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# UNIT 1 FREE TRADE THEORY

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## 1.0 OBJECTIVES

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After reading this Unit, you will be able to:

- understand the different theories of free trade;
- appreciate the advantages of or gains from international trade;
- identify the limitations of theories of free trade; and
- situate the theories explained in the present context of globalisation and trade liberalisation.

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## 1.1 INTRODUCTION

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A sound understanding of trade theories has assumed greater importance in the realms of trade policy-making in the context of recent trends and debates on globalisation and trade liberalisation. Given this imperative an attempt has been made to first, present different theories of the classical vintage in a simple manner. The theories are posited in such a way that they highlight how different determinants were emphasised upon by different trade theorists in order to emphasise the potential gains from international trade. Some of the major limitations of these theories are also important to understand and it is undertaken with a view to compare and contrast different strands of thoughts.

Initially, an explanation is rendered to the pure theory of international trade as propounded by Adam Smith through the theories of absolute advantage. This is further contrasted with the advancements made by Ricardian comparative costs concepts. Furthermore, the Heckscher-Ohlin Theorem and its Extensions in the forms of Stolper-Samuelson theorem, Rybczynski's theorem and factor-price equalisation theorems are presented. Finally, a brief discussion on the empirical testing of comparative cost and the Heckscher-Ohlin Theorems is also given.

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## 1.2 THE PURE THEORY OF INTERNATIONAL TRADE – THEORIES OF ABSOLUTE ADVANTAGE

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Based on the considerations of absolute advantage, Adam Smith argued as to how countries can gain through international trade. This forms the basis for the pure theory of international trade.

The theory of absolute advantage can be explained through a simple example. Suppose two goods *A* and *B* can be produced by labour alone. It takes 100 units of labour to manufacture one unit of good *A* in country *X* but 200 labour units in country *Y*. Conversely, it takes 200 units of labour to manufacture one unit of good *B* in country *X* but only 100 labour units in country *Y*. In other words, country *X* is more efficient in producing good *A*, because it uses less labour per unit of output than country *Y*. By the same logic, country *Y* is more efficient in producing good *B*. Then country *X* is said to have the absolute advantage in producing good *A*, while country *Y* has an absolute advantage in producing good *B*.

Now country *Y* may gain by producing one unit of *B*, using 100 labour units, and exporting it to country *X* in exchange for one unit of *A*. In effect, country *Y* has used 100 labour units to obtain one unit of *A* indirectly, rather than using the same labour to produce 0.5 unit of *A* directly. Correspondingly, country *X* must have used 100 units of labour to produce the unit of *A* for export, in exchange for which it received one unit of *B*. But if it had tried to produce one unit of *B* itself, it would have required 200 units of labour. Thus, it may be concluded that by trading, both countries could have gained by having more of both goods.

The above example clearly demonstrates that two countries can gain through international trade if they have absolute advantage in producing different goods. However, gains from international exchange of goods need not be limited to the situations of absolute advantage. It was later shown by Ricardo as to how the benefits from trade can be reaped also in situations of comparative advantage, which came to be known as the theory of comparative advantage.

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## 1.3 RICARDIAN COMPARATIVE ADVANTAGE AND OPPORTUNITY COST

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It is important to highlight that the obviousness of gains from trade within the framework of absolute advantage of Adam Smith was never questioned by David Ricardo. However, the contribution of Ricardo was to show how two countries can derive gains from trade even if one country has absolute advantage as compared to another country in the production of all goods. The question then arises whether in a situation in which country *X* producing all goods with less labour cost than country *Y* would lead to gains from trade accruing to both the countries *X* and *Y*?

To understand this, we may refer to the model, which was used by Ricardo to propound the theory of comparative advantage.

Illustratively, England and Portugal were chosen as examples by Ricardo. Both

the countries produced two goods viz. wine and cloth. Portugal was assumed to be using lesser units of labour in producing not only cloth but also wine. The first two columns of Table 1.1 show what the cost conditions in the two countries were. It is clear that, Portugal has absolute advantage in the production of both wine and cloth because the number of hours of labour required for the production for each unit of the two goods is lesser in Portugal than in England.

The obvious question arises whether the two countries would gain from trade? In fact, both England and Portugal would gain from trade if the concepts of opportunity costs manifested in comparative advantages are understood at this stage.

The opportunity cost of a good *A* is defined as the amount of another good, i.e. *B*, that has to be given up in order to produce an additional unit of *A*. As demonstrated in Table 1.1 the opportunity costs of producing wine and cloth in England and Portugal are lower than each other in such a way that England should produce and export cloth to Portugal and the latter should produce and export wine to the former.

**Table 1.1: Labour Cost and Opportunity Cost Comparisons**

| Country  | Labour cost of production (in hours) |                | Opportunity cost of production |                 |
|----------|--------------------------------------|----------------|--------------------------------|-----------------|
|          | 1 unit of cloth                      | 1 unit of wine | 1 unit of cloth                | 1 unit of wine  |
| England  | 100                                  | 120            | $100/120 = 0.83$               | $120/100 = 1.2$ |
| Portugal | 90                                   | 80             | $90/80 = 1.12$                 | $80/90 = 0.89$  |

Let us explain it further. Portugal has the lower opportunity cost of the two countries in producing wine (0.89 as compared to England's 1.2), while England has the lower opportunity cost in producing cloth (0.83 as compared to Portugal 1.12). Therefore, Portugal has a comparative advantage in the production of wine and England has a comparative advantage in the production of cloth and both the countries should export to the other country the good in which it has a comparative advantage.

This brings us to the definition of comparative advantage. A country has a comparative advantage in producing a good if the opportunity cost of producing that good is lower at home than in the other country.

It needs to be highlighted that the difference in opportunity costs between two countries in the production of the same good or the presence of comparative advantage in one country vis-a-vis another arises due to technological differences.

### Check Your Progress 1

- 1) Differentiate between Adam Smith and Ricardo's Theory of International trade.

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- 2) Explain the concept of opportunity cost used by Ricardo.

- 3) Indicate the causes as explained by Ricardo that result in the differences in opportunity cost and comparative advantage.

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## 1.4 HECKSCHER-OHLIN THEOREM AND ITS EXTENSIONS

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The theory of comparative advantage in the Ricardian framework was explained in terms of a one-factor model, where the only factor was labour. The comparative advantage was determined by technological differences.

The Ricardian framework of comparative advantage was further improved upon in the Heckscher-Ohlin (H-O) model. The H-O model was first conceived by two Swedish economists, Eli Heckscher and Bertil Ohlin. Rudimentary concepts were further developed and added later by Paul Samuelson and Ronald Jones among others. Hence the extension of H-O model is referred as Heckscher-Ohlin-Samuelson (H-O-S) model.

In this model, trade between different countries is caused due to differences in relative factor endowments of those countries. It is a theory of long-term general equilibrium in which the two factors are mobile between sectors. Thus the H-O framework sheds new light on the determinants of trade in terms of 'factor proportions'. Furthermore, it provides insights into the effects of trade on factor use and factor rewards. In its extension, the Heckscher-Ohlin-Samuelson (H-O-S) model demonstrates how the free movement of goods between countries may bring about the factor-price equalisation.

There are four main theorems in the H-O-S model (hereafter called the H-O model for convenience): (i) the Heckscher-Ohlin theorem, (ii) the Stolper-Samuelson theorem, (iii) the Factor-Price Equalisation theorem, and (iv) the Rybczynski theorem. These are explained below.

### 1.4.1 H-O Theorem

According to the H-O Theorem, the determinants of trade are explained in terms of factor endowments of countries and factor intensities of goods. A country specialises in and exports that good, which intensively uses its most abundant factor. For example, if a country like India is abundant in labour then India would mainly specialise in labour-intensive goods that would form a large share of its export basket. In the same vein, India would import capital-intensive goods from countries that are capital-abundant.

