.5	1.5
	1999	9.8	4.5	5.5	2.0
New Zealand	1993	4.3	2.1	9.7	9.4
	1999	1.7	0.9	4.4	4.4
US	1995	5.5	2.7	6.0	4.4
	1999	6.1	3.1	4.5	2.4

(Source: World Development Indicators 2000)

### Annex 5: Export Share of HS Sections

Year	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01
I	4.237	3.530	3.125	3.605	4.018	4.020	4.324	4.930	3.929	4.188	4.280	3.848	3.891	4.016
II	14.582	10.270	10.848	9.734	9.856	6.514	8.131	7.796	11.177	9.713	9.722	11.503	8.889	7.021
III	0.136	0.063	0.285	0.270	0.406	0.313	0.472	0.603	0.848	0.585	0.506	0.512	0.714	0.522
IV	2.708	2.864	3.430	3.227	3.715	4.867	4.797	3.122	3.757	5.244	4.388	2.665	2.309	2.357
V	9.118	6.926	7.629	7.543	6.991	6.336	5.628	5.028	4.543	4.227	3.439	2.450	2.194	6.382
VI	4.646	15.103	8.399	7.864	8.621	6.968	7.080	7.853	7.746	8.793	9.448	9.056	9.510	9.538
VII	0.784	0.762	1.127	1.207	1.137	1.839	2.000	2.599	2.467	2.210	2.084	1.890	1.983	2.394
VIII	5.584	4.817	5.068	5.392	4.712	5.000	4.011	4.293	3.837	3.256	3.385	3.463	2.925	3.029
IX	0.117	0.091	0.087	0.080	0.092	0.074	0.227	0.168	0.118	0.128	0.099	0.073	0.080	0.080
X	0.208	0.137	0.193	0.186	0.203	0.259	0.836	0.384	0.476	0.433	0.334	0.376	0.449	0.542
XI	26.506	20.386	23.989	27.433	27.236	28.120	25.738	27.298	25.625	27.391	26.897	27.211	26.001	26.038
XII	2.877	2.505	2.457	2.864	2.684	2.369	2.270	2.181	1.918	1.760	1.589	1.852	1.756	1.551
XIII	0.308	0.351	0.384	0.434	0.571	0.719	0.795	0.996	1.024	0.974	0.944	0.914	1.066	1.180
XIV	16.772	20.010	19.175	16.205	15.387	16.942	18.035	17.179	16.643	14.183	15.327	17.861	20.951	16.710
XV	2.409	3.255	3.987	4.088	4.541	6.065	6.243	5.528	5.583	5.827	6.203	5.380	6.249	6.677
XVI	4.707	4.860	5.293	5.230	4.849	4.311	4.349	4.656	5.047	5.555	5.826	5.310	5.401	6.121
XVII	1.622	1.652	1.957	2.218	2.769	2.927	2.659	2.933	2.815	2.889	2.664	2.293	2.226	2.378
XVIII	0.627	0.542	0.684	0.464	0.416	0.319	0.359	0.374	0.377	0.435	0.449	0.501	0.675	0.737
XIX	0.002	0.001	0.003	0.001	0.001	0.005	0.003	0.002	0.001	0.003	0.011	0.001	0.002	0.005



**Annex 6: Import Shares of HS sections**

Year	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01
I	0.667	0.411	0.175	0.022	0.075	0.093	0.048	0.064	0.092	0.033	0.066	0.084	0.097	0.063
II	2.121	4.668	2.127	1.062	1.616	2.670	2.247	2.023	1.629	1.991	2.561	2.389	1.725	1.240
III	4.569	2.760	0.710	0.865	0.715	0.453	0.472	0.979	2.014	2.209	1.816	4.545	3.930	2.793
IV	1.284	0.374	0.661	0.410	0.466	0.487	0.493	3.103	0.520	0.359	0.642	0.946	0.758	0.285
V	21.349	19.335	22.078	30.406	32.266	31.616	28.888	25.918	24.577	30.607	25.649	20.554	30.357	36.047
VI	8.329	10.945	11.986	9.774	13.396	12.784	11.388	13.161	16.388	11.283	12.219	11.553	10.740	8.442
VII	3.382	3.770	3.719	3.509	3.666	2.658	2.694	3.012	3.355	2.823	2.479	2.402	2.132	1.856
VIII	0.113	0.179	0.300	0.437	0.401	0.390	0.496	0.443	0.370	0.366	0.365	0.365	0.316	0.394
IX	1.081	1.290	1.126	1.091	0.875	0.907	0.620	0.792	0.666	0.696	1.025	0.107	0.929	0.973
X	2.664	2.453	2.156	2.475	1.851	1.789	1.915	1.811	2.217	2.084	2.237	2.049	1.684	1.814
XI	2.032	2.437	2.189	2.126	1.726	2.211	2.320	2.957	2.558	2.005	2.022	2.034	2.266	2.309
XII	0.063	0.059	0.065	0.083	0.086	0.084	0.111	0.108	0.103	0.079	0.076	0.077	0.070	0.069
XIII	0.456	0.570	0.482	0.480	0.457	0.413	0.304	0.470	0.399	0.330	0.364	0.397	0.348	0.367
XIV	9.159	11.317	12.137	8.924	10.168	12.239	12.441	8.306	7.979	10.139	15.895	21.358	20.592	19.149
XV	11.556	12.783	13.315	11.494	8.668	8.600	7.741	9.193	8.592	8.793	7.847	6.056	4.972	4.223
XVI	17.489	15.604	14.736	13.825	11.518	11.793	13.015	14.997	16.664	14.968	15.566	14.153	12.425	14.063
XVII	3.417	2.669	4.220	3.966	1.916	2.114	5.444	3.908	2.925	3.798	2.538	1.905	2.294	1.883
XVIII	2.266	2.452	2.565	2.573	2.030	2.290	1.997	1.893	1.995	1.543	2.020	2.252	1.968	1.958
XIX	0.003	0.000	0.002	0.001	0.001	0.002	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.001

**Annex 7: Export Share of HS-industries at 2-digit level**

Year	1987-88	1988-89	1989-90	1990-91	1991-92	92-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
Code														
1	0.006	0.004	0.004	0.001	0.002	0.003	0.007	0.003	0.008	0.006	0.001	0.003	0.003	0.004
2	0.570	0.430	0.415	0.431	0.524	0.433	0.493	0.478	0.580	0.584	0.612	0.554	0.508	0.717
3	3.355	2.817	2.453	2.932	3.240	2.910	3.619	4.245	3.155	3.344	3.433	3.107	3.199	3.096
4	0.026	0.015	0.012	0.014	0.047	0.042	0.031	0.057	0.048	0.099	0.090	0.067	0.075	0.103
5	0.279	0.263	0.241	0.227	0.204	0.181	0.174	0.147	0.137	0.156	0.144	0.116	0.106	0.096
6	0.011	0.021	0.026	0.024	0.034	0.025	0.027	0.037	0.057	0.053	0.067	0.076	0.074	0.065
7	0.479	0.472	0.470	0.460	0.546	0.394	0.449	0.480	0.519	0.483	0.617	0.477	0.597	0.596
8	2.519	1.739	1.741	1.684	1.926	1.621	1.869	1.855	1.486	1.402	1.418	1.484	1.977	1.348
9	7.424	5.154	5.411	4.623	4.129	13.833	2.762	2.837	2.817	2.573	3.239	3.396	2.703	1.929
10	2.414	1.534	1.561	1.529	2.065	0.162	1.894	1.547	4.665	3.302	2.608	4.515	1.989	1.673
11	0.020	0.003	0.003	0.003	0.007	0.006	0.016	0.016	0.341	0.479	0.044	0.026	0.016	0.088
12	0.645	0.662	1.054	0.873	0.588	0.496	0.599	0.582	0.747	0.799	0.965	0.611	0.697	0.750
13	0.936	0.564	0.468	0.434	0.477	0.410	0.460	0.388	0.494	0.576	0.723	0.872	0.795	0.529
14	0.133	0.122	0.113	0.104	0.084	0.054	0.054	0.054	0.051	0.045	0.040	0.047	0.041	0.041
15	0.136	0.063	0.285	0.270	0.406	0.277	0.472	0.603	0.848	0.585	0.506	0.512	0.714	0.522
16	0.004	0.006	0.001	0.003	0.008	0.006	0.012	0.018	0.011	0.024	0.008	0.007	0.025	0.010
17	0.080	0.050	0.126	0.119	0.363	0.609	0.263	0.085	0.498	0.923	0.216	0.036	0.043	0.269
18	0.006	0.011	0.012	0.010	0.009	0.002	0.004	0.009	0.008	0.008	0.007	0.007	0.008	0.007
19	0.100	0.079	0.073	0.068	0.089	0.092	0.091	0.084	0.098	0.092	0.090	0.080	0.086	0.088
20	0.119	0.093	0.119	0.092	0.098	0.093	0.124	0.129	0.130	0.093	0.100	0.114	0.115	0.152
21	0.141	0.149	0.176	0.142	0.090	0.185	0.210	0.216	0.316	0.314	0.381	0.380	0.278	0.279
22	0.011	0.038	0.045	0.100	0.090	0.071	0.066	0.057	0.043	0.170	0.057	0.051	0.045	0.084
23	1.380	1.866	2.229	1.881	2.109	2.464	3.365	2.216	2.232	2.982	2.703	1.444	1.069	1.039
24	0.866	0.573	0.649	0.813	0.858	0.800	0.661	0.309	0.421	0.637	0.825	0.547	0.640	0.429
25	1.024	0.955	1.047	1.014	0.999	0.941	1.172	1.217	0.986	0.951	0.688	0.659	0.941	1.003
26	3.881	3.613	3.940	3.604	3.622	2.121	2.228	1.860	1.898	1.732	1.620	1.365	0.965	1.036
27	4.213	2.358	2.642	2.925	2.369	2.564	2.228	1.951	1.659	1.544	1.130	0.426	0.288	4.344
28	0.246	1.036	1.446	0.948	0.660	0.591	0.686	0.608	0.653	0.701	0.597	0.477	0.436	0.530
29	0.777	1.151	1.306	1.397	1.857	1.569	1.874	2.421	2.623	3.210	3.481	3.447	3.756	3.891
30	1.455	10.483	2.447	2.368	2.514	1.686	1.918	1.915	1.915	2.009	2.236	2.203	2.352	2.126
31	0.014	0.003	0.002	0.001	0.031	0.006	0.020	0.086	0.090	0.071	0.020	0.021	0.007	0.021
32	1.237	1.144	1.281	1.308	1.446	1.311	1.391	1.452	1.143	1.311	1.383	1.168	1.220	1.164

