3.1. INTRODUCTION

It was stated in the previous chapter that South Asian countries, despite outward orientation in trade during late 1970s and macro economic adjustments in late 1980s, could not improve their position in international trade as compared to other developing Asian countries like Korea, Taiwan, Malaysia, Philippines, Indonesia and Thailand. The main causal factor underlying poor performance of exports of South Asian countries seemed to be lack of emphasis on international competitiveness in these economies as compared to NIC-4 and ASEAN-4. South Asian economies lagged behind in the international competition by undertaking the production and export of commodities, keeping in view the world demand only while disregarding country's particular situation and resources. On the other hand, NIC-4 and ASEAN-4 moved up the ladder of competitiveness in world trade by selecting and implementing a trade strategy to take full advantage of the potential benefits, taking into account country's particular situation and resources. Thus enhancing competitiveness may be termed as one of the major objectives of trade strategy for South Asia. A general question therefore arises: what are the major corrections through which competitiveness could be improved. In an attempt to answer this question, the analysis of the present chapter is divided into three parts:

(a) Determinants of competitiveness.
(b) Sources of comparative advantage i.e., theories of comparative advantage and empirical models review.
Theoretical validity of Heckscher-Ohlin model of trade.

3.2. DETERMINANTS OF COMPETITIVENESS

Competitiveness is defined as "the degree to which a nation under free and market conditions, produce goods and services that met the test of the international markets while simultaneously maintaining and expanding the real incomes of its citizens".

The competitiveness is a dynamic phenomenon evolving as an integral component of the development process. This is because the development process and trading opportunities are interdependent. Trade policies lead to specialization in trade, specialization in trade in turn leads to increase in production. Increase in production (if accompanied by increased productivity) will help improve competitiveness. Two reasons may be attributing to this logic: First, as reallocation of resources depends on comparative advantage, the types of goods that less developed countries are best able to produce and export should be based on comparative advantage considerations. The export oriented approach is, to a considerable extent based on the theory of international comparative advantage. Its supporters advocate specialization in production and trade, using relative efficiency criteria. The experience of many developing countries of South Asia has clearly demonstrated that adequate consideration is not always given to comparative advantage of a country in planning for industrialization and trade. The neglect of comparative advantage very often leads to diseconomies of scale (less than minimum efficient scale) and inefficiency in production. The strategy of industrialization that takes comparative advantage into

---

consideration provides a suitable basis for an international division of labour between countries of different levels of economic development. An international division of labour on this basis is considered to be a desirable objective in the long run interest of a harmonious development of the international trade and the world economy. Thus the competitiveness of exports may depend on whether the composition of exports, as suggested by trade theories, is determined by comparative advantage or not.

Secondly, in a rapidly changing world of capital accumulation and technological progress, comparative advantage itself has come to be regarded as a constantly changing (a dynamic) phenomenon. There might be changes in comparative advantage with the progress of economic growth. The reasoning appears to be that sources of comparative advantage lay in factor endowments. Every economy, before development, depends on natural endowments. Thus, for every economy, the comparative advantage, in the initial stages of development, lay in raw materials and agricultural products. With technological improvements the relative endowment of capital changes. With increased accumulation of capital, as compared to natural resources and labour, the comparative advantage shifts from agricultural and raw material products to labour intensive manufactured products. The development process is further initiated in a chain reaction. Accumulation of capital leads to better skill and technological advancements which further shifts the comparative advantage from labour intensive manufactures to capital intensive manufactures. This in turn leads to economies of scale, increase in the size of market etc. There is further increase in accumulation of capital leading to still better skills and technology and hence shift in the comparative advantage to skill and technology intensive
manufactures. In accordance with this shift in comparative advantage, the composition of exports shifts from raw material and agricultural products to labour intensive manufactures, and ultimately to highly skilled and technology intensive manufactures.

In other words, the composition of a country’s export changes with the growth of its economy. The pattern approach to development analysis by Clark, Kuznets, Watanabe, Shisido Chenery and Taylor and subsequently followed up by many others, has greatly enhanced our understanding of the way the production structure "normally" changes in response to economic growth. Chenery and Taylor have demonstrated that variations in the production structure are related systematically not only with variations in national income and country size but also with trade patterns (Banerjee, 1975). The pattern of trade as per trade theories may vary from country to country because of differences in their endowment with productive resources and skill, in scale economies and in technology. A priori one would expect countries which are at lower levels of economic development, possessing simple technology, having a scarcity of physical capital and skill but with plenty of labour supply to specialize in the production and export of manufactures that are simple to produce and do not require much skill and capital. Conversely, countries with advanced technology, well endowed with capital and skill and having a relative shortage of labour are expected to specialize in research and capital intensive manufactures. As countries move from lower to higher levels of development, they are likely to accumulate capital, develop skills and generate a better technology leading to changes in the structure of comparative (relative) costs. This everchanging structure of

---

comparative costs allows a given country to move up the ladder of comparative advantage from specialization in primary product exports to unskilled labour intensive exports to capital intensive exports and further to knowledge and skill intensive exports.

3.2.1 Hypotheses

We may state that the competitiveness of an underdeveloped economy is going to be less in all products as compared to a developed economy. It is to be evolved with the development process. Enhancing competitiveness may be termed as one of the major objectives of trade strategy for a developing economy. Experience of successful exporting countries of the world show that these countries improved their competitiveness with the development process.

