

# **Chapter – I**

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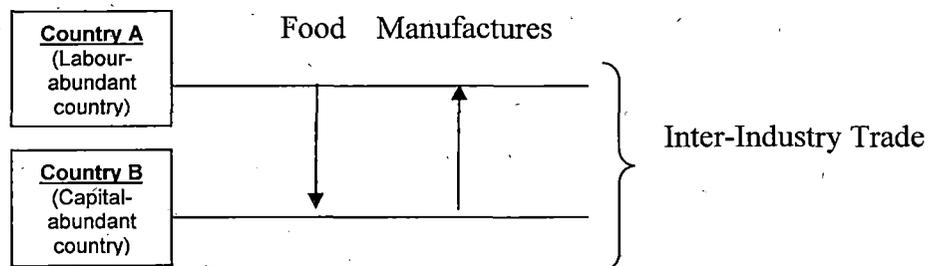
# Chapter – I

## Introduction

### 1.1: The Problem

The concept of Intra-Industry Trade was first used by Linder (1961) and then by Bela Balassa (1966). But the term is very much popular today especially in the context of liberalization and globalization. An intra-industry trade occurs when countries both export and import the same kinds of goods. This pattern of trade contradicts the traditional concept of trade known as inter-industry trade developed first by David Ricardo and then by Eli F. Heckscher and Bertil Ohlin(1933). The inter-industry trade developed by David Ricardo simply states once trade is allowed between two countries, each country should involve in the production of its comparative advantage good and export that amount of that good just after its own consumption to the second country in exchange for the other good. Obviously, it is a  $2 \times 2$  model i.e. two countries produce two goods according to their comparative advantage and exports and imports are taken place with dissimilar products. If, for example, country A produces and exports (being a labour abundant country) food and imports manufactures from country B (country B, say, a capital abundant country), then this is an example of inter-industry trade. In such a trade situation production occurs without economies of scale. In the case of inter-industry trade, a capital-abundant country is a net exporter of capital intensive good and a net importer of labour-intensive good. Trade in a two-country world without increasing returns may be depicted in diagram (1) drawn below.

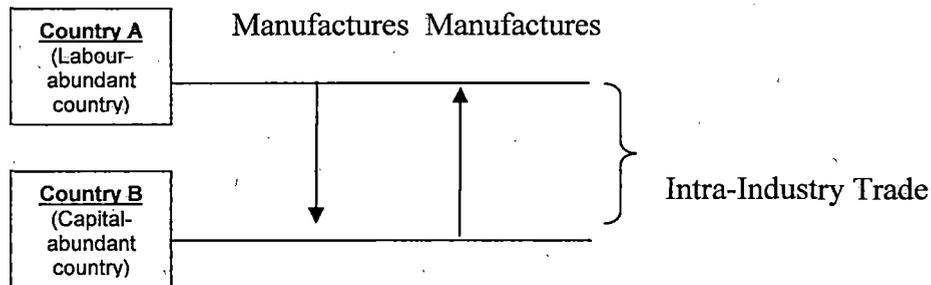
**Diagram 1: Inter-Industry Trade**



If two countries are similar in their capital labour ratios, then there will be little inter-industry trade. Thus under such a situation an intra-industry trade between countries

will tend to occur. An intra-industry trade i.e. trade based on increasing returns to scale may be shown in terms of the following diagram (2)

**Diagram 2: Intra-Industry Trade**



Intra-industry trade plays an important role in the trade in manufactured goods among the industrially developed countries. This trade accounts for about one-fourth of world trade and it occurs when countries are similar in their relative factor supplies and when scale economies and product differentiation are important (Krugman, 1997).

Intra-industry trade widens the scope of a new phenomenon in international trade which involves the exchange of non-homogeneous goods of the same industry or broad product group. This pattern of trade became apparent since the formation of European Union or Common Market when all sorts of restrictions to the flow of trade among the members of Customs Unions were removed in 1958. Balassa (1967), for the first time, noticed this pattern of trade and observed that in most of the increase in world trade involved exchange of differentiated goods within industrial classification. The intra-industry trade reduces and eliminates all sorts of trade barriers, reduces unit costs, helps production units concentrate in the production of a few varieties and styles of a product. The most striking factor is that it benefits consumers because a large choice of goods and services are available before them. Although it is said that intra-industry trade is quite opposite to that of comparative advantage theory Lancaster (1980) explains that in the case of intra-industry trade (IIT) there is much influence of comparative advantage in disguise. It is said that Ricardian theory is a reflection of natural comparative advantage while intra industry trade gives an exposition of acquired comparative advantage.