33	0.511	0.609	0.684	0.865	0.816	0.381	0.454	0.507	0.408	0.443	0.454	0.478	0.468	0.480
34	0.052	0.160	0.680	0.494	0.633	0.089	0.233	0.213	0.135	0.104	0.089	0.077	0.088	0.061
35	0.009	0.006	0.006	0.008	0.018	0.019	0.021	0.023	0.034	0.052	0.036	0.062	0.087	0.119
36	0.015	0.015	0.015	0.014	0.022	0.028	0.031	0.040	0.036	0.053	0.043	0.024	0.028	0.030
37	0.125	0.127	0.119	0.057	0.073	0.077	0.046	0.052	0.048	0.058	0.105	0.124	0.123	0.093
38	0.203	0.369	0.414	0.404	0.550	0.430	0.406	0.535	0.662	0.781	1.005	0.974	0.944	1.004
39	0.236	0.288	0.384	0.440	0.459	0.519	1.116	1.451	1.454	1.200	1.097	0.979	1.167	1.577
40	0.548	0.474	0.743	0.767	0.678	1.114	0.885	1.148	1.013	1.010	0.987	0.911	0.817	0.817
41	3.805	3.091	2.700	2.505	1.660	1.364	1.216	1.456	1.170	0.901	0.848	0.811	0.659	0.860
42	1.777	1.721	2.368	2.885	3.051	3.074	2.795	2.836	2.667	2.355	2.537	2.652	2.266	2.169
43	0.002	0.005	0.000	0.002	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
44	0.114	0.089	0.086	0.079	0.091	0.064	0.225	0.166	0.115	0.125	0.092	0.068	0.071	0.074
45	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.003
46	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.002	0.002	0.002	0.006	0.005	0.004	0.003
47	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.001	0.003
48	0.044	0.053	0.061	0.078	0.100	0.131	0.145	0.265	0.357	0.304	0.228	0.237	0.310	0.402
49	0.164	0.084	0.132	0.108	0.101	0.098	0.689	0.117	0.118	0.128	0.103	0.137	0.138	0.137
50	0.824	0.795	0.702	0.641	0.719	0.606	0.512	0.491	0.397	0.368	0.502	0.511	0.590	0.636
51	0.081	0.124	0.069	0.039	0.144	0.164	0.190	0.200	0.171	0.297	0.318	0.225	0.124	0.126
52	7.023	4.265	4.611	7.321	6.293	5.199	6.063	6.493	6.282	8.451	7.527	6.095	6.000	5.418
53	1.121	0.753	0.702	0.634	0.602	0.414	0.357	0.449	0.363	0.330	0.426	0.327	0.253	0.323
54	0.598	0.542	0.845	0.927	1.223	1.110	1.164	1.491	1.308	1.038	1.075	0.927	1.015	1.154
55	0.152	0.336	0.552	0.433	0.641	0.646	0.605	0.727	0.978	0.954	1.085	1.020	1.041	1.086
56	0.027	0.022	0.030	0.033	0.038	0.055	0.066	0.075	0.080	0.087	0.092	0.123	0.151	0.114
57	3.142	2.691	2.656	2.503	2.928	2.752	2.717	2.320	1.968	1.949	1.747	1.853	1.909	1.435
58	0.083	0.076	0.111	0.114	0.174	0.174	0.189	0.154	0.105	0.122	0.370	0.360	0.403	0.443
59	0.071	0.070	0.078	0.099	0.083	0.104	0.129	0.117	0.126	0.167	0.115	0.122	0.112	0.093
60	0.060	0.118	0.296	0.401	0.305	0.272	0.226	0.278	0.218	0.176	0.120	0.111	0.080	0.075
61	3.036	2.116	2.951	3.246	2.920	3.193	3.369	3.105	3.064	3.092	2.930	3.801	4.365	4.020
62	8.631	7.203	8.737	9.135	9.310	8.502	8.242	9.326	8.520	8.132	8.181	9.382	7.464	8.528
63	1.658	1.275	1.648	1.908	1.857	1.773	1.910	2.073	2.045	2.229	2.410	2.354	2.494	2.588
64	2.867	2.484	2.433	2.837	2.646	2.067	2.236	2.145	1.872	1.712	1.540	1.762	1.667	1.443
65	0.002	0.003	0.002	0.010	0.014	0.017	0.015	0.013	0.009	0.008	0.009	0.013	0.010	0.012
66	0.001	0.001	0.001	0.001	0.007	0.003	0.006	0.004	0.003	0.002	0.003	0.003	0.001	0.001
67	0.008	0.018	0.020	0.016	0.018	0.017	0.012	0.019	0.035	0.039	0.037	0.074	0.079	0.095
68	0.158	0.199	0.201	0.255	0.377	0.384	0.499	0.633	0.627	0.671	0.676	0.635	0.697	0.711



**Annex 8: Import Share of HS-industries at 2-digit level**

Year	1987-88	1988-89	1989-90	1990-91	1991-92	92-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01
Code														
1	0.0086	0.0064	0.0000	0.0042	0.0048	0.0047	0.0036	0.0035	0.0028	0.0021	0.0018	0.0008	0.0009	0.0006
2	0.0004	0.0001	0.0000	0.0000	0.0000	0.0017	0.0001	0.0000	0.0000	0.0002	0.0000	0.0000	0.0001	0.0002
3	0.0002	0.0001	0.0000	0.0000	0.0001	0.0004	0.0057	0.0034	0.0216	0.0122	0.0277	0.0352	0.0161	0.0133
4	0.6468	0.3920	0.1619	0.0088	0.0544	0.0744	0.0242	0.0351	0.0502	0.0040	0.0195	0.0240	0.0560	0.0231
5	0.0114	0.0123	0.0133	0.0087	0.0154	0.0089	0.0148	0.0216	0.0179	0.0148	0.0168	0.0236	0.0261	0.0260
6	0.0001	0.0007	0.0004	0.0002	0.0023	0.0007	0.0043	0.0123	0.0214	0.0253	0.0124	0.0041	0.0015	0.0009
7	1.2744	1.4937	0.7168	0.1411	0.6249	0.5238	0.8139	0.6980	0.5605	0.6781	0.8344	0.4597	0.2026	0.2238
8	0.5751	0.4410	0.4863	0.5700	0.7662	0.8655	0.9567	1.1223	0.8617	0.8233	0.8706	0.9271	0.8465	0.7615
9	0.0539	0.1600	0.0362	0.0484	0.0580	3.0268	0.0785	0.0469	0.0529	0.0630	0.0895	0.1827	0.1109	0.1123
10	0.0507	2.4264	0.7778	0.1467	0.0233	1.1998	0.2472	0.0104	0.0084	0.2910	0.6417	0.6625	0.4348	0.0156
11	0.0061	0.0056	0.0015	0.0014	0.0003	0.0004	0.0008	0.0026	0.0017	0.0033	0.0036	0.0347	0.0380	0.0227
12	0.0706	0.0551	0.0288	0.0392	0.0663	0.0512	0.0446	0.0478	0.0543	0.0304	0.0334	0.0513	0.0570	0.0514
13	0.0877	0.0833	0.0778	0.1144	0.0726	0.0752	0.0985	0.0799	0.0656	0.0732	0.0727	0.0625	0.0598	0.0489
14	0.0025	0.0022	0.0016	0.0008	0.0019	0.0017	0.0028	0.0024	0.0023	0.0032	0.0031	0.0043	0.0078	0.0028
15	4.5687	2.7601	0.7099	0.8648	0.7147	0.4394	0.4725	0.9790	2.0137	2.2095	1.8160	4.5447	4.0060	2.7927
16	0.0003	0.0000	0.0000	0.0000	0.0001	0.0000	0.0001	0.0013	0.0001	0.0001	0.0001	0.0000	0.0001	0.0003
17	0.9051	0.0175	0.2892	0.0388	0.0187	0.0215	0.0258	2.5663	0.1841	0.0175	0.3245	0.6455	0.5484	0.0317
18	0.0009	0.0000	0.0000	0.0000	0.0061	0.0091	0.0033	0.0055	0.0160	0.0271	0.0183	0.0240	0.0180	0.0187
19	0.2459	0.3053	0.3262	0.2869	0.3390	0.2791	0.1495	0.0853	0.0544	0.0595	0.0608	0.0217	0.0197	0.0224
20	0.0025	0.0002	0.0000	0.0001	0.0000	0.0001	0.0001	0.0010	0.0024	0.0011	0.0039	0.0122	0.0160	0.0171
21	0.0776	0.0073	0.0029	0.0449	0.0626	0.1092	0.1992	0.2347	0.1394	0.1337	0.1396	0.1230	0.0848	0.1038
22	0.0190	0.0232	0.0313	0.0238	0.0133	0.0144	0.0164	0.0312	0.0323	0.0209	0.0425	0.0310	0.0250	0.0216
23	0.0257	0.0134	0.0040	0.0119	0.0230	0.0368	0.0898	0.1676	0.0772	0.0834	0.0458	0.0708	0.0528	0.0547
24	0.0068	0.0069	0.0072	0.0041	0.0036	0.0027	0.0092	0.0107	0.0139	0.0159	0.0067	0.0174	0.0075	0.0091
25	1.8088	2.0397	2.0846	1.9403	2.0530	1.6221	1.1795	1.3817	1.1460	0.8828	0.9238	0.9275	0.9448	0.8671
26	0.3006	0.3168	0.4407	0.4786	0.3030	0.4157	0.3400	0.6223	0.5022	0.4245	0.4564	0.4907	0.5880	0.5695
27	19.2400	16.9784	19.5522	27.9872	29.9099	28.6424	27.3684	23.9138	22.9287	29.2993	24.2691	19.1355	29.4130	34.6122
28	1.8585	2.8741	2.2215	2.0368	4.2655	3.4897	2.0372	2.6745	2.2995	2.3410	2.9110	3.0570	2.7429	2.1428
29	3.2358	4.1760	3.7539	3.7743	3.3513	3.7028	4.5253	5.5547	8.4160	5.0446	4.7963	3.8683	3.5778	3.1557
30	0.4264	0.3728	0.7255	0.6691	0.5731	0.3544	0.2735	0.2435	0.2765	0.1644	0.2964	0.3224	0.2840	0.2970
31	0.8448	1.7385	3.4970	1.3359	3.3243	3.0980	2.7061	2.6913	3.6490	1.7525	2.0354	1.9310	2.2125	0.8777
32	0.3984	0.3244	0.4019	0.4006	0.3281	0.3058	0.3895	0.4913	0.4038	0.4345	0.4359	0.4441	0.3999	0.3773

33	0.1221	0.0987	0.1024	0.1887	0.1760	0.0526	0.0726	0.0770	0.0652	0.0680	0.0975	0.1094	0.1484	0.1560
34	0.1154	0.1216	0.1318	0.1491	0.1729	0.1390	0.1593	0.1820	0.1661	0.1648	0.1859	0.1916	0.1959	0.2034
35	0.0713	0.0747	0.0815	0.0763	0.0490	0.0570	0.0602	0.0636	0.0560	0.0514	0.0723	0.0683	0.0609	0.0640
36	0.0097	0.0109	0.0086	0.0046	0.0081	0.0094	0.0033	0.0025	0.0031	0.0025	0.0032	0.0020	0.0024	0.0057
37	0.3855	0.5001	0.4555	0.4637	0.4464	0.4599	0.4711	0.4971	0.4229	0.3840	0.4065	0.3991	0.3459	0.3863
38	0.8608	0.6528	0.6068	0.6750	0.7018	0.7373	0.6900	0.6838	0.6301	0.8757	0.9783	1.1603	0.9777	0.7763
39	2.6187	2.9759	2.9822	2.7317	3.0330	1.9568	1.9746	2.3659	2.5076	2.1331	1.7947	1.7405	1.6193	1.2969
40	0.7636	0.7940	0.7364	0.7775	0.6326	0.6223	0.7193	0.6457	0.8476	0.6900	0.6848	0.6615	0.5543	0.5592
41	0.0971	0.1583	0.2832	0.4307	0.3898	0.3652	0.4812	0.4141	0.3487	0.3365	0.3543	0.3549	0.3116	0.3770
42	0.0027	0.0042	0.0047	0.0031	0.0083	0.0054	0.0034	0.0046	0.0061	0.0111	0.0051	0.0050	0.0073	0.0155
43	0.0135	0.0164	0.0118	0.0037	0.0033	0.0074	0.0118	0.0247	0.0147	0.0179	0.0059	0.0046	0.0029	0.0020
44	1.0747	1.2732	1.1090	1.0799	0.8682	0.8730	0.6146	0.7857	0.6601	0.6909	1.0194	0.1027	0.9433	0.9687
45	0.0064	0.0170	0.0174	0.0116	0.0067	0.0075	0.0057	0.0066	0.0057	0.0050	0.0053	0.0047	0.0040	0.0037
46	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0005
47	1.0721	0.9168	0.8705	1.0873	0.6240	0.6263	0.6792	0.7097	0.7271	0.5923	0.6845	0.5609	0.5230	0.5569
48	1.2136	1.0713	0.9873	1.0827	1.0193	0.7859	0.9504	0.8635	1.2496	1.2727	1.1910	1.0849	0.8993	0.8763
49	0.3784	0.4645	0.2982	0.3054	0.2081	0.3243	0.2850	0.2379	0.2403	0.2193	0.3611	0.4028	0.2948	0.3805
50	0.2627	0.2537	0.3114	0.2915	0.3679	0.3977	0.4167	0.4415	0.2762	0.2139	0.1839	0.1864	0.2269	0.2453
51	0.7578	0.7286	0.6700	0.5683	0.4948	0.5333	0.5703	0.1334	0.4779	0.5166	0.4593	0.3135	0.2515	0.2174
52	0.1198	0.4535	0.1463	0.1358	0.0873	0.4068	0.1070	0.6367	0.4758	0.0924	0.1621	0.3554	0.6440	0.5724
53	0.0640	0.0532	0.0455	0.0688	0.0403	0.0316	0.1061	0.1248	0.0570	0.0682	0.0580	0.0924	0.0931	0.0702
54	0.3910	0.4584	0.4625	0.5355	0.2533	0.2347	0.4260	0.5019	0.3218	0.2316	0.2117	0.2816	0.3905	0.3744
55	0.1754	0.1567	0.2297	0.1842	0.1893	0.2056	0.2922	0.6274	0.4933	0.3816	0.3969	0.2494	0.1540	0.1797
56	0.0312	0.0377	0.0355	0.0429	0.0492	0.0427	0.0536	0.0694	0.0663	0.0697	0.0711	0.0694	0.0508	0.0522
57	0.0000	0.0000	0.0001	0.0000	0.0001	0.0008	0.0003	0.0016	0.0022	0.0041	0.0055	0.0138	0.0133	0.0181
58	0.0172	0.0169	0.0232	0.0217	0.0240	0.0249	0.0388	0.0729	0.0460	0.0359	0.0458	0.0454	0.0398	0.0421
59	0.0430	0.0645	0.0670	0.0891	0.0880	0.0925	0.1691	0.1728	0.2113	0.2752	0.2853	0.2802	0.2302	0.2440
60	0.0395	0.0495	0.0568	0.0382	0.0158	0.0219	0.0151	0.0172	0.0216	0.0166	0.0248	0.0378	0.0808	0.0985
61	0.0009	0.0017	0.0016	0.0021	0.0015	0.0043	0.0042	0.0046	0.0027	0.0041	0.0051	0.0057	0.0078	0.0133
62	0.0001	0.0001	0.0005	0.0002	0.0012	0.0098	0.0030	0.0018	0.0020	0.0042	0.0077	0.0161	0.0253	0.0294
63	0.1292	0.1623	0.1390	0.1477	0.1134	0.1387	0.1174	0.1513	0.1040	0.0907	0.1052	0.0867	0.1022	0.1521
64	0.0399	0.0405	0.0442	0.0565	0.0641	0.0650	0.0926	0.0747	0.0693	0.0447	0.0555	0.0616	0.0519	0.0492
65	0.0001	0.0002	0.0001	0.0000	0.0001	0.0000	0.0001	0.0003	0.0004	0.0003	0.0004	0.0006	0.0003	0.0007
66	0.0222	0.0177	0.0203	0.0266	0.0213	0.0162	0.0183	0.0329	0.0330	0.0335	0.0202	0.0145	0.0170	0.0161
67	0.0004	0.0007	0.0000	0.0001	0.0002	0.0003	0.0002	0.0005	0.0002	0.0003	0.0003	0.0004	0.0021	0.0030
68	0.0531	0.0575	0.0699	0.0783	0.0777	0.0831	0.0744	0.0806	0.0759	0.0612	0.0660	0.0737	0.0572	0.0691