The diversity of national resources and international marketing situations means that a single policy description would not be useful. Each country is unique and policies should be adopted to the particular circumstances of each. Nevertheless it would be equally wrong to imply that no general lessons can be drawn from past experiences. There are some common elements in the strategies of developing countries that have been successful in enhancing competitiveness of exports. Thus, the process by which Japan, NIC-4 and ASEAN-4 evolved this competitiveness may serve as a good example for major corrections to be incorporated in South Asia.

Every economy before development has a traditional production structure, based on its natural resources with acute lack of capital. For every economy the comparative advantage in the initial stages of development, thus, lay in agricultural and primary commodities. As economies grow, they accumulate capital, develop
skills and generate better technologies and thus the comparative advantage shifts from agricultural and primary products to labour intensive manufactured products, to capital intensive manufactured products and further to skill and technology intensive manufactures. Thus, if analysed in terms of comparative advantage (in static as well as dynamic sense), the nations following the theory of shifting comparative advantage i.e. moving up the ladder of comparative advantage from specialization in primary products to products which are intensive in capital, skill, technology and knowledge in a gradually progressive fashion would manage to evolve competitiveness in world trade.

Historical experience of the export-led growth of Japan demonstrates that in accordance with the principal of comparative advantage, Japan specialized in the exports of primary goods in the initial stages of development (1859-67); then in semi-manufactured goods (1876-86) and then into capital intensive manufactures (1886-93). NIC-4, following Japan, in early 1960s could also achieve higher rates of growth in trade by specializing in exports of primary goods and agricultural products in the initial stages of development, shifting to labour intensive products in late 1960s and 1970s and to capital intensive manufactured products in 1980s. The success of ASEAN-4 in the 1970s in international trade and growth was also based on the same policy. By expanding agricultural exports, ASEAN-4 countries realized greater foreign exchange earnings and improved the linkages between agriculture and other sectors.

---


NIC-4 (except Hongkong) and ASEAN-4 having realised that an expanding industrial sector cannot be fueled for long by resource transfers from a static agricultural sector and the economic potential of agriculture must be mobilized before it can be used, improved their competitiveness by increasing their share of primary exports in the initial stages of development.

The mobilization of agriculture for general development and trade however would depend, as per the experience of successful Asian countries on

(a) Macro economic and trade policies which are fairly conducive to expansion of agricultural exports

(b) Protectionist policies aimed at expansion of agricultural exports which gives stress not only on subsidies, but also on an increase in production and quality

(c) The increase in production in turn is achieved by development of adequate infrastructure in the field of agriculture.

The comparative study of 11 semi-industrializing countries by Bela Balassa\(^5\) reveals that export growth has been particularly rapid in cases where more or less equal incentives have been provided to exports of different sectors and individual export products. Macro economic and trade policies in Korea, Taiwan and ASEAN-4 were fairly conducive to expansion of agricultural exports.

It may not be implied by Bela Balassa’s results that only protection will lead to better performance of exports by the agricultural sector of the economy. Unless a sector (industry or agriculture) receiving protection in pushed rapidly to become

---

internally competitive by not only producing more but of quality too, it may not contribute significantly to improvement in competitiveness. The effects of primary exports on industrial development depend to a considerable extent on output relationships. In other words Agriculture could be exploited for general development and trade only if it first produced a surplus which was there for exploitation.

Comparative analysis of growth of agricultural production by countries reveals that agricultural exports were growing fastest in the countries with the highest rates of growth in agricultural production.

Production increase will prove to be effective i.e. cost disadvantage will be reduced only if backed by adequate infrastructure. Infrastructure in the form of ports, railways and roads often represents important inputs for primary exports and their availability may contribute to the development of industrial activities.

The Government is expected to develop the infrastructure by providing various types of economic services for promoting overall developmental climate in the country.

Comparative study of NIC-4, ASEAN-4 and South Asian countries\(^6\) reveals that the share of economic services in total expenditure of Central Government (consolidated accounts) works out much higher for NIC-4, ASEAN-4 and China as compared to South Asian countries.

Thus we may hypothesize that countries whose trade strategy supported composition of trade that not only confirmed to comparative advantage as it existed initially but also changed this composition in accordance with shift in

\(^6\) Please See Chapter VI.
comparative advantage (over time) with major emphasis not only on subsidies but on production and infrastructure improved their competitiveness in world trade.

The competitiveness of exports as per the first part of the hypotheses is to be evolved with development process by changing the composition of trade in accordance with changing or dynamic comparative advantage. For this we have to provide an understanding of the historical forces which give rise to current pattern of comparative advantage and provide an insight into likely direction of change in the future i.e., we have to look into the sources of comparative advantage. Thus before proceeding to the empirical analysis of comparative advantage in exports of South Asian Countries, a review of theories of comparative advantage and empirical model\$\$ review has been attempted in the following sections to determine the model of export determinant.