Several explanations for the occurrence of intra-industry trade can be offered (See Herbert Grubel and P.J. Lloyd, 1975). One such cause for intra-industry trade is the product differentiation. Consumers' tastes vary. Producers try to distinguish their products in the minds of consumers in order to achieve brand loyalty and this enhances

intra-industry trade. Secondly, transport costs for a product may play a dominant role in the creation of intra-industry trade. People of a country living in the border areas very often purchase some goods from the neighbouring countries rather than the domestic markets especially to avoid the burden of transport cost. Thirdly, two countries may have similar per capita income but the distributions of income may be different. This situation(s) may lead to intra-industry trade. Grubel (1970) has provided a hypothetical explanation of this sort of trade. The explanation, Grubel provides, can be applied in the case of Linder model (1961) in predicting the pattern of intra-industry trade. Fourthly, production experience through learning by doing helps reducing cost of production. This helps increase both export and import for each country. Due to this intra-industry trade is expanded over time. Finally, intra-industry trade depends on the way trade data are recorded and analyzed. If, for example, the product category is large or broad there will be greater intra-industry trade and vice-versa.

### **1.2: Objective of the Study**

Intra-industry trade reduces and eliminates all sorts of trade barriers, reduces unit costs and widens the consumer's choice over goods and services. The main objective of the research investigation is to find out a good measure of intra-industry trade for a developing economy like ours, highlight some of theoretical issues on testing intra-industry trade, expose the comparison of different trade explanations and concentrate on intra-industry trade, measure impact of the intra-industry trade on average per capita income and to analyse the influence of various country specific factors on the intensity and the probability of intra-industry trade, India's bilateral trade with the major trading partners especially with the SAARC (i.e. Bangladesh), the USA and EU countries. Finally we would like to estimate the welfare effect of intra-industry trade in the context of liberalization, privatization and globalization.

### **1.3: Methodology, Sample and Data Sources**

Before Bela Balassa, Staffin Linder initiated the analysis of intra-industry trade, noting that countries at similar stages of development had a high degree of trade; evidently he had in mind trade in similar products, so defined. Similarly, J.N. Bhagwati's (1964) survey of the theory of international trade where Linder's theory of trade was set alongside Ricardo's and the H-O theory as an alternative approach of significance. There are a number of alternative indices of intra-industry trade exchange, the properties of which have been quite widely explored. Trade specialization is distinguished between

intra-industry and inter-industry specialization. The methods to estimate the two kinds of specialization are different. Therefore several ways of measurement are necessary to carry out the empirical studies. The economic literature so far identifies six techniques to measure the inter-industry specialization. These techniques are: (i) Hine and Greenaway Method (ii) Sapir Method, (iii) Aquino-Balassa Index, (iv) Gini Index. (v) Normalized Balance and (vi) Donges and Riedel Index (Detail in chapter-II). These techniques are applied to measure inter-industry trade according to necessity. Intra-industry trade, being linked to consumer preferences, is more difficult to predict than the inter-industry trade. The intra-industry trade is probably much more influenced by stochastic factors and random processes.

The traditional measure of intra-industry trade is the Grubel-Lloyd Index (1975). Before Grubel-Lloyd index Bela Balassa developed an index in 1966 that measured the degree of the trade overlap-simultaneous import and export of goods within an industry. This is shown in equation (1) below

$$B_{ij} = \frac{|X_i - M_i|}{(X_i + M_i)} \dots\dots\dots (1)$$

Where  $i$  = Commodity with in industry  $j$ . This index, the ratio of net trade to gross trade, ranges from 0 to 1, with 0 representing "Perfect" trade overlap, and therefore pure intra-industry trade, while 1 represents pure inter-industry trade. In order to calculate the degree of intra-industry trade for all industries (country level), Balassa took an unweighted average for each  $B_{ij}$ , i.e.

$$B = \frac{1}{n} \sum B_{ij} \dots\dots\dots (2)$$

Where  $n$  = number of industries. This can be generalized to be a weighted index, i.e.

$$B = \sum_{j=1}^n w_j B_{ij} \dots\dots\dots (3)$$

Where  $w_j$  = industry  $j$ 's share of total trade.