**Annex 9: India's export and import shares for selected trade partners**

Countries	1987-88		Share		2000-01		Share	
	Export	Import	Export	Import	Export	Import	Export	Import
<b>High income</b>		(Rs. Lakh)	(%)			(Rs. Lakh)	(%)	
USA	291601	200168	18.69	9.00	4250988	1377387	20.93	5.95
Japan	161166	212620	10.33	9.56	819799	841591	4.04	3.63
Germany	105562	215862	6.77	9.70	871460	803857	4.29	3.47
Singapore	24199	41927	1.55	1.88	400704	668780	1.97	2.89
France	37708	79757	2.42	3.58	465986	292744	2.29	1.26
Italy	49799	51260	3.19	2.30	597896	330564	2.94	1.43
Netherlands	27883	44245	1.79	1.99	402065	199885	1.98	0.86
UK	100193	182849	6.42	8.22	1050153	1447247	5.17	6.25
Australia	17946	50336	1.15	2.26	185419	485515	0.91	2.10
Canada	16543	29874	1.06	1.34	299905	181400	1.48	0.78
<b>Low and middle income</b>								
Countries	1987-88		Share		2000-01		Share	
	Export	Import	Export	Import	Export	Import	Export	Import
		(Rs. Lakh)	(%)			(Rs. Lakh)	(%)	
Korea	14571	33341	0.93	1.50	205935	408309	1.01	1.76
Russia	196235	160777	12.58	7.23	406139	236490	2.00	1.02
China	1869	15415	0.12	0.69	379776	686270	1.87	2.96
Thailand	8195	6484	0.53	0.29	242184	154379	1.19	0.67
Malaysia	9018	84055	0.58	3.78	277831	537614	1.37	2.32
Indonesia	2683	6958	0.17	0.31	182624	415839	0.90	1.80
Brazil	263	35565	0.02	1.60	103267	66319	0.51	0.29



**Annex 10: The Concordance between NIC Codes (3-digit) and HS Codes (2-digit)**

<i>20-21: Manufacture of Food Products</i>					
NIC	HS	NIC	HS	NIC	HS
200	2	207	17	214	9
201	4	208	25	215	20
202	20	209	18	216	22
203	16	210	15	217	23
204	11	211	15	218	17
205	19	212	15	219	9
206	17	213	9		
<i>22: Manufacture of Beverages, Tobacco and related Products</i>					
NIC	HS	NIC	HS	NIC	HS
220	22	224	22	228	24
221	22	225	24	229	21
222	22	226	24		
223	22	227	24		
<i>23: Manufacture of Cotton Textiles</i>					
NIC	HS	NIC	HS	NIC	HS
230	52	233	52	236	52
231	52	234	52		
232	52	235	52		
<i>24: Manufacture of Wool, Silk and Man-made Fibre Textiles</i>					
NIC	HS	NIC	HS	NIC	HS
240	51	243	51	246	50
241	51	244	50	247	54
242	51	245	50	248	54
<i>25: Manufacture of Jute and other Vegetable Fibre Textiles (Except Cotton)</i>					
NIC	HS	NIC	HS	NIC	HS
250	53	254	53	258	53
251	53	255	53	259	53
252	53	256	53		
253	53	257	53		
<i>26: Manufacture of Textile Products (including Wearing Apparel)</i>					
NIC	HS	NIC	HS	NIC	HS
260	61	264	57	268	59
261	58	265	62	269	58
262	58	266	62		
263	57	267	63		
<i>27: Manufacture of Wood and Wood Products; Furniture and Fixtures</i>					
NIC	HS	NIC	HS	NIC	HS
270	44	273	44	276	94
271	44	274	44	277	94
272	44	275	45	279	44
<i>28: Manufacture of Paper and Paper products and Printing, Publishing and Allied Industries</i>					
NIC	HS	NIC	HS	NIC	HS
280	48	284	49	288	49
281	48	285	49	289	49
282	48	286	49		
283	48	287	49		
<i>29: Manufacture of Leather and Products of Leather, Fur and Substitutes of Leather</i>					
NIC	HS	NIC	HS	NIC	HS
290	41	293	42	296	43

291	64	294	43	299	42
292	42	295	43		
<i>30: Manufacture of Basic Chemicals and Chemical Products (Except Products of Petroleum and Coal)</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
300	29	304	29	308	93
301	31	305	33	309	38
302	39	306	55		
303	32	307	36		
<i>31: Manufacture of Rubber, Plastic, Petroleum and Coal Products, Processing of Nuclear Fuels</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
310	40	313	39	316	27
311	64	314	27	318	27
312	40	315	27	319	27
<i>32: Manufacture of Non-Metallic Mineral Products</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
320	69	323	69	326	68
321	70	324	25	327	68
322	69	325	68	329	68
<i>33: Basic Metal and Alloy Industries</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
330	72	334	74	338	72
331	72	335	76	339	81
332	72	336	79		
333	74	337	72		
<i>34: Manufacture of Metal Products and Part, Except Machinery and Equipment</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
340	73	343	82	346	82
341	73	344	83	349	83
342	94	345	83		
<i>35-36: Manufacture of Machinery and Equipment other than Transport Equipment (Manufacture of Scientific Equipment, Photographic/Cinematographic Equipment and Watches &amp; Clocks in 38)</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
350	84	357	84	364	84
351	84	358	84	365	85
352	84	359	84	366	85
353	84	360	85	367	84
354	84	361	85	368	84
355	84	362	85	369	85
356	84	363	85		
<i>37: Manufacture of Transport Equipment and Parts</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
370	89	374	87	378	87
371	86	375	87	379	84
371	86	376	87		
373	87	377	88		
<i>38: Other Manufacturing Industries</i>					
<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>	<b>NIC</b>	<b>HS</b>
380	90	384	71	388	84
381	90	385	95	389	96
382	91	386	92		
383	71	387	48		

(Modified upon the Concordance developed by Debroy and Santhanam (1993))

**Annex 11: Trade Share at 4-digit level**

Commodity Groups	1987-88		2000-01		
	Export Share	Import Share	Export Share	Import Share	
<b>39: Plastic Products</b>					
3901	Ethylene Polymers	6.736	42.360	7.851	18.770
3902	Propylene Polymers	1.066	8.868	20.585	8.602
3903	Styrene Polymers	2.093	4.420	3.644	2.847
3904	Vinyl Polymers	0.502	22.612	5.587	4.245
3905	Vinyl Acetate Polymers	0.018	2.817	0.488	3.372
3906	Acrylic Polymers (primary form)	0.774	0.570	0.596	2.815
3907	Polyacetals	1.041	2.924	7.593	13.107
3908	Polyamidess (primary form)	0.965	0.455	0.079	3.262
3909	Amino and Phenolic Resins	0.547	1.009	1.452	2.266
3910	Silicons (primary form)	0.207	1.246	0.234	2.098
3911	Petroleum Resins	0.358	0.577	0.059	0.766
3912	Cellulose and Chem. Derivatives	0.661	0.664	0.804	2.515
3913	Natural Polymers	0.527	0.576	0.220	0.312
3914	Polymers based ion exchangers	1.081	0.084	0.510	0.103
3915	Waste, Parings and Plastic Scrap	0.409	0.716	0.100	2.576
3916	Monofilament	0.351	0.124	0.434	0.332
3917	Tubes, Pipes and Hoses	2.637	0.497	2.309	3.730
3918	Plastic Floor Coverings	0.089	0.026	0.764	0.308
3919	Plastic Self Adhesive Plates	0.611	0.961	0.193	2.332
3920	Other Plates, Sheets of Plastic	32.372	4.742	16.925	6.441
3921	Other Plates, Sheets, Film Foil	1.509	0.848	2.125	3.621
3922	Baths, Shower Baths, Wash Basins	0.737	0.001	0.359	0.176
3923	Articles for Conveyance	12.824	0.946	13.891	4.648
3924	Tableware, Kitchenware	3.865	0.002	2.685	0.209
3925	Plastic Buildersware	0.514	0.016	0.404	0.218
3926	Other Plastic Articles	27.505	1.938	10.110	10.329
<b>40: Rubber Products</b>					
4001	Natural Rubber	0.167	38.207	0.872	2.346
4002	Synthetic Rubber	0.310	32.637	1.034	51.384
4003	Reclaimed Rubber (primary form)	0.304	0.028	0.379	0.005
4004	Waste, Pairing and rubber scrap	0.000	0.022	0.107	0.074
4005	Compounded Rubber	0.672	0.241	0.699	0.607
4006	Other forms	0.930	0.087	0.315	0.309
4007	Vulcanised Rubber, thread and cords	0.023	1.099	0.444	0.268
4008	Plates, Sheets, strips, rods	0.257	1.040	2.753	1.352
4009	Tubes, Pipes and Hoses	2.681	3.044	1.098	6.764
4010	Conveyor Transmission Belts	15.729	3.823	5.395	4.269
4011	New Pneumatic Rubber Tyres	62.830	5.041	55.381	4.334
4012	Used Pneumatic Tyres	6.371	0.171	2.868	0.367
4013	Rubber Inner tubes	3.117	0.010	5.488	0.105
4014	Hygenic or Pharmaceutical articles	2.519	2.633	8.328	0.288
4015	Apparel and clothing	0.736	0.002	3.247	0.324
4016	Other articles of Vulcanised Rubber	2.959	11.394	11.173	26.545
4017	Hard Rubber	0.395	0.523	0.421	0.658
<b>41: Raw hides and skins</b>					
4101	Raw hides and skins (bovine)	0.000	22.243	0.027	14.603
4102	Raw hides and skins (lamb)	0.000	2.709	0.002	11.599
4103	Other raw hides and skins	0.000	5.757	0.008	3.244
4104	Leather of bovine or equine animals	41.550	42.853	41.763	51.491
4105	Sheep or lamb	13.888	1.151	7.487	11.043
4106	Goat or kid skin leather	42.214	19.660	50.083	3.876
4107	Leather of other animals	2.335	3.416	0.162	3.594
4108	Chamois	0.000	0.000	0.166	0.002
4109	Patent leather and patent laminated	0.000	1.269	0.284	0.066
4110	Pairings and other wastes of leather	0.007	0.660	0.014	0.342
4111	Composition leather	0.005	0.280	0.005	0.139
<b>42: Articles of Leather</b>					