3.3 SOURCES OF COMPARATIVE ADVANTAGE:

3.3.1 Introduction:

The classical determinants of what goods and services countries will buy and sell in foreign trade is based on the theory of comparative advantage. As formulated by Ricardo and refined by the neoclassicists, the theory identified and arrayed goods in each country according to their unit costs. The precise pattern of specialization in production and trade depended on comparative costs. The comparative cost principle has profound implications for maximising economic efficiency and welfare.
In order to explain the pattern of international trade, theorists\(^7\) suggest the existence of three broad sets of determinants which govern patterns of specialization and trade. One set is technological. These determinants can be represented by intercountry variations in relative efficiencies and give rise to comparative advantage through differences in production functions. The Ricardian model of trade provides an example of this line of reasoning. Factor endowments are a second set of determinants. Their effects are highlighted by the factor abundance model of development by E. Heckscher and G. Ohlin (HO). The third group of determinants is demand related forces. Although these phenomenon have now claimed a place in the literature on trade, there is no equivalent demand oriented theory of international trade since the results it could provide are trivial.

The usual practice, in the absence of a universal model has been to explain comparative advantage in terms of only one set of determinants. The most striking example of this practice is found in the factor abundance approach by H.O. A series of interesting hypotheses and modifications of the simple H.O. theorem examining the importance of various alternative determinants of pattern of trade have been developed over the last forty years. However, during the last few years, there has been considerable scepticism, about the ability of conventional H.O. model to explain the post war growth in world trade specially of trade in manufactures. Neither the extensive trade among the industrial countries, nor the prevalence in this trade of two way exchanges of differentiated products, make much sense in terms of standard

---

\(^7\) For details please see:

theory. As a result many people have concluded that a new framework for analysing trade is needed. The main elements of such a framework—economies of scale, the possibility of product differentiation and imperfect competition have been termed, by Krugman, as New theories of trade among industrial countries.

3.3.2 Ricardian Model

The hypothesis suggested by Ricardian model is that the observed composition of trade can be explained by intercountry variations in comparative costs. Since labour is the key productive factor in the Ricardian model, measures of comparative labour productivity have been designed to serve as a proxy for comparative costs. Given the existence of other productive factors and the fact that, in actuality trade is determined by differences in absolute money prices among countries, the empirical testing of the Ricardian model has foundered on the fact that it clearly ignores many potentially important determinants of comparative advantage.

3.3.3 Heckscher Ohlin Model (H.O.)

The basis of trade was originally stated by Ricardo, in terms of the international variations in comparative costs of production. The Ricardian model, however, does not answer the more fundamental question of what determines these variations in costs. H.O. model of trade offers a better understanding of the sources of comparative advantage. It is concern for a more complete understanding of the sources of comparative advantage that distinguishes the H.O. model from its forebears. The importance of factors of production other than labour were recognised. The relative availability of these factors was seen to be ultimate cause of international

---

trade. This theory attributed to E. Heckscher and G. Ohlin, has received the most attention in the literature.

According to H.O. theory, pattern of trade between different countries is determined by the pattern of comparative advantage among them which in turn, (assuming the technology to be the same across countries) is the result of their resources endowment structure. The H.O. proposition is that differences in factor proportions are the most important single cause of differences in price structures from country to country. A relatively land abundant country will have a price advantage in respect of those goods which embody much of these land resources and consequently it will be able to export these goods. The basic theorem of the theory developed by Heckscher and Ohlin is the following assertion: "that differential endowments of factors of production between countries is the most important single factor’ in determining comparative cost differences leading to international trade. This coupled with the use of different proportions of the factors of production in different commodities, will lead to a pattern of trade "where each country tends to export commodities using relatively large amounts of its abundant factor" (Heckscher Eli 1949).

The H.O. model describes the export and import behaviour of an economy on

---

9 H.O. theory of comparative advantage is available in two versions. (a) The factor content version, (b) The commodity version. The factor content version depicts trade as an implicit exchange of the factors of production embodied in traded goods. The commodity version suggests that a country will tend to export goods which require comparatively large amounts of those factors of production which are relatively abundant in the country. Thus, a country which is rich in capital would be expected to produce and export goods which require relatively large amounts of capital.

10 Heckscher, Eli (1949); "The effects of Foreign trade on the distribution of income" Readings in the Theory of International Trade (Philadelphia, 1949, p; 285.)
the basis of its factor endowments and the factor intensities of the products. Notwithstanding the limitations of this theory, several attempts, over the last forty years, have been made in the literature to examine whether the observed trade behaviour confirms to the prescriptions of this theory.

3.3.3.1 Leontief Paradox

In early 1950s, W.W. Leontief\(^\text{11}\) made an attempt to verify the validity of the H.O. theorem. Based on the US data of 200 industries for the year 1947, cast in the input output structure with 50 sectors, the study revealed that the manufacture of US exports required a higher proportion of labour to capital than the manufacture of import-competing goods'. Since the US has been traditionally regarded as a country abundantly endowed with capital, these findings clearly conflicted with the expectations of the H.O. model. These findings, later termed as 'Leontief Paradox' aroused a great deal of comment and controversy in the economic literature. Leontief's methodology, assumptions and figures were questioned and subjected to criticism by numerous people. Leontief himself was not satisfied with his findings. He, in a subsequent article written in 1956\(^\text{12}\), trying to reconcile with findings with the factor proportions approach, concluded that, contrary to earlier expectations the US is indeed a labour abundant country. The quality of US labour makes up for its relatively small quantity and increase productivity to such an extent that labour is relatively abundant in relation to capital. According to the later study by Leontief,