It is the ratio (or proportion) of one factor to another that gives the model its generic name: the factor-proportions model. In the H-O model the ratio of the

quantity of capital to the quantity of labour used in a production process is the capital-labour ratio. Therefore it is assumed that different industries producing different goods have different capital-labour ratios.

In a model in which each country produces two goods, an assumption must be made as to which industry has the larger capital-labour ratio. Thus, if the two goods that a country can produce are electronics and textiles, and if electronics production uses more capital per unit of labour than is used in textiles production, we can say that the electronics production is capital-intensive relative to textiles production. Also, if electronics production is capital-intensive, it implies that textiles production must be labour-intensive relative to electronics.

Countries have different quantities or endowments of factors capital and labour, available for use in the production process. Thus, some countries like the US are well-endowed with physical capital relative to its labour force. In contrast, many less developed countries have very little physical capital but are well-endowed with large labour forces. The ratio of the aggregate endowment of capital to the aggregate endowment of labour is used to define relative factor abundance between countries. Thus if, for example, the US has a larger ratio of aggregate capital per unit of labour than India's ratio, we would say that the US is capital-abundant relative to India. By implication, India would have a larger ratio of aggregate labour per unit of capital and thus India would be labour-abundant relative to the US.

According to the H-O model, trade takes place in a gainful manner with important effects upon prices, wages and rents (factor prices), when countries differ in their relative factor endowments and when different industries use factors in different proportions. This is explained by Figure 1.1.

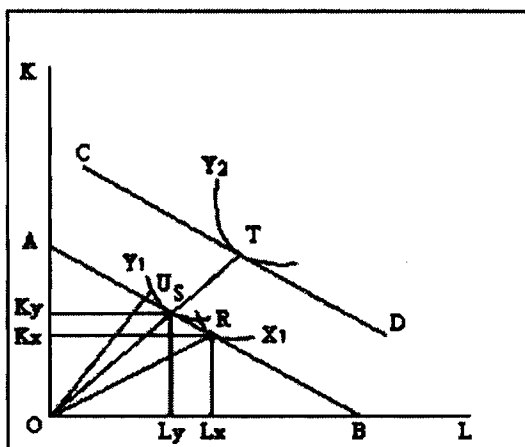


Figure 1.1: Equilibrium in production under free competition

If two goods,  $X$  and  $Y$ , are produced with different production functions, a possible equilibrium situation is as shown in Figure 1.1. At points  $R$  and  $S$  the factors of production are allocated so that the quantities specified by the isoquants ( $X_1$  of  $X$  and  $Y_1$  of  $Y$ ) are being produced at the lowest possible cost given the factor prices. In other words, at  $R$  and  $S$  the two isoquants are tangential to the lowest possible isocost line, which has a slope equal to the factor price ratio, the line  $AB$ . It follows that the ratio of the marginal product of labour to the marginal product of capital is the same for the two products, and that both are equal to the ratio of the wage rate to the return to capital (the negative of the slope of the line  $AB$ ).

Another possible equilibrium is shown by points  $R$  and  $T$ , where again the slope of the  $X$  isoquant at  $R$  is equal to the slope of the  $Y$  isoquant at  $T$  and both are equal to the given factor ratio.

An alternative way of deriving this important result is to draw upon another

standard result from microeconomics, that a producer facing given factor and producer prices will maximise his profits by purchasing factors to the point where the value of the marginal product of each factor (the marginal product times the price of the good) is equal to the price of the factor. Algebraically, using  $MPL$  and  $MPK$  to show the marginal products of labour and capital respectively,  $P$  for prices,  $w$  as the wage rate, and  $r$  as the return to capital, we have  $MPL_Y P_Y = w$  and  $MPK_Y P_Y = r$ , from which it is easy to show that in order to maximise profits the producer must combine capital and labour so that

$$\frac{MPL_Y P_Y}{MPK_Y P_Y} = \frac{w}{r} \text{ or } \frac{MPL_Y}{MPK_Y} = \frac{w}{r}$$

If the producer were producing good  $Y$  at a point such as  $U$  rather than point  $S$  then he would not be maximising profits. At  $U$  the marginal product of capital in producing  $Y$  is lower than it is at point  $S$ , and so the value of the marginal product of capital in producing  $Y$  at point  $U$  (the marginal product times the price of  $Y$ ) is lower than the cost of the unit of capital. Similarly, the value of the marginal product of labour at point  $U$  is higher than the cost of the labour. Profits would be increased by employing more labour and less capital, the capital-labour ratio would decrease, and we would move to a point such as  $S$  or  $T$ .

If for some reason factor prices were to change, factor intensities would also change. Let us assume that the price of labour compared with the price of capital increases. Then more capital-intensive methods of production will be used in both lines of production, as shown in Figure 1.2. Before the price change  $OA$  of capital cost the same to purchase as  $OB$  of labour, but after the change  $OA'$  of capital costs the same as  $OB'$  of labour, and  $OA''$  of capital costs the same as  $OB''$  of labour. The two budget lines  $A'B'$  and  $A''B''$  are parallel,

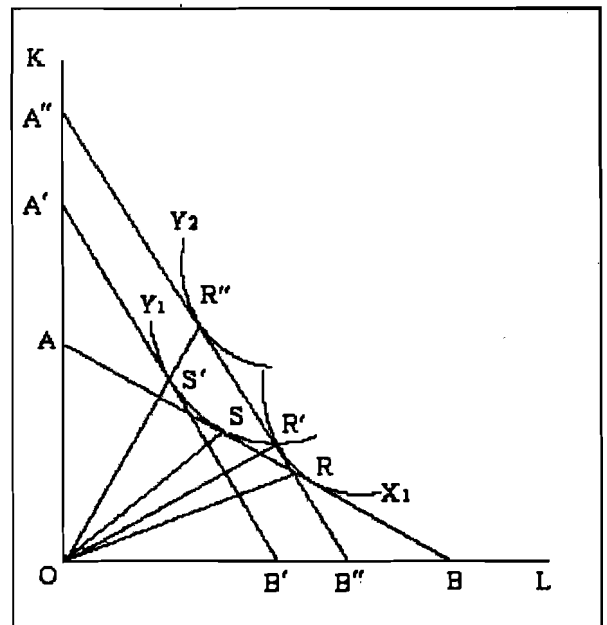


Figure 1.2: Factor prices, factor intensities and production costs

and steeper than the original budget line  $AB$ . As labour is now more expensive and capital is cheaper than before, so that methods of production become more capital-intensive for both goods. If the desired production of  $X$  is still  $X_1$ , then the capital and labour combination will be at point  $R'$ , and the higher capital-labour ratio in  $X$  is shown by the slope of line  $OR'$  being steeper than that of line  $OR$ . Similarly, quantity  $Y_1$  of good  $Y$  will now be produced at point  $S'$  and the slope of the line  $OS'$ , and the slope of the line  $OS'$  is steeper than that of line  $OS$ .

Let us explore the logic of the H-O theorem. It may be recalled that the H-O theorem predicts the pattern of trade between countries based on the characteristics of the countries. The H-O theorem says that a capital-abundant

country will export the capital-intensive good while the labour-abundant country will export the labour-intensive good.

A capital-abundant country is the one that is well-endowed with capital relative to the other country. This gives the country a propensity for producing the good which uses relatively more capital in the production process, i.e., the capital-intensive good. As a result, if these two countries were not trading initially, i.e., they were in autarky, the price of the capital-intensive good in the capital-abundant country would go down (due to its extra supply) relative to the price of the good in the other country. Similarly, in the labour-abundant country the price of the labour-intensive good would be going down relative to the price of that good in the capital-abundant country. By the same token, labour-intensive goods would be costly in the capital-abundant country and capital-intensive goods would be available at a high price in the labour-abundant country. Once trade is allowed, profit-seeking firms will move their products to the markets that temporarily have the higher price. Thus the capital-abundant country will export the capital-intensive good since the price will be temporarily higher in the other country. Likewise the labour-abundant country will export the labour-intensive good. The trade flows will rise until the price of both goods are equalised in the two markets.