4201	Saddlery and harness	5.344	0.295	4.455	0.627
4202	Trunk, Suitcases, Vanitycases	39.446	0.000	35.698	73.225
4203	Apparel and clothing	44.817	0.000	52.387	12.933
4204	Leather Articles	8.534	71.841	7.342	5.034
4205	Other Leather Articles	1.839	25.046	0.113	8.014
4206	Articles of Gut	0.020	2.818	0.006	0.167
<b>71: Gems and Jewelry</b>					
7101	Pearls	0.318	0.498	0.035	0.043
7102	Diamonds	93.912	96.069	83.248	48.562
7103	Perecious Stones	2.211	2.443	2.556	1.206
7104	Synthetic stones	0.047	0.069	0.039	0.026
7105	Dust or Powders of Natural stones	0.051	0.227	0.380	0.121
7106	Silver	0.161	0.079	0.001	6.039
7107	Base Metal Clad with Silver	0.000	0.002	0.000	0.000
7108	Gold	0.000	0.004	0.000	42.943
7109	Base Metal or Silver	0.000	0.000	0.000	0.023
7110	Platinum	0.046	0.081	0.227	0.235
7111	Base Metals, Silver or Gold	0.000	0.000	0.000	0.000
7112	Waste and Scrap	0.000	0.000	0.004	0.002
7113	Jewelry	3.059	0.000	12.838	0.517
7114	Goldsmithwares	0.028	0.009	0.046	0.001
7115	Other articles of precious metals	0.005	0.005	0.036	0.001
7116	Pearl and stone articles	0.007	0.000	0.003	0.000
7117	Imitation Jewelry	0.154	0.030	0.584	0.007
7118	Coin	0.000	0.486	0.002	0.274
<b>72: Iron and Steel</b>					
7201	Pig iron	0.776	1.371	3.335	0.054
7202	Ferro-alloys	63.938	3.856	8.611	6.428
7203	Ferrous Products	0.029	0.725	0.084	0.867
7204	Remelting Scrap ingots	1.268	26.836	0.069	33.114
7205	Granules and Powders	0.249	0.316	0.139	0.731
7206	Iron and non-alloy steel	0.808	0.480	2.343	0.125
7207	Semi-finished iron products	2.705	3.266	0.971	8.478
7208	Flat-rolled iron Products	1.442	12.988	14.941	16.340
7209	Flat-rolled iron Products	1.378	18.863	8.261	7.063
7210	Flat-rolled iron Products	10.019	6.997	24.288	0.653
7211	Flat-rolled iron Products	0.419	1.010	1.340	1.338
7212	Flat-rolled iron Products	0.157	0.638	1.312	1.338
7213	Bars and Rods	0.258	1.089	1.565	0.362
7214	Other iron Bars and Rods	3.455	0.549	0.693	0.276
7215	Other iron Bars and Rods	0.152	0.259	1.501	0.135
7216	Angles, Shapes	0.134	1.649	0.335	1.386
7217	Iron Ware	2.647	1.014	1.332	0.586
7218	Stainless Steel	0.076	0.163	0.620	1.966
7219	Flat-rolled Products	0.489	3.531	2.548	5.704
7220	Flat-rolled Products	0.482	1.459	0.902	0.694
7221	Bars and Rods	0.743	0.186	2.903	0.309
7222	Other Bars and Rods (Stainless Steel)	2.541	0.464	5.470	1.137
7223	Stainless Steel Ware	0.162	0.552	3.579	0.548
7224	Semi-finished products	0.157	0.330	0.601	0.305
7225	Flat-rolled Products	0.597	8.281	5.378	4.650
7226	Flat-rolled Products	0.026	0.610	4.043	1.571
7227	Bars and Rods	0.058	0.852	0.149	1.113
7228	Other Bars	3.911	1.369	2.382	1.933
7229	Ware of other alloy steel	0.925	0.297	0.307	0.797
<b>73: Articles of Iron and Steel</b>					
7301	Sheet piling (iron or steel)	0.615	0.608	0.336	0.480
7302	Track (Railway/Tramway)	0.895	29.228	0.157	1.907
7303	Tubes, Pipes	0.782	1.267	0.518	0.652
7304	Tubes, Pipes	1.126	35.346	0.352	19.998
7305	Other Tubes, Pipes	8.688	2.575	0.321	2.957
7306	Other Tubes, Pipes and hollow	9.761	5.145	3.829	5.154
7307	Tube or Pipe fittings	5.038	6.001	4.895	7.697

7308	Structures	9.796	4.062	8.357	3.213
7309	Reservoirs, tanks, vats	1.108	0.209	0.219	0.385
7310	Tanks, Casks, Cans	1.196	0.479	0.681	1.290
7311	Containers	0.844	2.022	0.523	2.175
7312	Stranded wares, ropes, cables	6.218	0.620	3.639	3.673
7313	Bar (iron or steel wares)	1.250	0.002	0.034	0.188
7314	Cloth	0.633	0.034	0.385	0.442
7315	Chain and parts thereof	1.016	1.061	1.420	2.661
7316	Anchors, Grapnels	0.035	0.018	0.063	0.186
7317	Nails, Drawing pins	0.472	0.138	0.221	0.139
7318	Screws, Bolts, Nuts	8.797	2.252	8.217	13.947
7319	Sewing needles	2.897	0.162	0.557	0.663
7320	Springs, and leaves for springs	0.783	1.632	3.424	3.494
7321	Stoves, cookers	0.238	0.021	0.288	0.709
7322	Radiators for central heating	0.466	0.008	0.072	0.074
7323	Table, kitchen	8.140	0.016	32.432	0.772
7324	Sanitary wares and parts	0.806	0.013	0.652	0.182
7325	Other cast iron articles	8.181	0.377	16.765	0.346
7326	Other iron articles	20.221	6.703	11.642	26.618
<b>84: Machinery and Equipment</b>					
8401	Nuclear Reactors	0.072	0.099	0.063	0.000
8402	Steam	2.075	0.993	0.675	0.064
8403	Central Heating Boilers	0.148	0.997	0.227	0.014
8404	Auxiliary Plants	0.094	0.354	0.143	0.035
8405	Producer or Water gas generator	0.005	0.324	0.137	0.060
8406	Steam turbines	0.066	2.100	0.119	1.281
8407	Spark ignitions	1.055	0.072	0.602	0.658
8408	Compression Ignitions	2.272	0.733	5.485	0.677
8409	Parts	10.831	2.193	7.672	3.150
8410	Hydraulic Turbines	0.009	0.084	0.206	0.827
8411	Turbojets	0.234	1.874	0.371	1.739
8412	Other engines and motors	0.105	0.416	0.399	0.480
8413	Pumps	4.276	2.937	5.365	2.692
8414	Air or vacuum pumps	7.276	4.198	4.217	2.612
8415	AC machines	0.094	0.657	0.712	0.978
8416	Furnace burners	0.021	0.231	0.072	0.238
8417	Industrial or laboratory furnaces	0.093	0.787	0.110	0.730
8418	Refrigerators, freezers	0.288	0.316	1.176	1.207
8419	Machinery, plant	1.819	2.812	1.683	1.316
8420	Calendering	0.006	0.091	0.182	0.051
8421	Centrifuges	0.298	1.113	1.961	1.878
8422	Dishwashers	1.220	0.816	1.292	0.762
8423	Weighing Machinery	0.264	0.117	0.171	0.079
8424	Mechanical Appliances	0.552	0.416	0.336	0.373
8425	Puley tackle and hoists	0.409	0.095	0.082	0.120
8426	Sheeps, derrick	0.244	0.655	0.258	0.778
8427	Forklift trucks	0.015	0.181	0.113	0.091
8428	Other lifting	2.399	0.441	0.426	0.525
8429	Self-propelled bulldozers	0.072	0.275	0.277	0.584
8430	Other machines	0.784	2.706	0.214	0.831
8431	Parts	1.607	11.245	0.739	1.740
8432	Agricultural, Horticultural machinery	1.006	0.045	0.915	0.125
8433	Harvesting or Threshing	0.082	0.063	0.089	0.134
8434	Milking machines	0.109	0.287	0.037	0.108
8435	Presses, crushers	0.142	0.006	0.118	0.003
8436	Other Agricultural machinery	0.315	0.159	0.208	0.017
8437	Machines for cleaning	1.176	0.433	0.559	0.135
8438	Machinery	0.506	0.341	0.807	0.244
8439	Machinery for making pulp	0.148	0.545	0.318	0.248
8440	Book binding machinery	0.063	0.096	0.033	0.042
8441	Other machinery	0.398	0.215	0.499	0.197
8442	Machinery, apparatus	0.204	0.460	0.321	0.224
8443	Printing Machinery	1.946	3.106	1.766	0.935

8444	Machinery for extruding, drawing	0.304	0.113	0.435	0.033
8445	Machinery for preparing textiles	4.582	1.032	1.914	1.288
8446	Weaving machines	0.800	0.777	0.250	0.733
8447	Knitting machines	0.513	0.220	0.166	1.647
8448	Auxiliary machinery for machines	5.274	3.801	3.474	1.476
8449	Machinery for manufacture	0.052	0.045	0.115	0.020
8450	Household or laundry type machines	0.004	0.087	0.245	0.329
8451	Articles and Machines	0.751	0.321	0.247	1.150
8452	Sewing machines	0.825	0.968	0.901	1.246
8453	Machinery	0.102	0.848	0.134	0.317
8454	Converters	0.105	0.482	0.444	0.722
8455	Metal rolling	0.329	1.426	1.531	1.178
8456	Machine tools	0.188	0.056	0.101	0.131
8457	Machining Centres	0.027	0.114	0.020	0.515
8458	Lathe for removing metal	3.432	0.259	0.511	5.358
8459	Machine tools	2.067	1.381	0.413	0.618
8460	Gear finishing machines	2.159	0.903	0.264	0.460
8461	Machine tools	0.669	0.505	0.230	0.273
8462	Machine tools	1.407	0.652	0.628	0.840
8463	Other machine tools for metal	1.068	0.100	0.221	0.195
8464	Machine tools	0.033	0.119	0.079	0.161
8465	Machine tools	0.282	0.121	0.149	0.181
8466	Parts and accessories	4.755	3.725	3.428	0.996
8467	Tools	0.272	0.192	0.682	0.106
8468	Machinery	0.080	0.142	0.249	0.156
8469	Typewriters	0.170	0.003	0.425	0.004
8470	Calculators	0.075	0.006	0.075	0.167
8471	Automatic Data Processing	9.727	2.753	5.131	15.992
8472	Other office machines	0.034	0.046	0.377	0.436
8473	Parts and accessories	1.703	5.281	12.574	15.739
8474	Machinery for sorting	0.471	1.806	0.580	1.232
8475	Machine for assembling electric	0.011	0.217	0.100	0.327
8476	Automatic goods venders	0.006	0.053	0.032	0.052
8477	Machinery for working rubber	4.515	1.478	3.128	2.012
8478	Machinery for preparing tobacco	0.088	0.044	0.088	0.037
8479	Machines having individual function	5.649	7.478	6.179	2.983
8480	Moulding boxes	0.339	1.394	0.762	1.797
8481	Taps, corks, valves	0.954	4.811	4.973	2.800
8482	Ball, or roller bearings	0.289	3.640	3.676	2.872
8483	Transmission shafts	0.648	5.632	1.644	3.048
8484	Gaskets and similar joints	0.077	0.184	1.412	0.445
8485	Machinery Parts	0.365	0.788	0.859	0.835
<b>85: Electrical Equipment</b>					
8501	Electric motors and generators	1.720	2.687	3.337	1.805
8502	Electric generating sets	0.653	2.160	1.361	1.247
8503	Parts	1.150	5.291	2.729	1.926
8504	Transformer	4.939	3.761	7.584	3.764
8505	Electromagnets	0.673	0.652	2.198	0.692
8506	Primary cells	4.175	0.503	1.773	0.652
8507	Accumulators	18.623	1.626	2.125	1.278
8508	Electromechanical tools	1.254	0.265	0.182	0.286
8509	Domestic appliances	0.362	0.138	0.678	0.135
8510	Shavers and hair clippers	0.203	0.001	0.019	0.036
8511	Electrical ignition	0.554	0.609	1.632	0.948
8512	Electrical lighting	0.490	0.120	0.912	0.474
8513	Portable electric lamps	0.042	0.010	0.195	0.141
8514	Oven	0.229	1.152	0.276	0.856
8515	Electric	0.606	1.621	0.247	0.765
8516	Electric instantaneous	0.208	0.407	0.610	0.609
8517	Electrical apparatus	0.735	5.391	1.355	7.609
8518	Microphones and stands	0.630	0.586	2.835	2.102
8519	Turn tables	1.958	0.131	0.067	0.241
8520	Magnetic tape-recorders	0.557	0.114	0.114	0.158