with a given quantity of capital, one man year of American Labour is equivalent to, say, three man years of foreign labour. Multiplying, therefore, the actual 1947 labour force of 65 million by three and then finding out capital per worker from this adjusted figure Leontief asserts: "Spread’ thrice as thinly as the unadjusted figures suggests - the American capital -supply (per equivalent worker) turns out to be comparatively smaller than that of many other countries. Further Leontief contends that this superiority of American labour vis-a-vis the foreign labour cannot be due simply to large amount of capital which American industry uses per employed worker, but because of the skills, mental attitudes and physical fitness which US labour allegedly possess. He presented a table\(^{13}\) showing labour inputs in export and import competing industries broken down by skill levels. This table showed that the export industries employed a higher proportion of skilled labourers than the import competing industries. Leontief’s latest finding may be reinterpreted as follows:

The international competitiveness of US exports can be ascribed at least in part to the relative abundance of skilled labour. This factor could outweigh the relatively less use by the export industries of the country’s other abundant resource - capital.

The Leontief "paradox" has stimulated a series of other interesting hypotheses and modifications of the simple H.O. theorem. In particular, a great deal of attention has been devoted to examining the importance of natural resources, human capital, scale economies, technological factors, product cycle, stage of production and consumption patterns as determinants of trade patterns and their composition. 

theoretical explanation of these determinants according to Huffbauer\textsuperscript{14} (except consumption pattern formulated by Linder), has developed in two directions:

1. The neofactor proportions approach and (2) the neo-technological approach.

\textbf{3.3.4. The Neo-Factor Proportions Approach}

The neo factor proportions approach was directed at attempting to extend the basic two sector H.O. model to include natural resources and to distinguish human capital from physical capital and unskilled labour. Studies of Vanek (1963), Weiser (1968), William (1970) and Baldwin (1971) explain natural resource content and Mitchell, E.J. (1968), Huffbauer (1971), Branson (1971) and Bhagwati (1969\textsuperscript{16}) following Leontief, explain the human capital in trade.\textsuperscript{15}

\textbf{3.3.4.1 Human Capital or Skill Explanation of Trade}

The inclusion of human capital as a main determinant of the commodity structure of trade was recognised by Leontief and later became a prime focus in empirical implementation of the H.O. model. There seems to be little question now that US exports are relatively more human-capital intensive than imports. Similarly, in studying the factor contents of trade in other countries the analysis is enriched when human capital is considered apart from physical capital and raw (unskilled labour. The studies by Bhagwati and Bhardwaj (1970, India) Fels (1972, West Germany), Lovinger (1971, Brazil) Tyler (1972, Brazil)\textsuperscript{16} focused narrowly on the role of human capital in determining comparative advantage. The skill explanation of

\textsuperscript{14} Huffbauer, G.C. (1971) : The Impact of National characteristics and Technology on the Commodity Composition of Trade in manufactured goods.

\textsuperscript{15} For details please see Bibliography.

\textsuperscript{16} Please see Bibliography for details.
trade is based on the assumptions that the ratio of skilled to unskilled labour is higher in some industries than others, and that interindustry differences in skill requirements are fairly consistent internationally. Thus Donald Keesing argues that international differences in skill endowments, reflecting different rates of investment in labour force, strongly affect the pattern of international trade. Countries, relatively well endowed with skills tend to export skill intensive products if its skill endowment is better than that of its partners.

We may state that the neo factor proportions approach (the Directed at attempting to extend the H-O model to include natural resources and to distinguish human capital from physical capital and unskilled labour) enables us to retain the familiar neo classical trade model. The policy guidelines implicit in the H-O theorem - a country should give priority to manufacture of products containing a high proportion of locally abundant factors - are not affected by this interpretation, Factors, however, should be carefully defined in order to avoid possible confusion arising from erroneous classification.

3.3.5 THE NEW TECHNOLOGY APPROACH

The neo-technology approach is a more recent and seemingly productive line of approach. The underlying theories - Technological gap, product cycle, economies of scale, stages approach-emphasize dynamic factors in explaining trade patterns.

3.3.5.1 Stage of Production

Theories of import substitution often presuppose that a stage of production sequence underlines trade. According to import substitution school of thought, the newly developing country will produce for itself and may even export consumer's
goods, while the advanced nation will specialize in exporting producer’s goods.

### 3.3.5.2 Technological gap and Product Cycle

The product cycle accounts and the technological accounts clearly belong to the same family. Both stress the sequential development of production history. But, while technological gap emphasises time, product cycle emphasises the transition from product differentiation to product standardization. Hence the two theories merit separate examination.

Technological gap - Technology has been intensively discussed in international trade theory during the last two decades. The discussion focused largely on the impact of change in technology on factor endowment, terms of trade, factor rewards and gains from trade. This approach, however, still retains the basic assumption that all technological changes are known to every producer and that the knowledge of how to produce goods is instantaneously and universally available.

One method of incorporating technology into trade models is to treat it as a capital augmenting factor. Technology under this formulation ceases to be a free factor; it is more expensive in some countries than in others and its intensity in use varies between different industries. This approach has been adopted by G.C. Huffbauer,¹⁷ and H.G. Johnson¹⁸ who suggested that capital should be redefined to include human capital.