Though the essence of this index has remained intact to this day, an index that measured intra-industry trade that gave pure intra-industry trade a value of zero was not intuitively appealing. Grubel and Lloyd (1975) proposed an alternative index as follows:

$$GL = \frac{(X_i + M_i) - |X_i - M_i|}{(X_i + M_i)} = 1 - \frac{|X_i - M_i|}{(X_i + M_i)} = 1 - B_{ij} \dots\dots\dots (4)$$

Where  $i$  = commodity within industry  $j$ , that assigned pure Intra-Industry Trade a value of 1 and pure inter-industry trade a value of 0. As with the Balassa Index, the Grubel-Lloyd Index has been calculated as an unweighted average to measure the degree of intra-industry trade at the country level.

This class of index has been criticized for suffering from categorical/sub-group aggregation issues. These issues have two basic forms that bias the index towards table 1.1 the grouping of two products in the same industry that should not be classified together, the Canoe and Tanker example above; and the trade imbalance. The grouping of two, or more, categories together that should not be in the same industry is best explained using the table 1.1 shown below.

**Table 1.1: Simple Aggregation Bias in GL Index**

Category	$X_i$	$M_i$	$ X_i - M_i $	$(X_i + M_i)$	GL index
3 Digit	150	160	10	310	0.968
Sub Group 5 Digit	0	160	160	160	0.00
Sub Group 5 Digit	150	0	150	150	0.00

Suppose we have one 3-digit “industry” that contains two sub-groups and each sub-group is independently engaged in (pure) inter-industry trade. We can see that the Grubel-Lloyd Index is zero for each of these sub-groups, so if we took an average, weighted or unweighted, of the two, the Grubel-Lloyd Index would still be zero. If, however, the import and export values summed to form the 3-digit category, it appears that we have almost pure intra-industry trade with Grubel-Lloyd index of 0.968. Though this is an extreme example, it should be clear that aggregating across improper categories can lead to a misrepresentation of the degree of intra-industry trade.

The simple aggregation bias example above is a particular case of trade imbalance bias however, can occur when sub-group appropriately aggregated. This problem arises when the net trade-gross trade ratio is characterized by opposite trade imbalances for the sub groups (Greenway and Milner, 1983). Suppose there are two commodities/sub groups with in an industry

$$\frac{|X_i - M_i|}{(X_i + M_i)} = \frac{|(X_{1i} - M_{1i}) + (X_{2i} - M_{2i})|}{(X_{1i} + M_{1i} + X_{2i} + M_{2i})} \dots\dots\dots (5)$$

If the country in question is a net exporter (importer) in both sub-group the weighting effect of the ratio is maintained, but if the country is a net exporter of one good and a net

importer of the other good, the weighting effect is lost and the Grubel-Lloyd Index will take on a different value (Greenway and Milner. 1983). This can be seen table 1.2.

**Table 1.2: Trade Imbalance Bias in the GL Index**

Category	$X_i$	$M_i$	$ X_i - M_i $	$(X_i + M_i)$	GL index
3 Digit	180	310	130	490	0.735
Sub Group 5 Digit	80	160	80	240	0.667
Sub Group 5 Digit	100	150	50	250	0.880
3 Digit	230	260	30	490	0.939
Sub 5 Digit	80	160	80	240	0.667
Sub 5 Digit	150	100	50	250	0.800

In the first category, the country is a net importer in both sub-groups, but in the second category the country is a net importer in one good and a net exporter in the other. Grubel-Lloyd Index does not recognize the direction of trade, the sub group indices are the same in both cases, but when the sub-groups are aggregated, the Grubel-Lloyd Index for the second category is biased upward.

The index can be corrected by replacing the original net trade-gross trade ratio with the following net trade-gross trade ratio, i.e.

$$\frac{\sum_{i=1}^n |X_{ij} - M_{ij}|}{(X_j + M_j)} \dots\dots\dots (6)$$

Where  $i$  = sub-group  $i$  with in  $j$ . This adjustment removes the trade imbalance bias that results from countries being a net exporter in one sub-group of an industry and a net importer in another sub-group as well as the simple aggregation bias. We are left with the following index of intra-industry trade, i.e.

$$GL'_j = \frac{\sum_{i=1}^n |X_{ij} - M_{ij}|}{(X_{ij} + M_{ij})} \dots\dots\dots (7)$$

Generally speaking, if a country is a net exporter/importer in both goods,  $GL = GL'_j$ , but if it is a net exporter in one good and a net importer in another,  $GL > GL'$ ;  $0 \leq GL' \leq GL \leq 1$  (Greenway and Milner. 1983). There was another adjustment suggested to the G-L index by Aquino. (1978) in response to an imbalance in overall trade. Greenway and Milner (1981) subsequently showed that the suggested adjustment is more

likely to induce, rather than remove, distortions in the Grubel-Lloyd index. Not surprisingly, this Aquino adjustment has fallen out of favour.