### **Difference in assumptions as compared to the Ricardian Model**

The H-O model incorporates a number of realistic characteristics of production that are left out of the simple Ricardian model. Recall that in the simple Ricardian model only one factor of production, labour, is needed to produce goods and services. The productivity of labour is assumed to vary across countries, which implies a difference in technology between nations. It was the difference in technology that motivated advantageous international trade in the model. It is worth-highlighting that a major distinction between the H-O model and the Ricardian model is in terms of technology-assumption. The production technologies differ between countries in the Ricardian framework whereas the H-O model assumes that production technologies are the same. The reason for the identical technology assumption in the H-O model is perhaps not so much because it is believed that technologies are really the same (although a case can be made for that), instead the assumption is useful because it enables us to visualise precisely how differences in resource endowments are sufficient to cause trade and its concomitant impacts.

### **1.4.2 The Stolper-Samuelson Theorem**

The Stolper-Samuelson theorem describes the relationship between changes in prices of goods and changes in factor prices such as wages (for labour) and rents (for capital) within the context of the H-O model.

The theorem states that if the price of the capital-intensive good rises then the price of capital (rents) will also rise, while the wages paid to labour will fall. Thus, if the price of electronics were to rise, and if electronics were capital-intensive, then the rental rate on capital would rise while the wage rate would fall. Similarly, if the price of the labour-intensive good were to rise then the wage rate would rise while the rental rate would fall.

**Magnification Effect:** The theorem was later generalised by Jones who

constructed a 'magnification effect' for prices in the context of the H-O model. The magnification effect allows for analysis of any change in the prices of the both goods and provides information about the magnitude of the effects on the wages and rents. Most importantly, the magnification effect allows one to analyse the effects of price changes on real wages and real rents earned by workers and capital owners. This is crucial from the point of view of policy-impact since real returns indicate the purchasing power of wages and rents after accounting for the price changes and thus are a better measure of well-being than simply the wage rate or rental rate alone.

This theorem has a topical relevance in the age of globalisation and trade liberalisation. When trade liberalisation occurs in a country, prices of goods change, and the magnification effect can be applied to seek an important result. A movement towards freer trade will cause the real return of a country's relatively abundant factor to rise, while the real return of the country's relatively scarce factor will fall. Thus, if the US and India are two countries who move towards free trade, and if the US is capital-abundant (while India is labour-abundant) then capital owners in the US will experience an increase in the purchasing power of their rental income while workers will experience a decline in the purchasing power of their wage income (i.e., they will lose). Similarly, workers will gain in India but capital owners will lose.

The reasons for this result are somewhat complex. When a country moves to free trade the price of its exported goods will rise while the price of its imported goods will fall. The higher prices in the export industry will inspire profit-seeking firms to expand production. At the same time, in the import-competing industry suffering from falling prices, will want to reduce production to cut their losses. Thus, capital and labour will be laid-off in the import-competing sector but will be in demand in the expanding export sector.

However, a problem arises due to the fact that the export sector is intensive in the country's (US) abundant factor, say capital – as per the H-O theorem. This means that the export industry wants relatively more capital per worker than the ratio of factors that the import-competing industry is laying off. In the transition, there will be an excess demand for capital, which will raise its price, and an excess supply of labour, which will bring down its price. Hence, the capital owners in both industries experience an increase in their rents while the workers in both industries experience a decline in their wages.

The theorem was originally developed to illuminate the issue of how tariffs would affect the incomes of workers and capitalists (i.e., the distribution of income) within a country, because tariffs raise the domestic price of imported goods. However, the theorem is just as useful when applied to trade liberalisation, as explained above. However, it should be kept in mind that these results have been derived in a model with only two goods and two factors that are perfectly mobile between sectors. They may not be valid in general. In particular, a factor, which is employed in a sector where output declines (because of competition from imports) will definitely suffer a loss in its real reward if it has no alternative source of employment.

### **1.4.3 The Factor-Price Equalisation Theorem**

According to the factor-price equalisation theorem when the prices of goods are equalised between countries due to international trade, the prices of the

factors (i.e. capital and labour) also get equalised between countries. This implies that freer trade will equalise the wages of workers and the rentals earned on capital throughout the world in the ultimate analysis.

The theorem derives from the assumptions of the H-O model, of which the most critical is the assumption that the two countries share the same technology and that markets are perfectly competitive. In perfect competition, factors are paid on the basis of the value of their marginal productivity which in turn depends upon the prices of the goods. Thus, when prices differ between countries so will their marginal productivities and hence so will their wages and rents. However, once prices of goods are equalised, as they are in free trade demonstrated earlier, the value of marginal products are also equalised between countries and hence the countries must also share the same wage rates and rental rates.

However, it should be noted that the factor-price equalisation is unlikely to apply perfectly in the real world. The H-O model assumes that technology is the same between countries in order to focus on the effects of different factor endowments. If production technologies differ across countries, as we assumed in the Ricardian model, then factor prices would not equalise once goods prices equalise.

#### 1.4.4 The Rybczynski Theorem

The Rybczynski theorem demonstrates the relationship between changes in national factor endowments and changes in the outputs of the final goods within the context of the H-O model. Briefly stated, according to this theorem an increase in a country's endowment of a factor will cause an increase in output of the good, which uses that factor intensively, and a decrease in the output of the other good. In other words, if India experiences an increase in labour supply, then that would cause an increase in output of the labour-intensive goods, like textiles, and a decrease in the output of the capital-intensive goods, like electronics. The reverse is true if the economy's capital stock increases. The theorem is useful in addressing issues such as investment, population growth, labour force growth, immigration and emigration, all within the context of the H-O model.

#### Check Your Progress 2

- 1) Describe magnification effect in the context of H-O model.

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- 2) What theorem is derived from the assumption in the H-O model that the two countries share the same technology and that markets are perfectly competitive? Explain

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- 3) Explain *Rybczynski Theorem* in the context of H-O model.

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## 1.5 EMPIRICAL TESTING OF COMPARATIVE COST AND THE HECKSCHER-OHLIN THEOREMS

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There have been several attempts of empirically testing the comparative cost and H-O theorems. However, testing the basic Ricardian model would not be sound, since detailed predictions depend strongly on the most unrealistic assumptions, e.g. only two goods. Therefore, in the existing literature, most studies have focused on testing the comparative advantage predictions within the H-O framework. It is for this reason that the empirical critiques of the H-O theorem are presented here.

One of the most notable empirical critiques of the H-O theorem is well-known as the Leontief Paradox. This is explained below.

### 1.5.1 The Leontief Paradox: the Factor- intensity Reversal

Leontief in his 1953 study found that despite the fact that the USA was a capital-abundant country it was exporting importantly labour-intensive products, which is an outcome contrary to the predictions of the H-O theorem. This came out in the observation that the exports of USA were found to be less capital-intensive than USA's imports even when USA ranks high among the countries with high capital-labour ratios. This depicts the situation of factor-intensity reversal.

However, it was argued that the Leontief Paradox was not actually a paradox and the profile of trade of the USA was consistent with the propositions of the H-O theorem. This was argued on the grounds that though USA's exports are less capital intensive than imports, but USA exported products that are more *skilled* labour-intensive and *technological* intensive than the products imported. This is consistent with the observation that USA is a high-skilled country with a comparative advantage in capital-intensive products.

### 1.5.2 Testing the 'factor content' version

We can think of a country indirectly exporting (importing) the services of factors which are embodied in its exported (imported) goods. This is called the 'factor content' of trade. The H-O model implies that a country should be 'exporting' (importing) factors for which their factor share is higher (lower) than their income share.

If trade in goods is an indirect way of trading factors of production, then

relative factor endowments should predict the direction and volume of trade. But the volume of trade is much smaller than what the H-O model predicts. Take for example, USA has about 25% of world income but only 5% of the world's workers. China has only about 3% of the world income but 15% of the world's workers. So a simplistic factor proportion calculation will say: through trade, USA should import large amount of labour and China should export most of its labour. But this is not the case in reality. This is the phenomenon of "missing trade" according to Daniel Treffer (1995), which is explained by dropping the H-O assumption of identical technology among countries.