8521	Video recording	0.160	0.232	0.390	0.511
8522	Parts and accessories	0.115	3.276	0.066	1.117
8523	Prepared unrecorded media	0.392	1.031	2.205	1.101
8524	Records, tapes	4.577	0.520	24.860	13.559
8525	Transmission apparatus	0.116	2.171	0.715	7.535
8526	Radar	0.656	1.556	0.102	0.556
8527	Reception apparatus for radio	0.383	0.051	0.633	0.261
8528	Reception apparatus for TV	0.351	0.036	1.946	0.689
8529	Parts	1.605	11.310	0.907	4.957
8530	Electrical signalling	0.031	0.169	0.094	0.094
8531	Electric sound	0.098	0.194	0.141	0.475
8532	Capacitors	1.920	2.762	0.858	2.180
8533	Resistors	0.505	1.672	0.709	1.322
8534	Printed circuits	0.528	0.874	2.532	0.861
8535	Electrical apparatus	3.101	0.529	2.900	0.322
8536	Electrical apparatus	1.940	4.690	3.930	4.791
8537	Boards, panels	0.501	0.607	0.290	1.010
8538	Parts	1.590	4.525	0.456	2.272
8539	Electric filament or discharge	0.506	0.686	1.542	1.201
8540	Thermionic, cold cathode	13.189	10.380	1.211	3.950
8541	Diodes, transistors and semiconductor	1.406	4.575	4.095	3.850
8542	Electronic integrated circuits	2.796	7.666	1.265	11.488
8543	Electrical machines	1.006	1.721	0.355	3.121
8544	Insulated wire	13.430	3.872	3.254	3.544
8545	Carbon electrodes	2.504	0.381	7.225	1.027
8546	Insulators	1.538	0.650	2.503	0.311
8547	Insulating fittings	0.800	0.187	4.274	0.520
8548	Waste and scrap of primary cells	4.494	6.454	0.312	1.653
<b>87: Road Vehicles and Parts</b>					
8701	Tractors	0.444	0.097	2.572	0.531
8702	Motor vehicles for transport	4.724	0.027	6.982	0.181
8703	Motor cars	4.008	2.242	10.939	5.130
8704	Motor vehicles for transport	2.809	0.154	7.143	0.233
8705	Workshops	0.418	2.238	0.200	2.168
8706	Chassis fitted with engines	12.034	0.075	5.591	0.094
8707	Bodies	3.160	1.851	0.495	0.234
8708	Parts and accessories of motor vehicle	25.718	65.292	32.144	85.386
8709	Works trucks	0.406	1.370	1.478	0.935
8710	Tanks	0.000	0.000	0.043	0.000
8711	Motorcycles	4.006	0.014	7.887	0.099
8712	Bicycles and other cycles	6.207	0.000	2.874	0.009
8713	Invalid carriages	0.101	0.001	0.004	0.015
8714	Parts and accessories of motor vehicle	33.219	26.171	21.213	4.624
8715	Baby carriages and parts	0.006	0.000	0.005	0.033
8716	Trailers and semi-trailers	2.739	0.468	0.431	0.328

**Annex 12: The Capital Labour Ratio Trend in 3-digit level**

Year/Industry	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98
200	1.095	0.966	1.505	1.312	1.900	3.677	5.213	4.286	5.715	6.117	7.709
201	1.339	1.589	1.769	1.961	2.073	2.152	2.220	2.469	3.069	3.101	4.790
202	0.697	0.933	1.138	0.969	1.374	1.325	2.117	2.340	2.544	3.304	3.108
203	0.431	0.616	0.689	0.933	1.004	1.239	1.498	2.011	2.400	2.557	3.579
204	0.345	0.436	0.508	0.649	0.858	0.790	0.913	1.025	0.999	1.129	0.985
205	0.462	0.623	0.804	1.025	0.988	1.213	1.231	1.370	1.548	1.739	1.903
206	1.048	1.235	1.701	2.078	2.212	2.559	3.158	3.752	3.717	4.013	5.045
207	0.116	0.117	0.152	0.177	0.203	0.186	0.197	0.230	0.275	0.274	0.742
208	0.160	0.177	0.209	0.265	0.239	0.307	0.364	0.427	0.445	0.529	0.623
209	0.686	0.862	1.372	1.318	1.592	1.696	1.814	2.309	7.528	4.783	6.537
210	1.243	1.440	1.679	2.521	2.805	3.089	3.368	5.380	5.644	6.149	6.794
211	0.608	0.909	1.300	1.370	1.754	2.277	2.614	3.290	3.674	4.100	3.876
213	0.327	0.575	0.569	0.694	0.905	1.041	1.332	1.613	1.630	1.731	2.110
214	0.026	0.028	1.214	1.952	1.830	2.056	2.636	2.671	3.438	2.870	3.464
215	0.375	0.553	0.038	0.050	0.053	0.048	0.071	0.065	0.081	0.092	0.110
216	1.049	1.170	2.033	2.148	3.305	2.677	2.322	3.876	2.882	4.086	4.223
217	0.716	0.967	0.977	1.378	1.265	1.336	1.633	2.113	2.150	2.293	2.243
218	#DIV/0!	#DIV/0!	0.780	1.134	1.158	2.523	2.037	2.019	2.256	3.024	2.993
219	0.551	0.953	1.171	1.242	1.641	1.703	2.110	2.109	2.088	2.468	2.545
<b>20-21: Manufacture of Food Products</b>											
220	0.971	1.446	1.409	2.060	2.255	2.630	3.208	3.821	4.181	5.646	5.870
221	1.060	1.030	1.606	1.331	2.628	4.058	3.785	3.933	3.764	3.712	4.789
222	1.340	2.885	4.278	4.243	3.657	4.317	4.556	5.637	6.045	6.992	8.030
223	0.638	1.192	1.086	0.944	1.120	1.476	1.834	2.132	2.476	2.541	2.376
224	1.633	2.307	2.315	2.856	3.640	4.137	4.849	5.614	6.902	7.852	10.995
225	0.084	0.096	0.150	0.192	0.280	0.279	0.304	0.458	0.426	0.613	0.358
226	0.010	0.013	0.012	0.018	0.020	0.022	0.028	0.025	0.028	0.028	0.028
227	1.709	1.942	2.324	2.322	2.508	3.073	3.786	4.465	4.206	5.551	6.246
228	0.235	0.257	0.333	0.383	0.419	0.537	0.562	0.663	0.947	1.016	1.802
229	0.352	0.603	0.736	1.067	1.104	1.014	1.214	1.499	1.387	1.698	2.558
<b>22: Manufacture of Beverages, Tobacco and Related Products</b>											
230	0.196	0.280	0.199	0.254	0.317	0.339	0.347	0.404	0.419	0.437	0.533
232	0.387	0.625	2.491	3.842	3.785	3.531	3.810	5.538	3.628	5.336	4.724
233	0.662	0.855	0.511	0.549	0.599	0.684	0.643	0.642	0.776	0.855	0.551
234	0.428	0.464	0.480	0.311	0.451	0.486	0.727	1.129	1.692	1.210	1.536



235	0.500	0.564	0.697	0.922	1.125	1.436	1.773	2.325	2.732	3.372	4.097
236	0.239	0.432	0.514	0.651	0.776	0.861	1.188	1.508	1.702	2.070	1.895
<b>23: Manufacture of Cotton Textiles</b>											
240	1.353	4.852	5.774	6.605	6.474	8.898	7.904	6.837	8.866	10.455	10.798
241	0.903	1.132	5.582	5.024	5.364	7.052	4.122	5.745	8.684	11.144	5.347
242	0.648	1.583	1.189	1.550	1.925	2.452	2.601	3.053	3.537	5.042	4.939
243	0.557	0.659	0.860	0.682	0.741	0.871	0.873	1.228	3.690	3.562	3
244	0.728	1.329	0.917	1.025	2.208	1.370	1.264	1.843	3.604	3.447	2.621
245	0.742	1.127	1.859	1.724	1.208	1.674	1.781	2.265	1.908	3.417	4.452
246	0.999	1.131	1.254	1.289	1.580	1.460	2.064	1.568	2.180	4.203	2.346
247	1.364	1.707	2.235	2.713	3.640	3.979	4.790	5.509	5.916	6.806	7.640
248	1.294	1.074	1.273	1.458	1.585	1.904	2.259	2.679	2.646	3.093	3.442
<b>24: Manufacture of Wool, Silk and Man-made Fibre Textiles</b>											
250	0.188	0.852	1.627	2.203	1.890	2.164	1.880	1.869	2.550	4.372	2.894
252	0.261	0.277	0.171	0.255	0.275	0.231	0.307	0.299	0.339	1.617	0.378
253	0.194	0.199	0.141	0.142	2.507	2.206	0.998	0.422	1.153	1.984	1.884
254	#DIV/0!	#DIV/0!	0.288	0.390	0.434	0.404	0.514	0.522	0.524	0.678	0.623
255	#DIV/0!	#DIV/0!	0.290	0.266	0.467	0.438	0.534	0.829	0.803	0.732	0.895
259	0.613	0.321	0.819	4.475	3.842	5.284	1.843	4.270	10.533	7.828	7.400
<b>25: Manufacture of Jute and Other Vegetable Fibre Textiles (Except Cotton)</b>											
260	0.466	0.614	0.676	0.705	0.933	0.930	0.956	1.297	1.925	1.874	2.658
261	0.769	1.142	1.181	1.173	1.571	1.827	1.775	2.154	2.415	2.822	2.431
262	0.232	0.437	0.506	0.685	0.927	0.864	1.230	2.015	2.450	2.503	2.454
263	0.586	1.643	0.859	1.554	2.662	3.057	2.702	1.906	2.549	3.095	2.730
265	0.177	0.194	0.306	0.387	0.488	0.524	0.636	0.789	0.896	0.974	1.153
266	0.353	0.445	0.661	0.817	1.100	0.835	1.364	1.090	4.341	2.050	1.559
267	1.094	1.246	1.766	1.864	1.934	1.808	1.649	1.828	2.233	1.910	2.212
268	0.268	0.445	1.179	1.788	1.561	1.649	1.763	2.147	2.769	3.719	3.581
269	4.647	2.779	1.843	2.517	2.508	3.237	2.760	4.881	4.601	4.597	3.829
<b>26: Manufacture of Textile Products (Including Wearing Apparel)</b>											
270	0.643	0.873	0.647	0.713	0.708	0.742	0.782	0.858	0.943	1.334	1.276
271	0.196	0.260	0.754	0.899	1.043	1.056	1.813	1.571	1.772	1.983	2.073
272	0.243	0.299	0.799	0.897	1.042	1.101	1.247	1.427	1.657	3.498	2.153
273	0.479	0.609	0.494	0.541	0.615	0.682	0.901	0.672	0.853	0.826	1.056
274	0.283	0.258	0.424	0.461	0.534	0.447	0.512	0.832	0.789	0.871	0.528
275	0.708	0.972	0.695	1.180	1.178	1.287	1.016	1.330	2.506	2.393	3.784
276	0.266	0.339	0.328	0.413	0.423	0.583	0.612	0.635	0.810	0.954	0.777
279	0.504	0.501	0.682	1.059	0.963	1.090	1.002	1.742	1.675	4.672	4.569
<b>27: Manufacture of Wood and Wood Products, Furniture and Fixtures</b>											