The samples include SAARC countries, viz., India, Pakistan, Bangladesh, Bhutan, Nepal, Maldives and Sri Lanka. The periods under consideration are between 1975-1990 and 1991-2003.

Secondary data are being used to explain India's Intra-Industry Trade with the SAARC, OECD and some industrially advanced countries. Important data sources are World Banks Publications, World Development Report, Asia Development Bank Publications, Statistical Year Book, EPW Research Foundation, RBI Bulletin, the Centre for Monitoring Indian Economy (CMIE), Directorate General of Commercial Intelligence and Statistics (DGCI&S), World Trade Development Report, etc.

#### **1.4: Research Gaps and Expected Contribution**

Product cycle theory, economies of scale, and Linder hypothesis of differentiated tastes describe the benefits and reasons for mutually beneficial trade between two countries. There are several other ways to explain this situation. In 1970s Krugman came up with another explanation of trade benefits in terms of intra-industry trade argument. With increase in overall world trade in general and with two firms in the same industry trading with one another in particular, theoretical significance of intra-industry trade has increased tremendously. Many eminent economists have done innumerable works. Eminent contributors were Linder (1961), Bhagwati (1964 & 1982), Balassa (1966 & 1986), Grubel & Lloyd (1975), Finger (1975), Venables (1979), Chipman (1992), Krungman (1970 & 1997), Lancaster (1980), Helpman (1981) and others. Recent literature on intra-industry trade shows that little work has been done on India's pattern of intra-industry trade in the context of globalization. This study specifically would seek to identify a suitable measure of intra-industry trade for a developing county like India, identify the pattern of India's intra-industry trade with SAARC nations, and with some of the developed industrialized nations like the US. The welfare effect of intra-industry trade will be carefully investigated applying some suitable statistical measures.

#### **1.5: Research Questions**

The investigation seeks to deal with the following questions relevant to our purpose:

- (i) How would we account for trade in goods of similar factor proportions?
- (ii) Has intra-industry trade increased the well-being of the countries involved in trade?

- (iii) Why is there such a large volume of trade between countries with similar endowment?
- (iv) Is intra-industry trade beneficial for the developing nations?
- (v) Is IIT compulsory to all the trading partners in the context of globalization?
- (vi) Is it possible to measure intra-industry trade in a systematic manner?

### **1.6: Hypotheses to be Tested**

In this research investigation we would like to test the following hypotheses: The first hypothesis is that the intensity and the probability of IIT are positively correlated with the differences in per capita income between the trading partners. This will be tested with the help of supporting data. The second hypothesis that we would like to test is that higher the share of IIT the higher the average per capita income in the trading countries. This again will be tested numerically taking relevant data. The third hypothesis is that the extent of IIT between any pair of countries is negatively correlated with differences in per capita incomes, representing differences in demand structure. The fourth hypothesis is that the extent of intra-industry trade depends on the concentration of trade i.e., the lesser the trade barrier the greater is the intra-industry trade and larger is the well-being of the country concerned. The fifth hypothesis is that trade liberalization biases trade expansion towards IIT. We would test this hypothesis taking India's intra-industry trade data. This will be tested taking trade data from reliable sources. The sixth hypothesis is that a country's share of bilateral IIT is negatively correlated with the absolute difference in bilateral incomes per capita. The result based on this hypothesis does not depend on the wishes of the researcher. Finally, the IIT benefits the trading nations. This possibility will be tested in the Indian condition. Apart from the above set of hypotheses, we have every freedom of inclusion and exclusion hypothesis.

### **1.7: Review of Literature**

In the field of international economics many empirical and theoretical works on intra-industry trade have been done by economists since 1966 (Balassa, 1966). Since then a vast literature has developed on the subject. In the present context we would like to make a brief review of the existing literature on IIT especially relevant for our purpose.

Balassa (1986) has tested various hypotheses as to the determinants of IIT in some thirty-eight developed and developing countries exporting and importing manufactured goods. The econometric model, fitting data, clearly shows that the extent of IIT increases with the level of economic development, size of domestic markets, and the openness of

national economies. The analysis shows that the existence of trading patterns with common borders and geographical proximity further contributes to intra-industry trade. This study in fact supports and complements ten relevant theoretical literatures. The estimates made in this study have separated the countries into developed and developing country groups.