Most of these tests, however, fail to control for possible differences in tastes across countries. They also do not make much sense in trying to explain the actual pattern of trade without allowing for substantial international differences in technologies.

Although the empirical evidence on the H-O model is mixed, the H-O model provides an explanation of the basis of comparative advantage (i.e. what determines it?) and helps to analyse the effects of international trade on income distribution.

### Check Your Progress 3

- 1) Leontief Paradox is empirical critique of the H-O theorem. Explain

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- 2) Briefly discuss the phenomenon of 'missing trade'

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## 1.6 LET US SUM UP

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After reading this Unit, you have been exposed to the different theories of trade. Beginning from the pure theory of international trade or the theory of absolute advantage, you have learnt about Ricardian Comparative Advantage and Opportunity Cost theories. Both the theories discuss one factor model and the factor taken here is labour. The unit also discusses improvisation in Ricardian Framework i.e. Heckscher-Ohlin Theorem and its Extensions. This framework takes into account two factors and explains that the trade between different countries is caused due to differences in relative factor endowments of those countries.

Four main extensions of H-O Model are discussed these are: (i) the Heckscher-Ohlin theorem, (ii) the Stolper-Samuelson theorem, (iii) the Factor-Price Equalisation theorem, and (iv) the Rybczynski theorem.

While discussing the extensions of H-O Model the unit explains the difference

in assumptions as compared to the Ricardian Model and magnification Effect. You are also exposed to Empirical Testing of Comparative Cost and the Heckscher-Ohlin Theorems. Here we have discussed the Leontief Paradox: the Factor- intensity Reversal and testing the 'factor content' version. Discussion on the 'factor content version', includes a brief discussion on the case of missing trade and also the limitations of these empirical tests.

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## 1.7 KEY WORDS

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**Opportunity Cost:** The opportunity cost is the true cost of doing something what one gives up to do that thing. For example, going for a walk may appear to cost nothing, until one considers the opportunity forgone to use that time earning money or doing something else. Thus in reality, everything one does has an opportunity cost.

**Capital-abundant Country:** A capital-abundant country is the one that is well-endowed with capital (as compared to labour) relative to the other country. This gives the country a propensity for producing the good, which uses relatively more capital in the production process or we may call it a capital-intensive good.

**Comparative Advantage:** A country has a comparative advantage in producing a good 'A' if the opportunity cost of producing good 'A' is lower at home than in the other country.

**Factor Endowments:** A country's endowment with resources such as land, labour, and capital.

**Factor Intensities:** Factor intensity is the relative importance of one factor (i.e. land or labour or capital) versus others in production process in an given industry usually compared across industries. Factor Intensities are mostly defined by ratios of factor quantities employed at common factor prices. These are also defined sometimes by factor shares or by marginal rates of substitution between factors.

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## 1.8 SOME USEFUL REFERENCES

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James R. Markusen, James R. Melvin, William H. Kaempfer and Keith E. Maskus. 1995. *International Trade: Theory and Evidence*. McGraw Hill.

Sodersten, B. and Reed, G. 1994. *International Economics*, 3rd ed., London; Macmillan.

Trefler, D. 1995. The Case of the Missing Trade and Other Mysteries, *American Economic Review*, 85(5): 1029-1046

Winters, L.A. 1991. *International Economics*. 4<sup>th</sup> Edition. Routledge.

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## 1.9 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

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### Check Your Progress 1

1) Adam Smith refers to absolute advantage while Ricardo refers to

comparative advantage and opportunity cost while explaining the theory of international trade. Please Read Section 1.2 and 1.3

2) Read Section 1.3

3) Read Section 1.3

### **Check Your Progress 2**

- 1) A movement towards freer trade will cause the real return of a country's relatively abundant factor to rise, while the real return of the country's relatively scarce factor will fall. Read Sub-section 1.4.2
- 2) Factor Price equalisation theorem. Read Sub-section 1.4.3
- 3) This theorem is about the relationship between changes in national factor endowments and changes in the outputs of the final goods. Read Sub-section 1.4.4

### **Check Your Progress 3**

- 1) Read Sub-section 1.5.1
- 2) Read Sub-section 1.5.2

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## UNIT 2 ALTERNATIVE EXPLANATIONS OF TRADE

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### Structure

- 2.0 Objectives
- 2.1 Introduction
- 2.2 Product Cycle Theory
- 2.3 Dynamic Comparative Advantage
- 2.4 Linder's Theory of Over-Lapping Demand
- 2.5 Gravity Model: Social Physics School
- 2.6 Economies of Scale
- 2.7 Imperfect Competition and Intra-Industry Trade (IIT)
- 2.8 Strategic Trade Theory
- 2.9 Let Us Sum Up
- 2.10 Key Words
- 2.11 Some Useful References
- 2.12 Answers/Hints to Check Your Progress Exercises

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### 2.0 OBJECTIVES

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After reading this Unit, you will be able to:

- provide a critique of the traditional trade theories of comparative advantage; and
- understand the determinants of trade closer to real world situations.

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### 2.1 INTRODUCTION

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In this Unit, the focus is on understanding the alternatives to the traditional trade theories. There have been several departures from the traditional theories explaining determinants of trade flows. Most of these attempts have been able to bring the theories of trade closer to reality and with less restrictive assumptions.

We noted in Unit 1 that in the Ricardian model the central feature is the presumed difference in technology between two countries for their trade. There is a divergence of opinion among economists on the importance that should be given to technological differences as an explanation of trade flows. At one extreme, some economists are unwilling to accept any model that has technological differences as its central feature. One basis for such an argument is that what we may perceive as a technological difference is in fact due to the omission of a factor of production. So, for instance, the absolute 'technological advantage' of Portugal in Ricardo's model may be a consequence of Portugal being better endowed with a factor which is important in the production of both cloth and wine, and its comparative 'technological advantage' due to wine being 'factor-intensive'.

Another view is that any technological differences can only be short term in nature. Some economists have advanced theories, which concentrate on the dispersion process for technological innovation, while others have argued that the basis of much trade is a process of continual innovation by one country, which allows it always to stay ahead of its competitors. A variant of these

models is captured in the product cycle theory. This comes as a departure from the traditional theories.

The presence of economies of scale in production also may influence trade patterns, generally encouraging nations to specialise to a greater extent in their comparative advantage industries. If economies of scale are extreme, they may specialise completely in production of export goods. This is yet another departure from the traditional comparative advantage theories.

Another important recent phenomenon that can be viewed within this general framework is the growing tendency towards intra-industry trade, which the comparative advantage theories fail to explain. Much of this trade within broad industry categories can be understood in terms of product differentiation, especially in oligopolistic industries where economies of scale are important; thus, many industrial nations export certain types of cars and import other types, for instance, in the same industry.

The competition among industrial nations resulting from such intra-industry trade within the manufacturing sector also creates intense pressures for governments to adopt industrial policy strategies to protect and enhance domestic market and export market shares. This is captured in the 'New Trade Theory' or the 'Strategic Trade Theory'.

Another significant development in recent years is the expansion of trade in services, although we often tend to think of trade as involving primarily raw materials and manufactured products. Some services, such as transportation and tourism, traditionally have been a part of international trade. However, the growing importance of business services involving areas such as technology transfer, construction, engineering, consulting, accounting, banking, and finance has raised new questions about how the concept of comparative advantage might apply in these areas and about the often more subtle barriers that governments utilise to restrict the international flow of such services.

Finally, two other factors that influence international trade patterns but are not incorporated in simplified trade theories are transportation costs and environmental regulations. Transportation costs effectively prevent the complete international equalisation of prices for traded goods, with the price in the importing nation exceeding that in the exporting nation by the amount of the transport costs. Some products either cannot be traded internationally or are prohibitively expensive to ship, but in other cases transportation costs simply reduce the volume of trade below what it would be without such costs. For some products, such as those involving natural resources, processing activities will be located either near the resources or near the final markets.