280	2.818	4.121	3.979	4.680	5.056	5.434	6.152	9.662	7.919	9.571	9.133
281	0.742	-0.759	1.006	1.210	1.401	1.625	2.909	2.113	2.213	2.713	2.852
282	0.329	0.540	0.642	0.948	1.260	0.943	1.096	1.751	2.016	5.151	3.319
283	1.976	2.941	2.969	3.277	3.696	3.715	3.906	5.082	4.635	5.552	5.149
284	0.940	1.238	1.439	1.718	2.017	2.357	2.916	2.923	3.144	3.879	4.980
285	0.491	0.568	0.624	0.888	0.902	0.914	1.037	1.122	1.253	1.457	1.731
286	1.266	1.503	3.461	5.141	4.959	5.098	4.542	2.507	2.384	4.212	31.164
287	0.431	0.491	1.039	1.478	1.124	1.603	1.924	2.652	3.436	4.551	3.569
288	0.314	0.375	0.529	0.453	0.501	0.717	0.667	1.114	1.020	0.976	1.391
289	0.657	0.823	0.923	1.034	1.334	1.502	1.733	1.980	2.093	2.317	3.798
<b>28: Manufacture of Paper and Paper Products and Printing, Publishing and Allied Industries</b>											
290	0.542	0.638	0.664	1.018	1.089	1.345	1.585	1.699	2.219	2.604	2.610
291	0.340	0.473	0.566	0.811	0.891	1.019	1.173	1.380	1.408	1.750	1.746
292	0.171	0.236	0.288	0.438	0.497	0.581	0.675	0.725	0.872	1.075	1.432
293	0.399	0.395	0.494	0.553	0.524	0.887	0.759	0.647	0.761	0.950	0.802
299	0.342	0.180	0.475	0.918	1.765	0.957	1.359	2.085	1.947	3.849	3.709
<b>29: Manufacture of Leather and Products of Leather, Fur and Substitutes of Leather</b>											
300	2.624	2.658	4.983	6.411	7.401	7.949	9.566	11.155	12.715	12.639	10.429
301	1.849	10.391	9.117	10.855	14.523	13.418	16.708	19.807	20.699	21.645	24.543
302	0.882	1.059	4.876	15.571	9.304	17.532	20.742	19.031	32.658	38.311	45.661
303	1.437	1.866	2.662	3.275	3.438	3.943	5.046	5.039	5.591	6.011	6.491
304	17.554	21.698	2.112	2.647	2.889	3.060	3.417	4.033	4.250	5.016	5.556
305	2.531	4.919	1.330	1.525	1.782	2.456	2.795	3.198	3.585	3.907	4.600
306	1.333	2.261	16.518	16.484	16.254	16.545	18.890	16.840	13.241	21.044	22.703
307	2.052	1.900	0.238	0.264	0.258	0.257	0.248	0.311	0.276	0.552	0.522
308	#DIV/0!	#DIV/0!	0.834	1.093	1.101	1.098	0.877	1.072	1.128	1.128	1.284
309	#DIV/0!	#DIV/0!	3.561	4.611	5.715	6.425	4.855	8.511	8.716	10.073	11.617
<b>30: Manufacture of Basic Chemicals and Chemical Products (Except Products of Petroleum and Coal)</b>											
310	4.502	5.301	5.083	5.437	7.110	7.287	5.736	7.247	8.369	10.368	9.954
311	8.030	9.357	18.916	20.168	17.224	18.163	17.317	18.340	18.394	16.126	18.425
312	1.445	1.964	1.344	1.833	1.715	1.906	1.715	2.299	2.649	2.834	2.775
313	1.098	1.389	2.601	3.061	2.980	3.389	3.040	4.639	5.281	8.573	7.045
314	0.964	1.240	18.761	22.624	26.838	30.278	35.328	34.830	40.904	46.626	49.989
315	1.718	1.710	16.517	14.100	18.451	16.389	15.798	12.377	14.152	17.254	17.997
316	4.520	5.989	20.560	20.998	22.268	20.031	20.465	20.646	19.574	30.295	28.494
318	0.590	1.143	1.816	1.864	1.864	2.326	2.504	2.573	2.897	3.340	4.275
319	2.376	2.357	4.262	4.750	7.362	4.853	5.683	7.687	6.407	8.526	8.470
<b>31: Manufacture of Rubber, Plastic, Petroleum and Coal Products; Processing of Nuclear Fuels</b>											
320	0.463	0.585	0.642	0.736	0.899	1.011	1.322	1.377	1.625	1.869	2.431

321	0.560	0.859	1.410	1.314	1.676	2.104	3.228	4.193	5.071	7.084	7.774
322	0.968	2	2.940	1.634	2.337	1.260	2.718	1.510	1.941	3.151	4.135
323	0.951	1.446	1.691	2.018	2.204	2.711	2.978	3.579	3.780	4.025	4.077
324	7.106	8.650	9.162	10.747	12.086	11.934	13.433	15.447	15.067	18.311	21.521
325	0.221	0.275	0.328	0.294	0.393	0.411	0.920	1.168	0.988	1.299	1.332
326	0.660	0.729	0.989	1.212	1.765	2.092	2.603	2.803	3.249	3.433	3.561
327	2.659	1.964	1.248	1.414	1.682	1.857	2.007	2.591	2.833	3.291	3.148
329	0.624	0.849	1.067	1.258	1.466	1.641	1.891	2.495	2.192	2.717	3.239
<b>32: Manufacture of Non-metallic Mineral Products</b>											
330	4.182	4.931	6.076	8.892	11.727	11.243	13.584	15.928	16.712	18.405	18.665
331	1.003	1.283	2.893	3.440	4.059	6.210	5.399	6.566	7.026	9.283	12.305
332	2.873	3.240	3.402	4.308	7.568	5.877	7.109	8.382	9.256	14.562	14.694
333	1.931	2.773	2.906	4.162	4.278	4.803	5.452	5.840	6.250	6.509	20.665
334	0.711	0.795	0.976	1.577	1.767	1.764	2.153	2.538	2.254	2.700	2.329
335	10.006	10.465	12.225	9.999	12.525	14.969	18.472	15.468	13.373	18.394	14.832
336	2.882	3.964	4.985	5.480	13.988	16.262	16.841	17.866	17.854	19.545	10.506
337	#DIV/0!	#DIV/0!	0.721	0.986	1.110	1.321	1.614	1.852	2.534	2.599	2.775
338	#DIV/0!	#DIV/0!	0.977	0.883	0.894	0.768	1.340	1.585	1.343	1.537	1.556
339	0.574	1.209	1.508	1.253	1.722	2.081	2.419	3.836	3.071	7.629	4.674
<b>33: Basic Metal and Alloys Industries</b>											
340	0.603	0.736	0.798	1.085	1.368	1.324	1.715	2.299	2.304	2.594	2.775
341	0.450	0.899	0.869	1.083	1.097	1.442	2.403	2.258	2.422	2.364	2.836
342	0.688	1.054	1.045	1.082	1.477	1.425	1.467	2.097	1.973	2.430	2.034
343	0.836	1.045	1.036	1.224	1.422	1.570	1.862	1.919	2.035	2.651	2.704
344	0.986	1.403	2.055	3.509	3.530	3.848	4.831	4.670	6.035	5.862	8.870
345	0.536	0.594	1.063	1.188	1.477	2.184	2.512	2.163	1.839	3.592	2.487
346	#DIV/0!	#DIV/0!	0.425	0.705	0.694	0.720	1.006	1.160	1.302	1.349	2.400
349	1.086	1.190	1.273	1.796	1.887	2.313	2.265	2.654	2.920	2.608	2.978
<b>34: Manufacture of Metal Products and Parts, Except Machinery and Equipment</b>											
350	0.747	0.917	1.213	1.456	1.733	1.858	2.062	2.303	2.826	3.401	3.723
351	1.084	1.140	1.539	1.701	1.885	2.052	2.120	2.264	2.640	3.294	4.654
352	1.017	1.438	1.543	1.940	2.028	2.334	2.440	3.138	2.651	3.224	3.675
353	0.871	1.141	1.293	1.527	1.771	2.267	2.356	2.574	3.012	3.528	5.432
354	0.796	1.221	1.324	1.677	2.003	2.008	2.153	2.548	2.435	3.170	3.826
355	0.824	1.378	1.514	1.514	1.733	2.351	3.271	3.481	3.668	4.660	4.471
356	1.200	1.260	1.950	2.239	2.719	3.486	3.438	3.485	3.783	4.142	4.192
357	0.775	1.050	1.286	1.764	1.734	2.123	2.499	2.623	2.698	2.878	3.420
358	0.430	0.606	1.479	1.767	1.946	3.809	4.223	3.655	4.870	5.542	4.804
359	0.471	0.822	0.756	0.940	1.187	2.256	2.042	2.306	2.496	3.019	3.788

360	0.959	1.433	1.455	1.651	1.736	1.939	2.300	2.840	2.975	3.304	3.457
361	1.999	2.566	2.675	3.656	4.071	4.420	5.635	6.471	5.715	7.084	7.585
362	1.137	1.303	1.875	1.957	2.052	2.508	2.683	3.492	3.546	4.578	5.406
363	0.882	1.054	1.895	1.879	2.607	2.823	2.865	3.559	4.557	4.737	4.393
364	0.993	1.691	2.624	2.613	2.699	2.939	2.849	3.346	3.500	4.583	4.877
365	1.101	2.605	1.597	1.795	2.014	2.322	2.880	3.148	3.928	4.659	5.164
366	1.587	1.428	2.284	2.621	3.238	3.808	4.270	6.181	5.609	6.557	8.260
367	1.590	2.341	2.218	2.674	2.861	2.954	5.199	4.806	4.952	5.514	4.861
368	#DIV/0!	#DIV/0!	1.676	2.179	3.789	3.421	3.625	3.307	3.954	5.149	4.468
369	1.843	0.731	1.207	1.594	1.476	1.778	2.356	3.349	3.744	2.824	3.477
<b>35-36: Manufacture of Machinery and Equipment Other than Transport Equipment</b>											
370	1.790	1.507	1.746	1.755	1.589	1.302	1.585	1.651	1.669	1.737	2.455
371	1.294	1.449	1.802	2.150	2.607	2.538	2.108	2.376	2.171	2.625	4.673
372	0.474	0.601	0.713	0.746	0.672	1.092	1.095	1.176	1.045	1.320	1.625
373	0.189	0.818	1.643	1.909	2.241	2.713	3.487	3.351	4.303	5.261	4.928
374	1.678	1.985	2.901	3.399	4.109	4.671	5.160	5.376	6.370	8.171	7.263
375	2.582	2.807	3.032	3.047	3.763	4.132	4.503	4.701	4.408	4.537	5.930
376	0.411	0.673	0.653	0.905	0.950	1.055	1.165	1.415	1.461	1.231	1.837
377	4.266	3.444	3.856	3.651	2.471	5.550	4.877	6.543	6.231	13.611	9.302
378	0.277	0.405	1.039	0.607	0.266	1.450	1.848	0.580	1	1.698	2.254
379	1.196	0.714	1.264	1.283	1.791	1.717	1.712	2.313	2.025	3.099	5.029
<b>37: Manufacture of Transport Equipment and Parts</b>											
380	0.785	0.961	1.135	1.363	1.723	1.935	2.520	2.624	2.938	3.275	3.624
381	1.021	1.085	1.907	1.916	2.007	4.538	4.604	6.605	4.920	6.172	9.983
382	1.834	2.226	2.631	3.362	3.400	3.756	4.474	4.756	4.376	5.080	5.701
383	0.602	0.533	0.653	0.558	0.571	0.838	0.823	0.997	1.007	1.134	1.298
384	#DIV/0!	#DIV/0!	#DIV/0!	0.482604211	#DIV/0!	0.775	0.689	0.696	1.258	2.023	1.451
385	0.284	0.381	0.531	0.603	0.735	0.745	0.663	0.766	0.901	1.095	0.890
386	0.476	0.587	1.835	1.632	2.091	1.971	2.119	2.070	2.018	3.763	2.824
387	0.536	0.736	0.968	1.167	1.192	1.508	1.931	2.069	2.615	2.255	3.492
388	#DIV/0!	#DIV/0!	1.978	2.730	2.55323505	2.112	3.423	5.951	5.515	5.763	6.168
389	0.426	0.491	0.541	0.743	0.701	1.070	1.141	1.741	2.251	1.386	1.653
<b>38: Other Manufacturing Industries</b>											