An empirical implementations of the oligopolistic model of intra-industry trade are investigated in the context of petro-chemical industry (Bernhofen, 1998) suggesting a new approach to the empirical analysis of intra-industry trade. It is motivated by the empirical industrial organization literature. The trade data reveal the prevalence of intra-industry trade at the individual product level. A theoretical extension of the Brander model has shown to yield testable hypotheses about the effects of country-specific differences in industry characteristics on the Grubel – Lloyd index of intra-industry trade.

Venables (1979) examines the role of subsidies to domestic production as a policy instrument for an economy whose imports are supplied by the imperfectly competitive firms. The main thrust is that under certain conditions welfare may be raised by undertaking domestic production, even if costs in the domestic industry exceed the supply price of imports.

Grubel and Lloyd (1975) have measured international trade for the major developed countries of the world by industries and time-periods and at different levels of statistical aggregation, with the help of a statistical index. The index is as follows:

$$\bar{B}_i = \frac{\sum_{i=1}^n B_i (X_i + M_i)}{\sum_{i=1}^n (X_i + M_i)} \times 100$$

$$= \frac{\sum_{i=1}^n (X_i + M_i) - \sum_{i=1}^n (X_i - M_i)}{\sum_{i=1}^n (X_i + M_i)} \times 100$$

$\bar{B}_i$  measures average intra-industry trade directly as a percentage of the export plus import trade. This is also equal to the sum of the intra-industry trade for the industries as a percentage of the total export plus import trade of the  $n$  industries.

Developed countries impose more trade barriers on middle-income countries than

on either poor or other developed countries (Fischer & Serra, 1996). Main result obtained the derivation of conditions under which a rich country rejects trade with middle-income countries, but accepts trade with either similar or poor countries. It is also seen that if increased inequality lowers median wealth in the developed country the range of countries for which free trade is rejected is enlarged.

Linder (1961) was one of the first who first emphasised the demand side explanations for international trade. The major finding of Linder's explanation is that countries with similar demand structures would develop similar sets of goods, first for home consumption, later for export, and the resulting trade would look intra-industry trade.

Shifting comparative advantage (Posner, 1961; Vernon, 1961) theories explain that trade takes place not only because of differences in technologies across countries but due to continuous renewal of existing technologies and because of their transfer to other countries.

Finger (1975) argues that intra-industry trade within three-digit SITC categories can be explained by the factor proportion theory. He explains that factor intensities vary almost as much within these groups as among them. This means that SITC groups do not constitute industries in the sense the terms is used in Heckscher-Ohlin model, and the terms intra-industry trade is a misnomer.

There is a causal link between intra-industry trade and economic integration. Economic integration encourages inter-industry rather than intra industry trade specialization (Drabek & Greenway, 1984). Many economists examine the causal links between intra-industry trade and economic integration and consider whether these can be expected to differ systematically between Customs Unions involving developed market economies and those involving centrally planned economies. Intra-industry trade is measured for members of the EEC and compared with indices for various members of CMEA (as well as several non-EEC European countries). Data show that average levels of IIT are indeed higher for EEC countries and various explanations for this finding are discussed.

Intra-industry trade tends to be prevalent between countries that are similar in their capital-labour ratios, skill levels, and so on. Intra-industry trade will be dominant between countries at a similar level of economic development and gains from this trade will be large when economies of scale are strong and products are differentiated

(Krugman, 1997). Intra-industry trade is more common of manufactured goods than of raw materials, textiles or footwear.

Veeramani (2001) has analyzed two aspects of India's intra-industry trade in manufactured goods. The analysis concentrates on the discussion of India's Intra-Industry Trade in the post-reformed era. It examines the impact of trade liberalization on intra-industry trade. The paper also analyses the influence of various country specific factors on the intensity and probability of intra-industry trade in India's bilateral trade with the major trading partners. The econometric exercise shows that certain country specific factors, which are found to be important in theory, are pertinent in determining the country pattern of India's intra-industry trade.

Mitsuyo Ando (2005) investigates the development of East Asia trade structure, the machinery trade of each East-Asian country in the 1990s into one-way trade (horizontal IIT), using finely disaggregated international trade data. The significance of vertical importance of one-way trade dropped and also shows that no evidence that most vertical IIT conform to the vertical product differentiation model. The explosive increase in the vertical IIT is largely due to the expansion of back-and-forth transaction in vertically fragmented production processes across borders.

Verdoorn (1960) found that the formation of customs union among the Benelux countries had stimulated large two-way trade flows of similar products.