In a similar manner, environmental regulations generally increase production costs. If such regulations deal with pollution effects from consumption, they increase product costs but do not directly affect production location. However, if the regulations deal with pollution, which arises from production, such as that associated with steel production, they may affect production location and trade patterns by giving relative cost advantages to those nations with the least restrictive regulations. Some observers view such production shifts as legitimate or appropriate, while others call for international harmonisation of environmental laws, offsetting subsidies, or countervailing trade barriers in order to prevent such shifts.

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## 2.2 PRODUCT CYCLE THEORY

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The product life cycle theory of Posner (1961) and Vernon (1966) reflects the importance of multiple factors of production in contrast to the traditional theories of trade, which speak about one or two factor models. In Posner's words, "Long-term patterns of international trade are influenced by product innovation and subsequent diffusion. A country that produces technically superior goods will sell these first to its domestic market, then to other technically advanced countries. In time, developing countries will import and later manufacture these goods, by which stage the original innovator will have produced new products."

More elaborately, new products developed through technological innovation are introduced *first* in a home market, where both a large market and the resources important at the initial stage are found. During the *second stage*, the domestic industry develops a capacity for export, again reflecting comparative advantage within the context of a generalised factor endowment model. During the *third stage*, foreign production begins, usually in other industrial countries to which the home firms exported during the second stage. A *fourth stage* witnesses the loss of competitive advantage in the home market as the technological gap narrows, and during a *final fifth stage* the product becomes standardised and is imported into the original home market. Developing countries often gain a production advantage at this point, again in a manner consistent with the generalised factor endowment model since they have an abundance of the semi-skilled labour that becomes a more important input at this stage in the product life cycle.

Similar dimensions are captured in the technological gap theory as well. Technological gap theory proposes that changes in international trade are dictated by the relative technological sophistication of countries.

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## 2.3 DYNAMIC COMPARATIVE ADVANTAGE

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One thing made clearer by these alternatives to the Heckscher-Ohlin theory is that a nation's relative factor endowments may change over time. Industrial nations in Europe along with Japan have narrowed the technological gap vis-a-vis the United States after the Second World War. Several developing countries now are quite capable of operating near the middle or even toward the beginning of the product life cycle. This catching-up process evident in the real world phenomena necessitate viewing of comparative advantage in dynamic terms. This means taking cognisance of a nation's ability to operate at different stages of the product life cycle due to its continuing efforts to develop a pool of human capital of skilled labour, scientists, and innovators with managerial and engineering talents. It is in this context, that the role of industrial policy has been emphasised to recognise the potential role of government in helping to shape and develop a nation's dynamic comparative advantage.

### Check Your Progress 1

- 1) How many stages are there in Posener Vernon theory of International trade? What are those stages?
- .....

- 2) Why is it necessary to view comparative advantage theory of international trade in dynamic terms?

## 2.4 LINDER'S THEORY OF OVER-LAPPING DEMAND

Staffan Linder (1961) proposed an alternative theory of trade that was consistent with Leontief's paradox. The Linder hypothesis presents a demand based theory of trade in contrast to the supply based theories involving international differences in technologies or factor endowments. According to the theory developed by Linder, trade in manufactured goods occurs between countries with similar domestic demand conditions – an alternative explanation to trade. Linder hypothesised that nations with similar demands would develop similar industries. These nations would then trade with each other in similar but differentiated goods.

Hypothesising that similar tastes or preferences derive primarily from similar income levels, Linder predicted that trade in manufactured goods would occur between countries with overlapping demands as reflected in overlapping ranges of per capita income. It is evident that much trade in manufactures does occur among industrial nations, rather than between industrial and developing nations as the traditional factor endowment theories would predict. However, global trade trends cannot be fully explained by this theory as there are strong trade linkages between the developed and developing worlds as well.

## 2.5 GRAVITY MODEL: SOCIAL PHYSICS SCHOOL

One alternative explanation to trade theory came from what is known as the social physics school of thought in economics. The gravity model of trade that used the gravity theory of Newton in physics mainly represented the alternate trade-determinants.

The gravity model of trade in international economics, similar to other gravity models in social science, predicts that bilateral trade flows are based on the economic sizes (often using GDP measurements) and distance between two units. The model was first used by Jan Tinbergen in 1962. The basic theoretical model for trade between two countries (i and j) takes the form of:

$$F_{ij} = G * \frac{M_i * M_j}{D_{ij}} \text{-----(1)}$$

Where F is the trade flow, M is the economic mass (or GDP) of each country, D is the distance and G is a constant. Taking logarithms, we can convert the

equation (1) into a linear form for econometric analysis where constant  $G$  becomes  $\alpha$  as shown in equation (2)

$$\ln(\text{Bilateral Trade Flow}) = \alpha + \beta \ln(\text{GDP Country 1}) + \beta \ln(\text{GDP Country 2}) - \beta \ln(\text{Distance}) + \varepsilon \text{ -----(2)}$$

The model often includes variables to account for income level (GDP per capita), price levels, language relationships, tariffs, contiguity, and colonial history (whether Country1 ever colonised Country2 or vice versa).

The gravity model estimates the pattern of international trade. While the model's basic form consists of factors that have more to do with geography and spatiality, the gravity model has been used to test hypotheses rooted in purer economic theories of trade as well.

Using the gravity model, countries with similar levels of income have been shown to trade more. Helpman and Krugman see this as evidence that these countries are trading in differentiated goods because of their similarities. This casts some doubt about the impact Heckscher-Ohlin has on the real world.

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## 2.6 ECONOMIES OF SCALE

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Another important determinant of trade is economies of scale or increasing returns to scale in production. As you have learnt in micro economics, economies of scale mean that production at a larger scale can be achieved at a lower cost. When production within an industry has this characteristic, specialisation and trade can result in improvements in productive efficiency, competitiveness and welfare.

Trade between countries need not depend upon inter-country differences in the presence of economies of scale. It is possible that countries could be identical in all respects and yet find it advantageous to trade. Thus, presence of economies of scale is often used to explain trade between industrialised countries like the US, Japan and the European Union. When traditional models of trade failed to explain trade among these countries with similar technologies, endowments and similar consumer preferences, economies of scale could provide reasoning.

To reiterate, economies of scale in production mean that production at a larger scale (more output) can be achieved at a lower cost (i.e. with economies or savings). A simple way to formalise this is to assume that the unit-labour requirement in production of a good is a function of the level of output produced. In Figure 2.1 we present a graph of the unit-labour requirement in steel production as a function of the scale (level of output) of production. At production level  $Q^1_s$ , the unit-labour requirement is given by  $a^1_{LS}$ . If production

were to rise to  $Q_s^2$ , then the unit-labour requirement would fall to  $a_{LS}^2$ . This means that at the higher level of output, it requires less labour (i.e. fewer resources or cost) per unit of output than it required at the smaller scale.

With a simple adjustment it is possible to show that economies of scale in production are equivalent to increasing returns to scale. Increasing returns to scale in production means that an increase in resource usage, by say  $x\%$ , results in an increase in output by more than  $x\%$ . In the adjoining diagram we plot labour productivity in steel production when production exhibits increasing returns to scale. [This graph is derived by plotting the reciprocal of the unit-labour requirement (i.e.  $1/a_{LS}$ ) for each output level in Figure 2.2]

Note that as output (scale) increases from  $Q_s^1$  to  $Q_s^2$ , labour productivity (given by the reciprocal of the unit-labour requirement) also rises. In other words, output per unit of labour input increases as the scale of production rises, hence increasing returns to scale.