An alternative approach is to treat technology explicitly and to introduce an

---


element of time into the trade model. Being first on the market gives a firm substantial advantage over competitors. Some industries have a higher proportion of new goods than others. Some countries have a higher capacity for innovation than others. This approach has been adopted by Posner (1961), Seev Hirsch (1967), G.C. Huffbauer (1970), Vernon (1970) and Klien (1973)\textsuperscript{19}. According to Posner (1961) who emphasizes the role of technical progress as a determinant of trade, new products and production processes are constantly being developed and innovating country will, for a time, enjoy a technological superiority over its trading partners. New technologies will eventually be replicated elsewhere but the process of technological advancement is continuously renewed as innovations occur and existing technologies are transferred elsewhere.

Huffbauer concluded that both factor endowments and technological influences were important in explaining the composition of exports. Industries with a high rate of technological progress tend to export a higher proportion of their output than those with a low rate of technological progress. The underlying hypotheses is that the ability to innovate new products and to reduce costs are high when technological progress is high.

Expenditures on Research and Development determine the level and rate of technological progress in an industry. The technology intensive industries tend to be those which have a high share of Research and Development expenditure in the value added. Keesing observed a significantly positive relationship for US industries between Research and Development expenditure as percent of value added and the net

\textsuperscript{19} For details please see Bibliography.
exports of an industry.

His findings were confirmed by Gruber, Mehta and Vernon\textsuperscript{20}. Gruber and Vernon provided further evidence of the importance of the technological factor (defining technology intensive industries as those which employed scientists and engineers in excess of six percent of their total work force, as measured by US data) by examining its role in a world trade matrix. Maurice Girgis analysis also supported the hypothesis that trade patterns in manufactured goods could be attributed to international differences in levels of technological achievements.

\subsection*{3.5.3 Product Cycle Model}

The product cycle model of trade, developed by Hirsch (1967),\textsuperscript{21} is based on the hypotheses that factor intensities as well as technical and marketing characteristics of different product groups vary in a systematic way with the maturity of a product. According to Hirsch, the advanced countries tend to have a comparative advantage in "new" and "growth" products because of their relative abundance of scientific and engineering know-how, capital management and external economies, namely factors important in the manufacture of these products, i.e., products with a stable and well established production process. "Mature" products are less demanding in their requirements of inputs that are relatively scarce in LDCs-Scientific know-how and capital - but are intensive in the use of the relatively abundant factor namely unskilled labour (Textiles, e.g.) Hence industrialising countries should specialise in the

\textsuperscript{20} William H. Gruber, Dileep Mehta, Raymond Vernon (1967) : "The R and D factor in Industrial Trade and international Investment of united States Industries".

\textsuperscript{21} Hirsch, S. (1967) : Location of Industry and International Competitiveness.
production and export of industries which have reached a matured stage in developed economies.

Another version of the model (Vernon, 1979)\textsuperscript{22} proposes that the development of new products is contingent on the nature of demand in the richer countries. Production and exports - will first occur in these countries and will only later be transferred to lower cost locations.

Partial tests of the product cycle model have been carried out by Wells (1969) and Adler (1970)\textsuperscript{23}. Wells formulations were unfortunately vague and empiricism was so casual that his results do not seem well grounded. Similarly, Adler's assumption about the relations involving price elasticities was shown to be valid.

3.3.5.4 Availability Hypotheses

Availability hypotheses, developed by Kravis, explains a country's trade composition, at a given point of time, in novel way. According to this, hypotheses, a country imports goods which happen to be non-available at home and exports those that are available. According to Kravis, "it is the elasticity of supply abroad and its inelasticity at home that gives rise to this trade, not the relative capital or labour requirements of the products". Natural resources, innovation (technological progress) and product differentiation are the important determinants of availability. The product cycle thesis associated with Vernon and others is in fact the same as Kravis' availability thesis. National product differentiations - in the sense that due to

\textsuperscript{22} Vernon (1979) : An anatomy in the Theory of Comparative Advantage.

preferences of buyers the products of a particular nation succeed in securing a favoured position in a country - can also be seen as a basis for the operation of availability factor in international trade.

3.3.5.5 Preference Similarity

S.B. Linder\textsuperscript{24} offers a different story of determinants of trade. According to Linder, "trade in primary products may be due to differences in natural resource endowments among countries and therefore the H.O. theorem provides a reasonably good explanation of trade in these products. Trade in manufactures, on the other hand, is due to structural similarities between countries. It is possible that the factor proportion theorem has gained such wide acceptance only because a pattern of trade in primary products dictated by differences in natural resource endowments, is so plausible".

Linder's central hypothesis is that the intensity of trade in manufactures between two countries is greater, the greater the similarity in the demand patterns of the two countries. The pattern of demand is further assumed to be similar in countries with comparable levels of per capita income. In other words, the volume of trade in manufactures will be more intensive between countries with similar per capita income than between countries with dissimilar incomes. This theory is based on two premises:

i) It presumes that existence of home demand is a necessary condition for a product to be qualified as export.

ii) Second, as a corollary to the above, the output composition of a country is

\textsuperscript{24} Linder, Staffan, Bruenstan (1961) : Essay on Trade and Transformation.
supposed to adjust itself to the pattern of its internal demand, as the relative prices of the country’s product will then tend to be low.