Annex 13: The Skilled Labour as a % of total employment Trend in 2-digit level

Year/Industry	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98
20-21	20.30741376	20.66070398	20.31884454	20.34155192	21.13799995	20.78173388	22.01063942	21.77853156	21.33386734	21.79537104	21.2133253
22	8.078736694	8.609592182	6.515951028	8.546257677	6.916827898	6.992515817	8.390739232	7.308410121	8.50532657	7.182193667	6.37679467
23	11.98004125	12.25936491	12.08977414	11.70863634	12.49812988	13.16024634	13.01041065	13.63131625	13.59599857	13.62579737	14.2413645
24	16.8228188	16.78113639	18.43311352	18.76089081	18.67664158	19.68672602	19.57011489	19.98842268	20.46244971	19.69807753	20.1898607
25	8.487408677	8.319717885	9.500575678	8.3190074	8.215576733	8.788402972	8.084439263	7.736577001	7.694186801	7.863859	7.08749641
26	18.19120444	17.25232695	16.24887375	17.44607883	17.601965	17.59620942	16.36690062	15.90378764	18.14297226	16.14942409	16.0589115
27	17.7684778	18.55897022	18.67024292	18.91784425	19.54910826	18.64495039	18.71678437	18.97309327	18.13640832	19.50686642	18.3875924
28	24.99216649	24.47364337	25.05883215	24.91278488	24.39808995	24.97115155	25.4688164	26.27989554	26.71495359	26.85746687	26.195554
29	15.63183181	14.46781389	14.90447222	16.73468602	17.0289622	18.62553794	17.64424351	16.47023959	18.40123576	16.63329393	17.1315002
30	25.77440652	25.74955357	30.25190503	30.67464699	30.57855976	31.62864184	31.54347397	31.73924234	32.58611393	32.19097257	30.9921064
31	31.20246245	30.7478634	25.28772759	25.01827735	25.83726782	26.54227956	27.33140737	26.34369791	26.03549936	25.58566782	26.3717969
32	17.31524413	17.63592607	18.40588009	17.99812532	18.84422166	19.06593792	20.17205745	19.76840476	20.38431889	20.81962892	20.495674
33	22.03788245	22.78834534	23.59156659	25.08371199	24.86543281	24.79505534	24.95894332	24.41723797	24.75623152	24.40658594	24.5943915
34	22.87812975	22.51236289	22.41757835	23.58234582	23.87557062	25.02981062	25.77314236	25.98765457	24.75238966	23.59980579	26.3365378
35-36	33.00431345	33.96645037	33.62155992	34.17193277	34.68224002	35.61057378	34.59832606	34.07763873	34.06496945	33.82330643	34.259671
37	24.00152031	24.28734299	25.01422236	25.08867245	25.58302016	27.25321888	25.73070217	26.12561855	26.00967453	26.2181113	26.2125592
38	25.73264217	24.22082869	25.27400139	24.84053902	24.67362511	27.44113792	26.11417384	26.95832397	26.00230447	25.13484047	25.8344959
Total	21.02549784	21.33770155	21.00251368	21.546844	21.82556241	22.41241315	22.55225961	22.33964587	22.71917779	22.46117365	22.2591934

(Labour in Number)

Annex 14: The Skilled Labour as a % of total employment Trend in 3-digit level

Year/Industry	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98
200	27.770	26.779	24.968	25.100	24.992	24.934	24.755	22.621	19.030	21.072	23.351
201	35.838	35.430	38.334	37.565	39.492	37.118	37.052	37.422	39.288	38.649	36.570
202	22.180	20.467	21.593	21.249	27.010	23.641	22.248	20.271	20.372	22.799	18.736
203	22.337	18.615	18.800	18.366	17.560	17.915	19.882	18.132	18.757	18.301	16.663
204	17.108	16.006	15.726	15.770	17.921	18.387	19.387	19.592	17.698	19.502	17.674
205	23.148	23.357	22.879	22.396	21.428	22.231	23.303	24.195	22.423	23.336	22.088
206	33.209	32.695	33.032	32.016	32.861	32.681	34.595	34.505	33.759	33.183	34.405
207	8.386	6.711	8.022	7.891	8.151	8.023	8.448	8.341	9.047	8.417	11.644
208	11.991	13.013	9.926	11.262	10.042	10.366	11.059	12.160	12.095	10.266	9.216
209	27.116	30.818	32.461	27.907	27.521	28.085	25.513	25.520	23.013	26.353	29.171
210	30.079	29.658	27.318	31.536	30.693	29.606	29.789	29.940	29.135	29.008	25.117
211	23.049	23.477	22.171	24.631	24.051	26.926	27.610	27.138	26.570	25.878	27.197
212	15.087	14.820	21.778	20.280	22.603	0.000	45.161	30.769	26.804	0.000	27.778
213	18.196	15.425	14.426	14.377	14.003	14.227	14.160	15.313	14.546	15.151	14.348
214	6.793	11.667	17.459	20.359	18.555	18.364	19.893	22.020	21.183	20.155	24.408
215	14.020	15.928	6.691	5.902	6.603	5.501	10.267	8.374	5.603	5.580	4.908
216	31.222	30.387	30.914	31.293	29.449	27.311	24.491	31.403	29.767	30.924	31.585
217	16.624	17.475	34.949	35.037	32.013	32.733	32.985	35.559	34.317	28.820	33.557
218	0	0	18.934	15.620	14.230	20.974	17.652	16.183	19.913	17.254	14.032
219	17.818	18.850	18.833	19.182	19.144	19.759	21.311	21.613	22.424	23.234	28.106
<i>20-21: Manufacture of Food Products</i>											
220	24.533	26.031	22.907	24.785	25.593	22.128	23.370	23.097	24.847	24.466	24.539
221	22.103	16.455	20.926	20.787	21.938	25.334	22.499	23.081	26.140	26.537	20.077
222	23.788	24.195	24.680	24.660	20.440	24.315	21.907	20.691	23.648	21.661	20.167
223	20.421	21.734	20.234	18.085	17.256	21.522	20.794	21.041	21.771	20.450	18.662
224	39.199	39.751	39.247	38.550	36.261	38.388	34.043	37.565	32.694	32.756	32.942
225	12.390	12.631	11.501	22.183	14.843	12.340	16.728	16.963	24.581	19.645	8.908
226	3.285	3.410	2.443	2.992	2.636	2.629	3.998	2.912	2.824	2.506	2.481
227	21.684	21.499	21.332	16.412	18.269	20.198	17.957	18.241	19.435	18.905	20.230
228	14.809	17.281	16.276	18.411	17.635	18.636	17.922	21.270	22.976	19.235	17.624
229	25.584	27.856	18.724	25.008	22.547	24.446	22.336	26.881	22.249	27.517	30.538
<i>22: Manufacture of Beverages, Tobacco and Related Products</i>											
230	13.343	12.638	11.335	11.664	13.179	13.504	13.261	15.708	13.094	12.920	15.664
231	11.147	11.494	9.520	8.660	10.767	13.563	10.546	15.780	13.040	19.338	11.063
232	17.683	18.524	25.829	15.969	19.558	16.562	24.493	19.478	24.672	22.826	27.793
233	11.577	8.741	13.707	14.268	13.596	15.671	13.094	13.618	13.453	13.089	12.067
234	-36.673	31.350	11.516	10.992	12.610	12.127	14.329	13.810	14.750	12.731	13.965

235	12.121	13.226	11.830	11.278	11.686	12.528	12.267	12.639	13.009	13.088	13.332
236	11.209	13.602	17.189	17.239	21.413	19.440	20.071	18.962	20.135	21.107	18.303
239	17.544	12.543	0	0	0	0	0	0	0	0	0
<i>23: Manufacture of Cotton Textiles</i>											
240	3.673	28.186	26.616	24.295	24.583	23.148	25.345	24.275	24.873	25.004	22.652
241	19.330	18.964	19.822	18.792	21.407	32.020	13.978	31.424	19.495	18.742	13.349
242	17.703	16.356	18.539	17.512	17.665	19.282	18.595	21.414	21.772	21.310	22.760
243	20.234	22.731	20.380	19.987	16.330	19.755	19.429	19.280	18.545	22.061	30
244	20.973	16.970	18.824	25.472	20.968	38.200	16.408	11.816	22.017	13.294	19.106
245	13.321	14.202	15.611	16.551	12.849	12.878	14.683	16.338	16.150	18.089	21.108
246	16.153	18.147	16.081	14.658	18.120	14.178	14.815	15.165	20.513	21.391	15.655
247	17.970	16.188	18.799	19.581	18.699	19.973	20.102	19.546	20.467	19.123	19.623
248	15.934	16.888	16.495	15.708	18.987	18.490	18.426	19.290	18.979	19.440	19.874
249	9.589	22.135	0	0	0	0	0	0	0	0	0
<i>24: Manufacture of Wool, Silk and Man-made Fibre Textiles</i>											
250	37.631	8.256	25.862	30.499	31.604	35.638	30.605	43.956	31.514	36.735	27.632
251	8.189	8.137	5.622	7.247	10.113	10.776	0	8.147	9.783	8.939	8.486
252	31.596	26.087	9.015	11.296	9.958	12.344	11.332	11.587	10.963	13.339	9.324
253	14.583	11.819	4.691	11.135	18.274	10.678	14.963	8.666	14.000	13.554	11.609
254	0	0	9.318	8.034	7.914	8.350	7.606	7.208	7.386	7.362	6.848
255	0	0	19.847	22.293	19.789	13.535	18.446	21.439	14.784	15.785	11.402
256	0	0	0	0	0	25.420	0	0	19.366	0.000	#DIV/0!
257	0	0	27.913	27.838	25.230	22.632	23.849	45.028	9.708	28.990	7.267
258	0	0	0	0	0	25	0	0	0	0	23.333
259	22.533	16.055	15.980	30.573	30.303	28.571	12.757	15.244	30.448	20.370	19.872
<i>25: Manufacture of Jute and Other Vegetable Fibre Textiles (Except Cotton)</i>											
260	15.118	16.147	15.665	15.768	15.332	16.755	16.836	18.647	20.980	18.431	19.264
261	21.628	17.628	16.465	17.831	21.605	21.583	20.665	17.983	18.863	16.681	15.137
262	16.685	15.724	21.092	18.047	17.927	19.866	20.826	19.996	20.817	21.325	16.021
263	25.716	25.038	8.846	30.447	30.611	24.386	26.665	22.436	23.464	28.839	24.458
264	17.194	16.635	19.868	22.988	21.543	18.477	12.398	13.106	14.896	11.364	20.869
265	26.353	18.696	16.316	16.349	16.506	16.404	15.231	14.256	16.944	14.481	14.940
266	14.792	15.127	29.757	21.938	33.129	33.956	31.306	32.087	36.936	35.417	27.176
267	23.990	23.693	24.297	19.387	21.259	22.421	17.547	21.356	25.095	22.412	19.494
268	16.581	18.361	25.444	27.802	26.271	28.918	24.535	28.066	27.344	30.818	25.714
269	29.382	20.838	17.847	22.826	23.985	23.017	21.770	22.776	22.307	24.710	21.765
<i>26: Manufacture of Textile Products (Including Wearing Apparel)</i>											
270	16.407	17.584	18.470	16.612	22.908	19.378	18.754	20.072	17.993	20.589	20.537
271	17.831	18.780	18.423	18.848	16.621	16.787	17.880	17.024	16.512	18.158	17.333
272	15.094	18.561	20.089	22.897	19.882	21.773	21.848	23.465	20.773	17.534	19.578
273	21.322	19.073	14.725	18.078	16.972	18.645	18.975	17.849	22.015	21.479	19.564