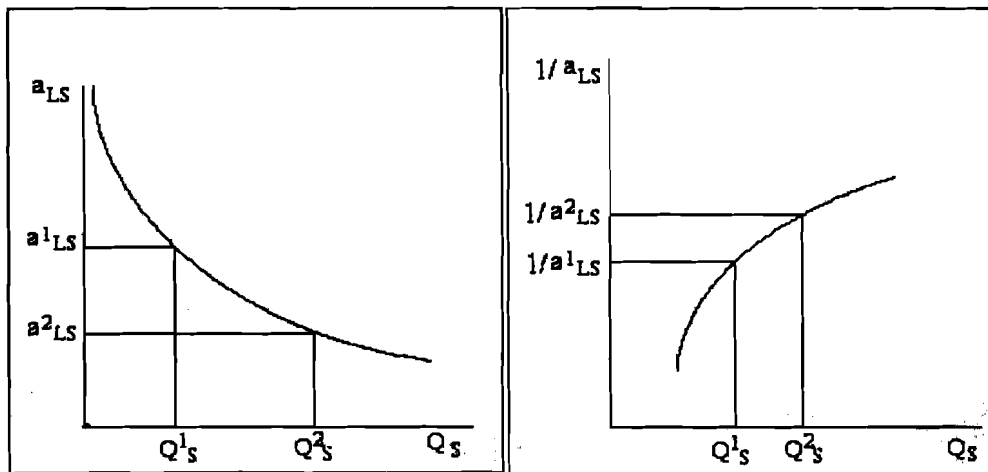


Figure 2.1

Figure 2.2

Another way to characterise economies of scale is with a decreasing average cost curve. Average costs,  $AC$ , are calculated as the total costs to produce output  $Q$ ,  $TC(Q)$ , divided by total output. Thus  $AC(Q) = TC(Q)/Q$ . When average costs decline as output increases it means that it becomes cheaper to produce the average unit as the scale of production rises, hence economies of scale.

Economies of scale are most likely to be found in industries with large fixed costs in production. Fixed costs are those costs that must be incurred even if production were to drop to zero. For example fixed costs arise when large amounts of capital equipment must be put into place even if only one unit is to be produced and if the costs of this equipment must still be paid even with zero output. In this case the larger the output, the more the costs of this equipment can be spread out among more units of the good. Large fixed costs and hence economies of scale are prevalent in highly capital-intensive industries such as chemicals, petroleum, steel, automobiles etc.

## Check Your Progress 2

- 1) Demand based theory of international trade is named after which economist? Explain.

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- 2) Gravity model of international trade explains what kind of trade? Discuss.

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## 2.7 IMPERFECT COMPETITION AND INTRA-INDUSTRY TRADE (IIT)

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It is worth noting that the assumption of economies of scale in production can represent a deviation away from the assumption of perfectly competitive markets. In models with the assumption of perfect competition, it is assumed that production takes place with constant returns to scale. This means that the unit-cost of production remains constant as the scale of production increases. In other words, this assumes away the possibility of economies of scale.

It is at this stage that relaxation of the assumption of perfect competition becomes possible and a more real world situation of imperfect competition and economies of scale and intra-industry trade (IIT) enter into the analysis.

In fact, the phenomenon of intra-industry trade remains unexplained by the traditional trade theories. Intra-industry trade implies that many countries export and import similar products. A country may export and at the same time import cars, clothes, engineering goods, electronics, etc. It is possible to argue that to some extent intra-industry trade arises because many different types of products are aggregated into one category or industry. Since different types of products are often aggregated into one category, it may seem as though the countries are exporting and importing identical products when in reality they are exporting one type of the product and importing another type. This means that the phenomenon of IIT is susceptible to the definition of an 'industry'.

Nevertheless, it is possible to explain IIT with the help of determinants that include economies of scale, product-differentiation and imperfect markets even when there are similarities among countries. In addition, there are some very simple explanations of IIT which can be analysed within the types of inter-industry trade models, for instance, transport costs, seasonal differences etc.

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## 2.8 STRATEGIC TRADE THEORY

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Based on research into imperfectly competitive industries, some of the new theoretical research suggests that it is possible to increase national wealth with specific types of government intervention in trade relations. The research is referred to as Strategic Trade theory. The strategic trade theory acknowledged the use of trade policies, including tariffs, subsidies, and even export-subsidies, in the context of imperfect competition and/or increasing returns to scale to alter the outcome of international competition in a country's favour, usually by allowing its firms to capture a larger share of industry profits. It came as a critique of free trade from the perspective of increasing returns to

scale. It was treated akin to 'infant industry' argument with quantitative rigour. The theory has been associated with Brander and Spencer and Krugman.

Unlike the other models, the strategic trade theory tried to capture the real life phenomenon of markets having small number of firms, i.e. absence of perfect competition. These theories could explain behaviour of firms with the help of oligopolistic models. This allowed for consideration of *strategic interdependence* between firms in the industry. Each firm in the market knows that it is sufficiently large for its decisions to affect the profits of other firms. It must then consider how its competitors are likely to react to its decisions. The view it takes of its competitors' reactions is usually described as its *conjectural variation*.

As you must have learnt in MEC-001 course, which is on micro-economics that there is no 'universally preferred' form of oligopolistic model. A major difference between alternative models is the form of conjectural variation assumed to influence a firm's decisions. Many duopoly models (a version of which is oligopoly) make the assumption that the competitors exhibit 'Cournot behaviour'. That is, each firm takes the other's output as given when it makes decisions about its own output; that is, output is the firm's strategic variable. In simple Cournot duopoly models with one home firm and one foreign firm, it was shown that (a) identical firms based in different countries would have an incentive to export the same product to each other's markets (IIT in identical products); (b) export subsidies and import tariffs could raise a country's welfare. Both of these conclusions are very different from the results of traditional trade theory discussed in Unit 1.

Many countries seem keen to abandon free trade, at least if this can be accomplished without retaliation. Although such behaviour is inconsistent with the standard competitive model, the theory of strategic trade policy provides a possible explanation. In the presence of oligopoly there are economic rents (extra-normal profits) to be captured and creating a tilted playing field may be in the national interest. According to de Meza (1986), countries with the lowest production costs choose the highest export subsidies. The principle involved is that since the motivation to subsidise is to shift profits to home firms, the location with the most profitable firms (i.e. the country where costs are lowest) will set the highest subsidies.

The strategic trade theory has another feature in as much as it also could take into account protection to strategic sectors in a country aimed at increasing its share in the global trade for instance, the case of Japanese cars. Some other examples of such industries include aerospace, advanced materials, computers and supercomputers, semiconductors and microprocessors, and bio-chemicals.

In this context, "strategic" refers to the oligopolistic character of the industry and not its military significance. To sum up, strategic trade theory focuses on industries where markets do not work perfectly on account of economies of scale, high technological barriers to entry, and production processes marked by a high level of learning-by-doing.

Strategic trade theory has been criticised too, on the grounds that its predictions are overly sensitive to modelling assumptions. For example, Eaton and Grossman (1986) show that Brander and Spencer's (1985) seminal result – i.e., when firms compete by setting quantities the optimal policy involves

governments subsidising their domestic industries – is reversed if the firms compete by setting prices. Applying recent results in duopoly theory, by considering three-stage games in which governments choose subsidies, firms' owners choose incentive schemes for their managers, and then the managers compete in the product market, it has also been shown that if firms' owners have sufficient control over their managers' behaviour, then the optimal strategic trade policy does not depend on whether firms compete by setting prices or quantities.

In general, this has led to a body of literature known as the 'New Trade Theory', which is based on four innovations that have in recent years modified the reigning neoclassical economics:

- An appreciation of market imperfections.
- The new industrial economics of strategic behaviour.
- New Growth Theory, a fresh approach to the question of economic growth.
- A changing appreciation of the political context.

Much of New Trade Theory is simply the application of the well-established economic principle the Theory of the Second-Best. This holds that even if perfectly free markets are best in an ideal world, the minute you introduce one market imperfection, subsequent imperfections may in fact be better than pure free-market policies, as they may just cancel out previous imperfections and push the market back towards efficiency, not away from it. So if we don't have perfectly free domestic markets, due to imperfect competition, government regulation and other factors, then perfectly free markets in foreign trade are not necessarily optimal. For example, if US exports are subsidised by the global US security apparatus, it should be taxed to balance this subsidy or the market will produce too much of it.