Hellvin Lisbeth (1994) compared the extent of intra-industry trade in between different groups of Asian countries. It was found that intra-industry trade in manufactures was most important in trade between the NICs-NECs (about 29 percent), while only about one percent of the trade among LDCs and between LDCs and NECs are intra-industry trade. In non-manufacturing goods, the greatest intra-industry trade share is found in trade among the LDCs. The pattern of intra-industry trade within Asia is consistent with the predictions, despite the presence of developing countries inward oriented trade regimes and intra-Asia trade is dominated by the NICs, especially Singapore and the Republic of Korea whose economies are relatively undistorted and export oriented.

Culem Claudy and Lumdbërg Lars (1983) state that intra-industry trade is an increasingly important phenomenon in international trade. Measured on the 4-digit level of the ISIC, the share of intra-industry trade of the total foreign in manufactures varied between 35 percent and 80 percent for a sample of 11 industrial countries. The European countries in the sample all have a higher share of intra-industry trade in their total foreign

trade than the non-European countries. Intra-industry trade is much more important among developed countries than between developed and developing countries. It shows that the intra-industry share of total trade between two countries tends to be higher, the less are the difference in average income and the geographic distance between the trading partners. The share of intra-industry trade in the total international of the developed countries in the sample has been increasing during the 1970s. The highest rate of increase is shown by the intra-industry trade with the less developed countries in particular Southern Europe.

Kulkarni and Ishizaki (2001) intended to inspect the intra-industry trade index for Japanese manufacturing trade as a whole and the dividing it into commodity groups and in different time blocks. There is no evidence that intra-industry trade is completely absent in any commodity groups and in different time blocks. There has been an increasing evidence of intra-industry trade for Japanese manufacturing. After investigation, it is proved that Japanese manufacturing trade is completely intra-industry oriented.

Balassa (1967) was probably the first to point out some of the modified implications for the welfare calculation of trade liberalization and the costs of adjustment policies. According to him, in the case of industries like those manufacturing machinery, precision equipment, and intermediate products at higher levels of fabrication, the gain from trade liberalization are likely to come sense to include cost reductions obtained through the lengthening of production runs associated with the reduction of individual plants. Further, he argued that in the case of consumer products, the benefits from much of the increased two-way trade will be in the form of improvements in consumer welfare resulting from the availability of a wider variety of products within each industry. He followed this up by claiming that the structural adjustment costs due to increased intra-industry trade would be low as increased exchange of differentiated consumer goods is compatible with unchanged production in every country and that in the case of number of other products, changes in production-composition within the industry can be achieved relatively easily.

Chipman (1988, 1991) argues that the oft-cited statistics on the large share of intra-industry trade in total trade provide no basis for rejecting the H-O factor proportions model of trade, and develops a theorem that it is always possible to find endowments for which 100 percent of trade is intra-industry trade.

In the early 1980s a new set of models gained prominence in international trade. Krugman (1979, 1980), Lancaster (1980), Helpmen (1981) studied the far-reaching implications of monopolistic competition for international trade theory. To a large extent, this line of research that was part of 'New' trade theory was motivated by two stylized facts that the traditional theories of international trade Ricardo or Hecksher-Ohlin failed to explain. First, why does most of world trade flow between developed countries that are similar in terms of endowments and technology? Second, why is it that major fraction of trade consists of intra-industry trade in similar products?

Helpman and Krugman (1985) showed that a monopolistic competition model could explain both facts as long as firms produce differentiated products with increasing returns to scale technology, and as long as consumers have utility functions that reward diversity.

Michael J. Gilligan (1997) says that one of the starting features of the international economy in the last thirty years has been the dramatic increase in intra-industry trade among nations-trade in different varieties of the same products. This trade was not explained by existing international trade theory, which predicted inter-industry trade between countries with different factor endowments. Economists have developed a set of models over the last fifteen years to explain this pattern of trade. The typical model explains this trade with monopolistic competition.

Brander (1981) and Brander and Krugman (1983) highlight the strategic interactions between international firms as the main determinant of two-way trade. One implication of these important models is that intra-industry trade is *prima facie* a phenomenon associated with increased competition. Two way trades with collusion are generally not considered.

Markusen and Venables (2000) establish the importance of both relative and absolute factor endowments in determining whether or not multinationals operate. The investigation suggests that convergence in income levels between major trading blocks – Europe, the US and Japan may be one cause of the growth of multinationals. It can also be shown that the world as a whole benefits from the presence of multinationals, and these gains accrues disproportionately to countries whose factor endowment is such that, in the absence of multinationals, they would have few national firms.