274	16.301	17.201	15.509	15.987	15.197	19.692	16.038	19.405	22.135	22.275	9.826
275	26.128	25.446	25.034	25.738	34.326	24.219	12.189	25.798	28.426	27.933	28.829
276	23.204	22.692	22.553	25.848	22.360	24.155	23.483	23.940	24.313	25.891	20.747
277	0	0	0	0	0	0	25.540	15.278	19.854	17.159	9.445
279	14.552	14.878	14.726	15.231	13.531	15.831	18.422	21.959	16.893	19.922	22.708
<b>27: Manufacture of Wood and Wood Products, Furniture and Fixtures</b>											
280	24.261	23.666	23.735	22.638	21.913	22.186	22.399	23.108	24.924	23.172	22.229
281	21.060	19.864	19.697	20.415	20.016	22.252	21.947	22.639	22.475	22.450	24.054
282	17.941	16.482	21.814	19.914	17.223	17.586	18.385	18.978	16.653	18.348	21.301
283	24.815	21.053	35.896	20.902	27.716	28.201	29.833	28.794	26.087	29.156	28.525
284	50.484	49.626	52.113	54.133	54.228	51.863	55.770	58.556	57.455	57.211	52.461
285	21.849	21.068	21.071	20.205	20.641	21.411	20.848	20.153	21.713	23.553	24.568
286	17.541	20.254	17.576	21.387	16.548	19.595	22.471	16.973	17.038	22.188	21.143
287	29.222	24.577	25.447	26.592	22.984	23.691	30.040	30.096	46.195	33.426	35.111
288	14.385	12.923	13.344	14.898	10.774	11.844	15.185	25.040	17.686	30.831	20.720
289	18.716	19.434	19.249	19.921	19.822	20.890	22.552	22.119	21.343	23.170	22.411
<b>28: Manufacture of Paper and Paper Products and Printing, Publishing and Allied Industries</b>											
290	16.483	15.886	14.534	17.199	17.236	20.010	21.029	19.762	22.278	19.697	20.486
291	14.705	13.271	15.631	17.112	17.668	18.654	16.434	15.016	16.431	14.403	15.671
292	15.024	13.257	11.653	11.472	13.086	15.315	13.611	13.152	17.589	14.501	14.804
293	15.977	15.287	18.951	16.974	17.720	16.347	18.075	15.858	16.379	18.485	16.213
294	0	0	0	0	0	0	55.556	1.429	4.348	34.375	100
295			47.706	0	0	0	27.778	7.960	19.856	0	0
296	13.793	0	0	0	0	0	0	14.28571429	0	17.21854305	0
299	22.039	10.505	18.398	21.466	21.520	23.817	24.049	30.646	23.388	29.888	25.207
<b>29: Manufacture of Leather and Products of Leather, Fur and Substitutes of Leather</b>											
300	26.774	25.899	31.305	31.869	32.726	32.393	33.323	33.184	32.839	33.379	29.378
301	20.776	22.497	33.524	34.136	34.463	35.728	34.766	36.050	36.138	35.743	35.633
302	22.886	23.082	33.273	33.296	34.593	35.898	35.452	43.672	47.317	35.660	33.353
303	25.625	24.725	38.536	38.289	35.986	38.015	36.589	38.974	37.275	38.349	39.345
304	36.622	37.775	39.962	40.597	39.777	39.908	40.094	39.325	40.210	41.441	39.239
305	35.238	34.799	20.442	19.871	20.836	22.611	21.423	21.398	23.629	24.035	25.394
306	18.266	19.896	27.315	26.524	26.680	26.769	26.679	23.301	20.790	22.213	23.231
307	28.513	26.374	6.801	6.691	6.314	7.124	6.794	6.571	9.520	6.949	6.682
308	0	0	13.353	14.603	14.839	14.358	14.248	12.079	15.838	11.839	10.095
309	0	0	37.437	33.792	36.176	40.291	37.774	39.569	40.566	34.911	42.626
<b>30: Manufacture of Basic Chemicals and Chemical Products (Except Products of Petroleum and Coal)</b>											
310	31.138	33.019	26.163	27.036	27.823	25.524	27.745	28.295	27.687	24.085	25.584
311	36.446	33.878	20.019	21.057	20.725	21.673	21.629	22.234	23.622	22.437	21.379
312	37.644	36.348	23.994	23.186	24.330	25.435	23.691	22.420	23.443	23.929	25.268
313	41.551	41.881	26.056	25.181	26.450	27.374	29.566	27.172	26.316	26.650	27.198



314	22.003	22.054	31.214	30.390	31.131	31.515	31.209	31.870	33.949	34.687	32.847
315	25.092	24.792	18.733	18.736	20.723	18.338	20.710	20.966	17.294	17.681	18.456
316	31.282	29.559	42.637	37.995	41.845	39.043	37.047	40.199	36.762	33.598	32.576
317	7.2838	8.0317	0	14.748	37.5	0	0	0	0	0	0
318	13.181	13.669	16.353	18.037	15.929	16.052	15.508	17.286	18.196	16.256	17.139
319	36.904	33.060	25.659	26.409	30.384	42.128	40.305	33.669	26.082	37.402	36.072
<b>31: Manufacture of Rubber, Plastic, Petroleum and Coal Products; Processing of Nuclear Fuels</b>											
320	10.900	10.904	10.972	11.337	11.397	12.150	13.802	12.815	13.426	14.112	14.353
321	17.185	17.696	19.494	18.948	24.162	19.868	19.573	19.731	21.781	21.341	20.004
322	28.025	5	26.190	6.509	17.316	21.925	29.612	23.299	17.778	20.332	18.657
323	18.773	18.537	18.378	18.759	19.786	19.565	20.268	20.189	19.685	20.101	19.929
324	24.950	26.359	28.098	27.185	26.347	27.580	26.498	26.364	27.138	27.332	28.965
325	22.256	19.632	21.569	18.180	19.749	21.724	28.873	25.048	22.245	22.094	25.646
326	18.296	17.779	19.020	17.160	18.834	18.856	21.106	22.072	20.921	21.241	21.529
327	25.275	24.988	23.968	24.463	25.169	26.038	24.068	30.923	29.794	28.920	29.820
328	22.784	22.469	0	0	0	0	0	0	0	0	0
329	22.154	20.911	21.163	21.848	21.454	22.434	25.165	23.654	22.812	24.060	21.949
<b>32: Manufacture of Non-metallic Mineral Products</b>											
330	20.432	21.470	22.956	25.185	23.973	24.110	24.057	23.309	23.987	23.834	22.654
331	23.645	24.264	23.855	26.099	27.457	28.645	27.837	26.368	26.362	28.155	27.706
332	21.414	23.005	22.679	22.792	19.965	20.534	22.926	23.394	23.843	24.723	24.719
333	29.695	28.782	37.312	31.211	31.163	32.024	35.241	32.291	31.159	30.206	28.779
334	25.314	25.311	25.302	25.086	25.418	27.245	24.219	22.890	25.218	21.367	19.502
335	26.243	23.816	29.139	27.830	27.220	27.523	30.797	29.012	28.688	24.917	29.113
336	20.050	19.662	20.272	33.395	24.346	21.844	23.739	28.638	25.625	24.200	30.002
337	0	0	21.928	22.170	24.623	23.147	23.131	23.477	22.292	21.886	24.966
338	0	0	23.529	20.964	16.721	16.328	22.981	22.407	20.997	18.945	20.918
339	31.832	32.212	34.442	27.467	31.569	30.808	30.426	34.979	31.671	31.524	23.585
<b>33: Basic Metal and Alloys Industries</b>											
340	23.355	21.163	21.647	25.727	27.135	26.528	26.735	28.171	26.530	25.523	30.851
341	21.795	24.983	22.628	22.602	23.245	24.084	26.975	26.367	24.414	21.662	25.151
342	21.842	21.662	25.876	24.403	26.060	28.150	25.466	28.634	26.156	21.817	26.270
343	21.849	21.054	22.100	23.084	22.935	23.802	24.323	22.660	22.052	24.235	23.157
344	26.889	25.606	26.723	25.576	26.053	28.401	28.349	29.794	26.991	26.766	29.945
345	19.935	18.370	22.906	22.775	20.299	21.087	26.474	23.725	25.236	22.909	22.949
346	0	0	17.641	18.055	17.797	20.165	21.436	22.177	21.954	21.406	27.091
349	30.201	29.296	25.701	26.019	24.883	26.716	26.168	26.521	27.105	24.273	23.010
<b>34: Manufacture of Metal Products and Parts, Except Machinery and Equipment</b>											
350	29.460	30.681	27.818	29.816	32.405	29.830	32.070	30.100	31.528	30.071	30.958
351	34.467	34.295	33.242	37.853	38.747	37.574	38.016	39.613	36.180	37.665	34.873
352	31.917	34.612	33.856	34.239	34.624	36.968	36.705	37.863	32.815	34.197	36.106

353	27.854	27.700	28.209	27.156	28.752	30.394	30.211	29.289	30.775	31.265	30.110
354	34.594	36.540	35.215	36.129	35.565	35.872	33.076	35.457	35.782	39.171	35.593
355	33.622	36.379	31.226	30.272	29.350	30.727	33.843	31.740	29.755	27.119	31.886
356	33.487	36.633	33.108	32.912	34.745	35.420	34.814	33.751	30.774	33.230	34.216
357	35.397	36.947	36.579	36.501	36.032	36.508	36.468	33.764	34.935	35.803	33.186
358	36.051	34.469	33.658	32.363	37.382	42.065	34.471	38.213	32.029	36.895	33.755
359	24.461	25.902	26.262	27.109	28.204	30.247	31.721	27.441	29.350	32.589	30.564
360	37.075	36.390	37.154	36.677	37.523	37.617	37.502	35.897	38.313	36.136	36.425
361	30.884	31.336	29.940	32.211	31.687	31.260	31.005	31.187	31.572	32.580	36.547
362	28.703	28.158	25.632	28.310	29.164	27.770	28.218	28.197	34.568	25.921	23.517
363	25.638	28.222	25.707	25.079	25.161	25.275	24.085	24.425	25.348	22.224	22.377
364	33.531	33.222	28.863	30.505	29.258	32.534	25.182	27.940	28.118	27.941	33.592
365	25.470	58.796	39.036	40.100	39.882	42.037	40.625	41.456	41.257	41.937	41.147
366	48.090	46.141	32.978	33.580	32.848	34.713	32.658	30.154	32.808	29.143	34.194
367	34.751	31.808	51.178	51.558	50.400	57.100	50.432	51.725	43.285	32.335	41.594
368	0	0	36.611	40.626	37.856	31.895	36.200	32.269	34.723	35.762	33.709
369	37.954	34.610	33.320	38.163	35.082	36.052	36.724	36.997	35.849	29.064	33.204
<b>35-36: Manufacture of Machinery and Equipment Other than Transport Equipment</b>											
370	24.696	24.577	26.885	24.454	21.367	16.652	23.391	15.435	21.867	21.676	24.023
371	23.386	24.646	25.953	26.162	24.333	23.733	20.852	29.765	29.964	35.215	8.952
372	16.417	17.577	18.390	18.464	21.540	28.112	20.270	21.904	19.866	22.792	24.256
373	17.038	21.467	28.923	28.147	28.947	31.040	31.707	30.102	29.618	29.874	30.540
374	29.714	29.127	28.115	28.638	26.773	26.769	26.587	28.537	28.367	29.055	27.371
375	27.410	28.622	28.169	28.828	30.418	30.735	28.576	27.274	26.636	25.872	26.195
376	17.081	16.223	16.407	16.155	16.777	17.998	19.789	18.268	18.172	13.212	19.923
377	42.365	40.237	42.077	46.433	43.636	35.495	42.602	37.308	42.951	40.881	31.625
378	28.077	18.905	13.120	31.485	18.712	23.367	22.472	11.015	17	25.459	26.733
379	27.334	18.947	24.605	27.077	28.085	28.092	27.867	29.027	31.660	26.645	29.745
<b>37: Manufacture of Transport Equipment and Parts</b>											
380	33.099	30.394	34.209	33.135	32.649	36.553	36.489	37.558	34.588	35.291	33.634
381	32.396	32.877	29.926	31.659	34.441	35.647	32.052	32.465	34.130	29.852	34.021
382	24.586	24.735	23.268	25.241	24.752	23.968	25.007	25.886	25.067	22.860	22.588
383	13.613	12.038	13.800	13.074	15.463	18.233	15.406	16.012	18.977	17.168	20.332
384	0	0	0	18.8187821	0	19.478	20.023	20.814	21.961	22.318	18.971
385	19.860	23.806	23.469	24.138	23.623	22.160	17.611	17.961	19.755	20.831	25.702
386	26.474	22.486	23.349	33.773	40.426	39.437	38.807	36.516	34.518	16.730	44.294
387	23.707	24.290	24.466	23.869	22.828	26.649	26.007	29.169	29.786	28.889	30.678
388	0	0	39.698	43.902	50	32.054	38.889	26.386	31.097	41.169	40.952
389	17.923	17.138	20.510	16.675	20.220	25.084	21.780	23.516	21.577	18.234	19.872
<b>38: Other Manufacturing Industries</b>											