### **Check Your Progress 3**

- 1) Briefly discuss the phenomena of intra industry trade in real world economies.

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- 2) Critically examine the nature of strategic trade theory.

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## **2.9 LET US SUM UP**

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You have learnt about the alternative explanations to trade theories in this Unit, the Unit provides a critique of the Comparative advantage theories discussed in the previous Unit 1 and explains the trade theories where determinants of

trade are closer to real world situations. It gives seven alternative explanations of International trade. These are Product Life Cycle theory, Dynamic Comparative Advantage, Linder's Theory of Over-Lapping Demand, Gravity Model, Economies of Scale and Imperfect Competition and Trade Intra-Industry Trade. The Unit ends with Strategic Trade theory that explains how the industrial policy strategies and the export market shares influence the present day international trade.

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## 2.10 KEY WORDS

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**Capital-Intensive:** Describing an industry or sector of the economy that relies relatively heavily on inputs of capital, usually relative to labour, compared to other industries or sectors..

**Dynamic Comparative Advantage:** A changing pattern of comparative advantage over time due to changes in factor endowments or technology

**Labour Intensive:** Describing an industry or sector of the economy that relies relatively heavily on inputs of labour, usually relative to capital but sometimes to human capital or skilled labour, compared to other industries or sectors.

**Intra-industry Trade:** The phenomenon of intra-industry trade (IIT) is susceptible to the definition of an 'industry'. It implies that many countries export and import similar products. A country may export and at the same time import cars, clothes, engineering goods, electronics, etc. To some extent intra-industry trade arises because many different types of products are aggregated into one category or industry.

**Economic Rents:** Extra normal profits or the the premium that the owner of a resource receives over and above its opportunity cost.

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## 2.11 SOME USEFUL REFERENCES

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Brander, James A. and Barbara J. Spencer. 1981. Tariffs and the Extraction of Foreign Monopoly Rents under Potential Entry, *Canadian Journal of Economics* 14: 371-389.

Grubel, Herbert G. and Peter J. Lloyd. 1975. *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products*, New York: Wiley.

Helpman, E. and P.R. Krugman. 1985. *Market Structure and Foreign Trade*, MIT Press.

James R. Markusen, James R. Melvin, William H. Kaempfer and Keith E. Maskus. 1995. *International Trade: Theory and Evidence*. McGraw Hill.

Johnson, Harry G. 1953. Equilibrium Growth in an Expanding Economy, *Canadian Journal of Economics and Political Science* 19?.

Krugman, P.R. 1979. Increasing Returns, Monopolistic Competition, and International Trade, *Journal of International Economics*, 9 (4): 469-479. Re-printed in P.R. Krugman. 1990. *Rethinking International Trade*, MIT Press.

Sodersten, B. and Reed, G. 1994. *International Economics*, 3rd ed., London: Macmillan.

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## **2.12 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES**

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### **Check Your Progress 1**

- 1) Five, Read Section 2.2
- 2) Read Section 2.3

### **Check Your Progress 2**

- 1) Read Section 2.4
- 2) Bilateral Trade Relations. Read Section 2.5

### **Check Your Progress 3**

- 1) Read Section 2.7
- 2) Read Section 2.8

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## **UNIT 3 GAINS FROM FREE TRADE AND WELFARE**

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### **Structure**

- 3.0 Objectives
- 3.1 Introduction
- 3.2 The Case for Free Trade
  - 3.2.1 What is Free Trade
  - 3.2.2 Benefits of Free Trade
    - 3.2.2.1 When Domestic Industry is Perfectly Competitive
    - 3.2.2.2 When Domestic Industry is a Monopoly
    - 3.2.2.3 Due to Economies of Scale and Product Differentiation
- 3.3 Recent Arguments on Free Trade Policy and Liberalisation as a Tool of Economic Development
- 3.4 A Critique
- 3.5 Let Us Sum Up
- 3.6 Key Words
- 3.7 Some Useful References
- 3.8 Answers/Hints to Check Your Progress Exercises

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### **3.0 OBJECTIVES**

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After reading this Unit, you will be able to:

- understand the benefits of free trade;
- recognise the associated gains from free trade; and
- comprehend a balanced analytical and policy debate on free trade and protection.

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### **3.1 INTRODUCTION**

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In Units 1 and 2 we analysed the different implications of traditional theories of trade and also several theoretical departures from them. From the concept of absolute advantage to comparative advantage and thereafter the concepts of factor endowments and factor intensities helped us to understand the gains from trade and the determinants of trade. But the real world international trade patterns and features posed analytical challenges in as much as the traditional theories were unable to explain a large part of global trade. The alternative explanations came forth in a quest to identify the determining factors of trade that were better approximations of reality.

Such theoretical departures also influenced the policy-practice at both the national and global levels. When free trade theories could not hold the test of time due to stringent assumptions like perfect competition, arguments in favour of protection were advanced. It had a developmental angle but on occasions it also justified unfair trading practices. Countries practiced the policy of import-substitution and import protection especially in the developing world. But later it was observed that while this had a beneficial effect on building a manufacturing and economic base in these countries, it also generated undue economic rents and made them 'high-cost poor quality' economies. As a response to correct these anomalies and some success of East Asian economies, an open trade or a freer trade policy was advocated.

Classical economic analysis shows that free trade increases the global level of output because free trade permits specialisation among countries. Specialisation allows nations to devote their scarce resources to the production of the particular goods and services for which that nation has a comparative advantage. The benefits of specialisation, coupled with economies of scale, increase the global production possibility frontier. An increase in the global production possibility frontier indicates that the absolute quantity of goods and services produced is highest under free trade. Not only are the absolute quantity of goods and services higher, but the particular combination of goods and services actually produced will yield the highest possible utility to global consumers.

Free trade policies are often associated with general *laissez-faire* economic policies, which permit faster growth. Laissez-faire policies—the absence of government intervention in trade, entrepreneurship and investment—is often positively correlated with high per capita income. Voluntary exchange, by virtue of its voluntary nature, is beneficial to the parties involved. Thus, the restriction on voluntary exchange, restricts commerce and ultimately the accumulation of wealth.

Thus, countries switched over to the policies of export-promotion and import liberalisation from policies of import-substitution. Such a move also made the arguments for having a freer trade regime at the multilateral level as well. While the multilateral negotiations of the Uruguay Round to establish WTO was in progress, in parallel the predilections of the new trade theory and the strategic trade theory in favour of infant industry protection or protection to strategic industries through government's role was also gaining momentum. Trade distortionary policies were advocated in response to imperfect markets and existence of restrictive business practices, the unfair trade practices. The present era is nothing but a reflection of coexistence of both theory and practice of free trade doctrine on one hand and government's support to sectors on the other. Both trade liberalisation and protection find their ways in the policy-domains all over the world.

In this Unit a brief sketch of this debate at the analytical and policy levels is presented. But before that we shall learn the meaning of free trade and the gains from trade in detail.

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## **3.2 THE CASE FOR FREE TRADE**

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### **3.2.1 What is Free Trade?**

A situation of free trade is one where countries engage in international trade **without** imposing any policy restrictions that interfere with the free flow of goods and services across international boundaries.

Assuming that countries specialise in the production of goods and services in which they have a comparative advantage, each country will export the good(s) which it produces relatively efficiently and imports goods in which it has a comparative disadvantage.

In the absence of policy restrictions on the international exchange of goods and services, prices of goods in the domestic economy tend to be the same as those prevailing in the rest of the world.

With free trade domestic firms are fully exposed to competition from international firms. If a domestic firm charges a price which is higher than the price prevailing in the world market, then domestic consumers would prefer to import this good instead of buying it from the domestic firm. Thus with free trade firms are subject to the discipline of international competition and domestic consumers tend to benefit most in this situation.