Hassan Kalbasi (1995) examines empirically that IIT is high among developed countries or newly industrial countries but there is theoretical and empirical evidence that

a low IIT exists among developed and developing countries and most of OECD members are among high income countries. Economic distance, large difference in factor endowments and technology levels are important reason of low IIT. On the other hand there are many aggregations among European countries and most of them are members of WTO. This will make more trade barriers for non-member countries. This could strong reason of large fall in IIT.

Greenway and Milner (1981) examined that the level of simultaneous exchange of similar products generated by permanent or recurring microeconomic influences. In cross sectional modeling, aimed at, "explaining" or identifying determining factors, the judicious selection of years so as to avoid periods of obvious, overall disequilibrium may be an appropriate means of excluding transitory influences of significant payments adjustment forces. Alternatively, during periods when substantial and continuing adjustment influences are present, then the averaging of the indices over a judiciously selected time period may be preferable.

Tharakam (1985) investigates that a considerable part of the growth in world trade, particularly amongst developed countries, is of an intra-industry trade (IIT) nature- the simultaneous export and import of products that are very close substitute for each other in terms of factor inputs and consumption.

Grubel-Lloyd (1967) estimates that 48 percent of the trade of ten industrialized countries involved goods belonging to the same basic industry groups.

Helpman, Krugman and Lancaster (1979) argue that modern trade in automobiles, computer, defense equipment and so on is primarily in terms of Intra-Industry.

Yarbrough- Yarbrough (1999) pointed out that even through Grubel-Lloyd found that about 66 percent of the trade in chemicals was intra-industry type, since the chemicals industry is large and diverse; it is not unusual to import some type of chemicals and export other.

Husted-Melvin (1999) recognized that "some intra-industry trade is purely a statistical phenomenon, one that would go away if economists had access to highly detailed data on trade( e.g. data on trade in cotton vs. wool sweater)". In such a case, intra-industry trade could just be an illusion.

According to Havrylyshyn and Civan (1985), India's IIT in 1978 was 37.4 percent of total trade with the world as compared to 15.6 percent in 1968. India's IIT with the

Newly Industrializing Economics was 15.1 percent in 1978 as compared to 17 percent in 1968.

S.V. Hariharan (1998) examines the export performance of Indian economy and compares its performance with other countries of the Asian region in recent year. He focused the growth of exports of India for a period of fifty years from 1947 to 1996. The export performance of India has been compared with other Asian countries, namely Bangladesh, Bhutan, China, Fiji, Indonesia, Korea, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Singapore, Sri Lanka and Thailand. The relative performance of India is assessed through linear growth rate of export, average for five year periods, export-GDP ratio, per capita exports and share in the exports of the origin. The value of exports is sizeably higher for Japan, Korea, Singapore, China, Indonesia Malaysia, and Thailand analysed in terms of average for five years periods. Hence, India's performance cannot be regarded as very impressive. Most of the Asian countries have registered higher growth rate of exports than India.

Satish C. Jha (1996-97) investigates the changing pattern of intra-regional trade in the Asian region. One of the important characteristics of Asia is its rapid growth in international trade. During the period from 1980 to 1992, the average rates of growth of Asian merchandise exports and imports were 9.6 and 6.1 percent respectively, compared with the world average of 5.5 percent for both exports and imports. Consequently, Asia's share in world trade rose sharply from 15.9 percent in 1980 to 25.3 per cent in 1991 for exports, and from 17 percent to 21.5 percent for imports over the same period. Among the Asian countries, the largest bilateral trade flows are between people republic of China and Hong Kong, which accounted for 73 billions of US dollars in 1992. Another striking feature is the dominant importance of Japan and the Newly Industrialized Countries in Intra-Asian trade. Japan's exports to Hong Kong and Taipei, and China are over 20 billions of US dollars each while its exports to Korea, Singapore and Thailand are over 10 billions of US dollar each. Intra-regional flows in South Asian economies are very small in value, partly because of the small value of their total external trade and partly because of traditionally higher barriers to trade in those countries.