For a product to be consumed (or invested) in a country, there must be a demand for the product at the ruling world market prices. It is representative demand that is necessary for a good to be potential export product.

Linder gives two reasons for this hypothesis:

1) It is unlikely that an entrepreneur will even think of satisfying a need that does not exist at home;

2) Even if foreign need was seen, the basically correct product to fill it might not be conceived of, it is still improbable that the product could be finally adapted to unfamiliar foreign conditions without prohibitive costs being incurred. The exceptions; according to Linder, to the home demand prerequisite are (i) it is easy to become aware of foreign demand in spite of the non-existence of home demand for the product; (ii) the product as such is available without inventive effort; and (iii) little or no product development work is needed. He thought primary product industries would fall into this category and the factor proportions account of trade to be applicable.

A review of the two approaches reveals that the interpretation of the Neo-factor proportion approach does not affect the policy guidelines implicit in the H.O. theorem, a country should give priority to the manufacture of products containing a high proportion of locally abundant factors. Factors, however, should be carefully defined in order to avoid possible confusion arising from erroneous classification. In other words, “the neo-factor proportions enables us to retain the structure and
methodology of the familiar and elegant neo-classical trade models, though it may require the introduction of one or two additional variables". (Hirsch, 1974)25

The neo-technology approach emphasizing dynamic factors such as technological gap, product cycle, economies of scale, in explaining trade patterns is a more recent and productive line of approach. Though these factors are important and they need to be distinguished more carefully, the factor endowment model has yet to be integrated systematically with an endogenous mechanism of technological change and diffusion.26 A noteworthy effort to incorporate neo-technology explanation of trade with the neo-factor proportions was made by Huffbauer in 1970.27

Huffbauer sought to explain the characteristics embodied in 1965 exports for 24 developed and less developed countries, using 3 digit SITC trade data for manufactures and assuming that US coefficients could be applied to all other countries, he calculated export characteristics for each country that were designed to reflect (i) capital per man, skill ratios, and wage differentials in accordance with the factor endowments theory; (ii) the "first trade date", to represent the introduction of new products according to the theory of the technological gap; (iii) Product differentiation, to represent a stage of specialization in the product cycle; (iv) scale economies arising from specialization for the home market; and (v) the ratio of consumer goods to total industry sales, to capture the stage of economic development.


These national export characteristics were then related by rank correlation methods to various national attributes: fixed capital per man in manufacturing and skilled employees as a percentage of the labour force to approximate factor endowments; gross domestic product per capita to reflect technological sophistication; and total manufacturing output to represent the possible realization of scale economies and the stage of development in production. Despite the crudity of his measures Huftbauer found that the various explanations did relatively well and concluded that both factor endowments and technological influences were important in explaining the composition of exports.

Leamer's latest work (1984)\textsuperscript{28} may be considered to be an improvement over Huftbauer's analysis.

The simple linear model by Leamer explained a large amount of variability of net exports across countries and it also identified the sources of comparative advantage. As per Leamer's results "unskilled labour and land are sources of comparative advantage in the agricultural products and natural resources are sources of comparative advantage in natural resource products. As per manufactured products, in 1958 success in exporting manufactured products was linked to abundance of knowledge capital embodied in the professional/technical work force. In 1975, however, knowledge capital continued to be the most important source of comparative advantage in chemicals but physical capital and skilled and unskilled labour were the sources of comparative advantage in machinery and labour intensive and capital

\textsuperscript{28} Leamer, Edward, E. (1984) : Sources of Comparative Advantage.
intensive manufactures". 29

There are several novelties in Leamer's work as compared to Huffbauer's.

Firstly, Huffbauer's study was confined to manufacturing sector only whereas Leamer explained the structure of trade for all the sectors of an economy.

Secondly, Huffbauer assumed that US co-efficients could be applied to all other countries whereas Leamer did not have to impose US coefficients on other countries.

Thirdly, Leamer's work offered an explicit procedure for selecting 'best' theory by the multiple testing of competing theories in contrast to Huffbauer's procedure of testing theories one by one.

Finally, Huffbauer searched for a single theory for all commodities that could vary from country to country whereas Leamer's work profiled each country's characteristics on the basis of the commodity cross section results by allowing the best theory to vary with commodity class while assuming it constant across countries.

Leamer's model is a static model of comparative advantage. Although Leamer mentions about change in accumulation of capital in the developing countries from 1958 to 1974, his model does not incorporate the dynamic characteristics of the pattern of international trade or comparative advantage. In a rapidly changing world of capital accumulation and technological progress, the dynamic nature of comparative advantage needs to be stressed.

29 Leamer: Ibid.
3.3.6 NEW THEORIES OF TRADE AMONG INDUSTRIAL COUNTRIES

There has been considerable scepticism during the last few years, about the ability of conventional H.O. model to explain the post-war growth in world trade specially of trade in manufacturers. Many economists have proposed that a new framework for analysing trade is needed. The main elements of such a framework - economies of scale, the possibility of product differentiation and imperfect competition- have been termed, by Krugman, as New theories of trade.