Jitender Kumar Dhanwal and Moneet Kumar (1995) investigate the trade relationship between India and some of the Asian countries. The data on trade during the period 1985-86 to 1992-93 have been used for this study. The Asian countries taken for investigation are SAARC countries (i.e. South Asia Countries) and East Asian countries

including China and Japan. India has been consistently enjoying a favourable balance of trade with this region and her exports and imports are growing. Bangladesh is India's largest trading partner in the region followed by Sri Lanka. India has adverse balance of trade with East Asia. India has traditionally strong trading relationships with most of the countries in this region, which accounted for 1.5 per cent of India's global trade during the period April-October 1992. India has established joint committees with Australia, New Zealand, South Korea, Philippines and Thailand. In addition, there is joint commission with Australia and Malaysia. This enables regular contact to discuss bilateral issues on trade, investment and economic co-operation.

J.B. Kelegama (1994) examines how far the SAARC Preferential Trading Arrangement will help for the expansion of mutual trade in Asia. Intra-regional trade in South Asia works out to less than 3 per cent of the total trade of the region. This indicates that the trade complementarities in South Asia are limited and it constitutes only a small market for the area's products. Trade complementarities have grown in other regions mainly based on manufactures. However, this has not taken place in SAARC due to the small size of the manufacturing sector and the restricted range of products. Machinery forms only a small fraction of intra-regional trade while bleached cotton fabrics and grey woven cotton fabrics are the major manufactured items. The cotton fabrics are exported only by India. Raw cotton and rice are the principal commodities of intra-regional trade and both are exported by Pakistan. Tea is exported by Bangladesh, India and Sri Lanka while jute and jute products are exported mainly from Bangladesh. India has the largest volume of intra-regional trade in 1990 followed by Pakistan, Bangladesh and Nepal. The decline in the share of intra-regional trade in SAARC compared to the total trade during the past decade seems to indicate that the complementarities based on agricultural products and light manufactures have reached their limits. The goods produced in the sub-region do not appear to meet the consumer demands of the important countries. Although the SAARC countries have diversified their exports in recent years by launching new export industries, they are geared to export markets outside the sub-region.

Kumeresan Govindan (1994) attempts to investigate the overall trade pattern and intra-regional trade pattern for different South Asian countries with emphasis in agricultural commodities. The author also investigates to identify the causes for low level of intra-regional trade and suggests measures to strengthen the trade within the region. The overall trade pattern of South Asian countries. The author at different points of time

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analyzes the extent of intra-regional and the direction of trade. According to him, the share of intra-regional exports to total exports of the region remains around three to four percent between 1970 and 1990. The share of intra-regional imports in total imports has come down from 2.9 percent in 1970 to 1.9 percent in 1990. The overall magnitude of intra-regional trade has gone down from 3.2 percent in 1970 to 2.3 percent in 1990. Another important feature noted by the author is that about 40 percent of trade of the SAARC countries is with the Asian-Pacific Economic Co-operation Region. By investigating the trade pattern of selected food commodities, the author observes that intra-regional trade is small for most of the commodities. South Asian countries are exporting food commodities, mainly to other developing countries and industrial countries. About 60 per cent of total exports of food commodities from the SAARC countries are exported to other Asian developing countries and 37 percent of food exports go to industrial countries.

### **1.8: Short Overview**

Chapter II is related to various measurement techniques for IIT. This chapter specifically deals with the theories of specialization and methodology for measurement. Determinants of specialization and trade have clearly spelt out with a brief analysis of reasons for IIT. In a section the effect of trade and a distinction between inter and intra-industry trades have been made. Chapter III is about our overall performance of trade. It makes a comprehensive discussion of historical development of trade with the elaborate representation of our exports and imports of goods and services. India's foreign trade picture during post reform period has been clearly depicted. A directional analysis of our exports and imports, and exports and imports as percentage to GDP has been done with the help of simple statistical tools and techniques. A comparison of Indian exports with the world exports has also been made in this chapter. Chapter IV deals with examining Indo-Bangladesh trade with an extension of Indo-SAARC trade relations. Trade intensity indices have made to identify trend, structure and current picture of Indo-Bangladesh trade. In this context also we have particularly analyzed the importance of India in the overall trade of Bangladesh and also the importance of Bangladesh in the overall trade of India. To see the intensity of IIT with the neighbouring countries we have measures Indo-Bangladesh IIT indices. Growth and pattern of our IIT has been presented in chapter V. In this chapter we have also analyzed Indo-US IIT pattern. The chapter makes an exhaustive study on the growth of IIT under liberalization, India's merchandise and IIT with East

Asia, Indo-EU trade relation. Evidence and measurement of India's overall IIT have been done. In Indo-US section of this chapter we have described the issues such as India's trade with the USA, IIT between these two great democracies with a methodology for measuring IIT. Chapter VI summarises and concludes.