The conventional forces of comparative advantage operate on groups of product (industries) and thus give rise to interindustry specialization and trade. Several recent empirical studies of trade suggest that inter-industry specialization and trade, which reflect the conventional forces of comparative advantage, are also accompanied by intra-industry specialization, which reflects scale economies and consumer’s taste for a diversity of products. Much of the world’s trade in manufactures is trade between industrial countries with similar relative factor endowments; much of the trade between these countries involves two-way exchanges of goods produced with similar factor proportions (intra-industry trade). Furthermore most manufacturing industries are characterized by at least some degree of increasing returns (specially if we include dynamic scale economies associated with Research and Development and the learning curve). Most manufacturing industries are also imperfectly competitive to at least some extent. Thus conventional model (H.O.) which assumes constant Returns, exogenous technology and perfect competition cannot give adequate guidance for trade policy in these industries.
In response to this, many economists\textsuperscript{30} have proposed alternatives to conventional trade theory. It has been widely recognised that economies of scale provide an alternative to differences in technology or factor endowments as an explanation of international specialization and trade. Balassa (1967) and Kravis (1971)\textsuperscript{31} have argued that scale economies play a crucial role in explaining the post-war growth in trade among the industrial countries. Assuming scale economies to be internal to firms, with the market structure that emerges being one of chamberlinian monopolistic competition, the model shows that trade need not to be a result of international differences in technology or factor endowments. Instead, trade may simply be a way of extending the market and allowing exploitation of scale economies, with the effects of trade being similar to those of labour force growth and regional agglomeration.

Thus, according to new theories of international trade, scale economies play a crucial role in explaining the post-war growth in world trade among the industrial countries - perhaps more important than differences in factor endowments.

\textbf{3.3.7 THEORETICAL VALIDITY OF THE H.O MODEL}

The H.O. Model has conventionally been used to explain the pattern of international trade. According to this theory (assuming the technology to be the same across countries), comparative advantage is the result of the resource endowment structure of different economies. The model describes the export and import


behaviour of an economy on the basis of its factor endowments and the factor intensities of the products. A series of modifications of the simple H.O. theorem, examining the importance of natural resources, human capital, scale economies, technological factors, product cycle, stage of production and consumption patterns have been developed over the last forty years. The theoretical explanation of these determinants has developed into three directions:

i) The neo-factor proportions approach

ii) The neo-technological approach, and

iii) New Theories of Trade

A detailed review of the first two approaches reveals that:

The neo-factor proportions enables us to retain the structure and methodology of the neo-classical trade models, though it may require the introduction of one or two additional variables. Factors, however, should be carefully defined in order to avoid possible confusion arising from enormous classification.

The neo-technology approach emphasizes dynamic factors such as technological gap, product cycle, economies of scale. Though these factors are important and they need to be distinguished more carefully, the factor endowment model has yet to be integrated systematically with an endogenous mechanism of technological change and diffusion. A noteworthy effort to incorporate neo-technology explanation of trade with neo-factor proportions was made by Huffbauer (1970). Leamer's work (1984) may be considered to be an improvement over Huffbauer's analysis. Leamer's model, however, is a static model and does not incorporate the
dynamic characteristics of comparative advantage. The need is to improve our understanding of the processes whereby technology and other forces determine comparative advantage at a point in time and alter its structure overtime. To accomplish this, these various forces must be treated endogeneously in our theoretical model. The factor endowment model has yet to be integrated systematically with an endogenous mechanism of technological change and diffusion. According to Stern, due to conceptual inadequacies in recent empirical research on technological and related factors, explanations of trade were often difficult to interpret and compare. Thus it may not be possible to integrate factor endowment model systematically with an endogenous mechanism of technological change and diffusion at a point in time.

We may contend that all the dynamic factors are indirect source of comparative advantage and thus govern the future course of comparative advantage over time by changing the factor endowments first and then the pattern of trade. For example improvement in technology will lead to change in factor endowment of an economy. This changed factor endowment will lead to change in the pattern of trade. Thus, though it may not be possible to integrate factor endowment model systematically with an endogenous mechanism of technological change and diffusion at a point in time as suggested by Stern, it may be feasible to do so by testing empirically the factor proportions model over different points of time in an economy. What we require is to determine the composition of exports as per different factor endowments at different points of time as the factor endowments change with changes in technological factors.
Every economy, initially is an underdeveloped economy. An underdeveloped economy is characterized by low level of technology and skill, abundant labour, shortage of capital and small sized domestic market. Its pattern of trade is determined by natural endowments i.e. land, labour and capital. Thus its composition of exports will comprise more of raw material products, agricultural products or labour intensive manufactures depending upon the relative endowment of raw materials, land or labour and capital in the economy. This resource endowment of the economy changes with technological improvements. With technological improvements the relative endowment of capital changes. With this increased accumulation of capital as compared to natural resources and labour, the pattern of specialization changes. Economy's share of exports of light manufactured products increases as compared to raw material and agricultural products. Once the process of technological improvement changes the resource endowment of an economy the process of development goes on. Increased capital accumulation leads in turn to better skill and technological advancements which changes the pattern of specialisation further from light manufactured products to skill and technology intensive manufactured products. Thus factor endowment proposition's structure is retained if observed as a static one at different dynamic points i.e. at different points of time as per level of technological achievement. Bela Balassa's theory of stages approach to comparative advantage strengthens the above viewpoint.

Thus, we may state that neo-factor propositions approach as well as neo-technological approach to comparative advantage enables us to retain the structure and methodology of factor proportions theorem. The policy guidelines implicit in the
H.O. theorem are not affected by these interpretations. The Neo factor proportions require the introduction of one or two additional variables and the Neo-technology approach enables us to explain factor proportions theorem at different points of time as per different levels of technological advancement and hence level of development achieved. In other words, the sources of comparative advantage lay in differences in factor endowments. The factors, however are to be defined clearly. Factor endowment is the result of (1) natural endowment and (2) past economic, political and social process. We may state that endowment of land, labour and part of physical capital is the result of natural endowments whereas that of capital (human, physical) skill, technology are the result of past, economic, political and social processes. The importance (weighage) of different factors may vary from country to country depending on level of development and from sector to sector. Differences in natural endowments (land, labour and natural resources) may be given more weighage as sources of comparative advantage in raw materials and agricultural products, capital (physical, human), technology, scale economies, research and development may be given more weighage in manufactured products. Secondly, the distribution of resources across countries is changing overtime but the pace of change is different for each resource. Patterns of specialization and trade should be altered as a result of these shifts, i.e., attempt should be made to evaluate the dynamic comparative advantage as compared to static one.

The review of the third approach i.e. New Theories of trade reveals that, there has been considerable scepticism during the last few years, about the ability of conventional H.O. model to explain the post-war growth in world trade specially of
trade in manufacturers. It has been widely recognised that economies of scale provide an alternative to differences in technology or factor endowments as an explanation of international specialization and trade. The role of scale economies, as per new theories of trade, is considered to be more important than the differences in factor endowments in explaining the post war growth in world trade among the industrial countries.

The strength of two sets of determinants (factor endowments and scale economies), however, would vary depending on nature of trade (inter-industry or intra-industry). Helpman and Krugman (1985, p.262)\textsuperscript{32} show that the pattern of trade is shaped by the underlying exchange of factors but with an overlay of additional specialization to realize economies of scale: the pattern of inter-industry trade is explained by the conventional H.O. model, while the overlay of additional specialization is intra-industry in scope and its extent is dependent upon country similarities. "Countries with similar factor endowments will engage in intra-industry trade, while countries with different endowments will engage in H.O. trade" (Krugman, 1990).\textsuperscript{33}

The analysis of international distribution of factor endowments by Leamer (1984)\textsuperscript{34} and Ballance (1990)\textsuperscript{35} reveal substantial differences between the two major country groups, i.e., Developed Market Economies (DME) and Developing


\textsuperscript{34} Leamer (1984): Sources of Comparative Advantage.

Economies (DE). The study by Ballance (1990) further reveals that the differences in the endowment patterns of the developing countries are as interesting as the distinctions between two country groups (DME and DE). DMEs are relatively homogenous in terms of their basic economic characteristics while DE's are not. Secondly, scale economies and product differentiation may exert a positive influence on intra-industry-trade in industries where concentration is significantly and positively influenced by the extent of economies of scale while the intra-industry trade of DEs reveals no similar evidence.

Thus, as the diversity of factor endowments is great, a strong H.O. component (with modifications) should be present among the determinants of the commodity composition of trade, specially for developing economies of South Asia.

3.3.8 CONCLUSION

A review of the theories of comparative advantage and the empirical models review reveals that the H.O. Model has conventionally been used to explain the pattern of international trade. According to this theory (assuming the technology to be the same across countries), comparative advantage is the result of the resource endowment structure of different economies. A series of interesting hypothesis and modifications of the simple H.O. theorem examining the importance of various alternate determinants of pattern of trade have been developed over the last forty years. A detailed review of these modifications reveal the following: First, sources of comparative advantage lay in differences in factor endowment. The weight carried by different factors may, however, vary from country to country and from sector to sector. Differences in natural endowment (land, labour and natural resources) have
been taken to be as sources of comparative advantage in case of raw-materials and agricultural products. Capital (physical and human), technology, scale economies, research and development have similarly been given high weight in manufactured products. Second, in a world of rapidly changing technology one needs to focus on the dynamics of comparative advantage as compared to the static one. Third, the role of scale economies in determining pattern of trade would depend on the nature of trade (inter-industry or intra-industry) which in turn is dependent upon country similarities. "Countries with similar factor endowment will engage in intra-industry trade, while countries with different endowment will engage in H.O. trade (Krugman, 1990). As there as substantial differences in the endowment pattern of developing economies of South Asia, a strong H.O. component should be present among the determinants of the commodity composition of trade in these economies. The comparative advantage of trade in agricultural products of South Asian countries, thus, is examined (in static as well as in dynamic sense by practical application of the commodity version of H.O. model.

The familiер neo-classical version of factor proportions explained the pattern of trade for the economy as a whole i.e. considered all the sectors - agriculture, industry etc. The later theories, except a few (Leamer, Linder) considered sources of comparative advantage in manufacturing sector only. The reason may be that most of the studies were for developed economies (mainly USA) who were at that stage of development where primary exports weightage becomes quite low. South Asian economies being underdeveloped economies characterized by abundance of labour, scarcity of capital, technology etc. our analysis will consider not only the
manufacturing sector but all the sectors in these economies to judge whether their pattern of trade has been as per the resource endowment structure as reflected in the comparative cost advantages.