### 3.2.2 Benefits of Free Trade

In what follows, we use standard cost-benefit apparatus that analyses welfare gains and losses to various economic agents like households (consumers) and firms (producers) to compare alternative situations like free trade and autarky.

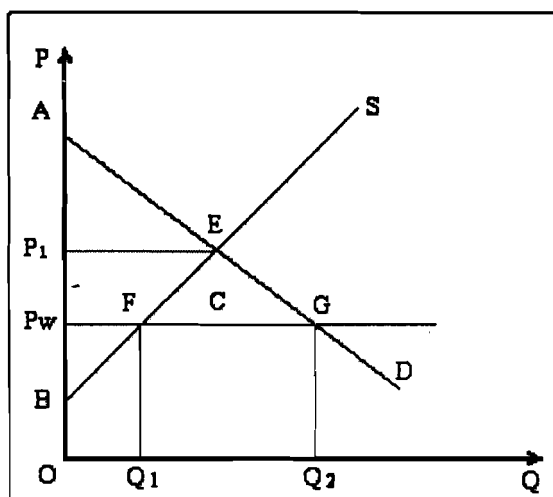
#### 3.2.2.1 When Domestic Industry is Perfectly Competitive

We will use a simple diagram (Figure 3.1: Benefits of Free Trade) to illustrate the benefits that accrue to a country engaging in free trade.

The main assumptions underlying the diagrammatic analysis are (a) perfect competition in the domestic industry; (b) the industry being considered is a small part of the country's economy (so we can use partial equilibrium analysis); and (c) the country is a small player in the international market for the product, which means that it can import any amount at the world price  $P_w$  (it is a price-taker in the world market).

The downward sloping line AD represents the demand curve for the product of industry X, while the upward sloping line BS represents the domestic supply curve of the industry.

In the absence of trade, domestic price of the product of industry X is  $P_1$ . In this case total social welfare  $W$  is the equal to the area of triangle AEB. You should note that  $W = \text{Consumers' Surplus (Area of triangle } AP_1E) + \text{Producers' Surplus (Area of triangle } BP_1E)$ .



Source : Figure 6.1 in Sildar (2003), p.121.

**Figure 3.1: Benefits of Free Trade**

Let world price of good X,  $P_w$  be below  $P_1$ . This means the domestic consumers will be better off importing the good. With free trade, good X will be imported and the price of good X in the domestic market will be forced down to  $P_w$ . Obviously, domestic firms cannot charge a price higher than  $P_w$ , as nobody would buy the good at a higher price if cheaper imports are freely accessible.

With trade, total domestic demand at price  $P_w$  is  $Q_2$ , which is met in part by domestic supply (of amount  $OQ_1$ ) and partly by imports (amounting to  $Q_1 Q_2$ ).

You should note there is a net gain in social welfare in the post-trade situation, amounting to the area C. Consumer surplus has increased from  $AP_1E$  to  $AP_wG$ , while producers' surplus has fallen from  $BP_1E$  to  $BP_wF$ , giving a net gain in welfare of area C. In principle, the losers (the producers) can be compensated

by the gainers (the consumers). From the diagram it should be clear to you that the extent of gain in social welfare is positively related to the gap between  $P_1$  and  $P_w$ .

Using Figure 3.1 above we have just carried out a partial equilibrium analysis of free trade for an industry. Here we have not considered the secondary effects of trade on the economy. In particular we have not taken into account the effects of trade on factor markets, on the terms of trade, or on the Balance of Payments and exchange rates. However, if the industry being analysed has considerable weight in the national economy these secondary effects can be quite important.

### 3.2.2.2 When Domestic Industry is a Monopoly

When a monopolist controls the domestic industry X, the gains from trade can be illustrated using Figure 3.2. The monopolist faces the downward sloping demand curve D, while MC and MR are the monopolist's marginal cost and marginal revenue schedules respectively.

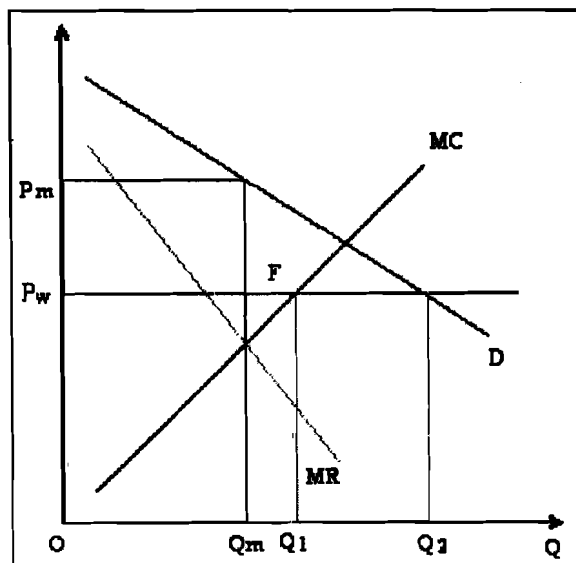
In the situation before trade the equilibrium quantity, determined by the intersection of the MR and MC schedules is  $Q_m$  and the corresponding price, read off the demand (or Average Revenue) schedule is  $P_m$ .

As explained before consider a situation where the domestic country has a comparative disadvantage in the product of industry X. That is, the world price  $P_w$  is lower than  $P_m$ , so the good is imported. When trade is opened up, imports become available at the world price  $P_w$ . So in the post-trade scenario the monopolist cannot charge a price higher than  $P_w$ , which now provides an upper bound for the price that can be charged in the domestic market.

Thus with free trade the monopoly equilibrium shifts to F. At the post-trade price  $P_w$ , total domestic demand is  $OQ_2$ , of which  $OQ_1$  amount is supplied by the domestic monopolist and  $Q_1Q_2$  amount is imported.

Before trade the price of the good in the domestic market  $P_m$  was higher than marginal cost. However, opening up trade lowers the domestic price and in the post-trade equilibrium F, the price  $P_w$  is equal to marginal cost. Therefore social welfare is clearly higher in the post-trade situation as international competition has served to limit the monopolists' price-setting power and moved the economy to the competitive equilibrium.

In this context additional gains from trade can arise through a reduction of X-inefficiency, if competitive pressures induce the monopolist to become a more efficient producer.



Source : Figure 6.2 in Sildar (2003), p.122

**Figure 3.2: Benefits of Free Trade with Monopoly**

### 3.2.2.3 Due to Economies of Scale and Product Differentiation

Our discussion so far shows that gains from trade primarily occur due to specialisation in production and exchange along lines of comparative advantage. Gains from trade may also arise from another source, viz. the existence of scale economies (or increasing returns) in certain industries.

Economies of scale are said to exist, when large scale production leads to a reduction in unit costs for firms, leading to lower prices for consumers. In industries with economies of scale, the smallness of the market is the single most constraint that prevents the realisation of scale economies. This could be a problem especially in low income developing countries, where industrialisation based on the domestic market alone may only allow production of a narrow range of products.

This is where international trade can play an important role, by enhancing the size of the market facing domestic industry. Clearly with trade, firms can produce for the domestic as well as foreign markets, allowing them to enhance the scale of operation and reap the benefits of scale economies. With falling unit costs, consumers would also benefit from lower product prices.

The assumption of perfect competition breaks down with the existence of scale economies. So these trade models (associated with economists like Avinash Dixit, Elhannan Helpman, Paul Krugman and others) are analysed using models of imperfect competition (such as monopolistic competition, which is a market situation characterised by firms selling differentiated products).

In this situation there is another source of gains from trade. In the presence of economies of scale even the variety of goods, a nation produces, is constrained by the smallness of the market size. With trade each nation would specialise in the production of a relatively small variety of goods (and reap benefits of scale economies) and import a wide variety goods that it does not produce from the rest of the world. This widens the range of choice for consumers and they derive higher utility from a more differentiated consumption basket.

Here trade results in mutual gains, even when countries do not differ in terms of endowments of resources and technology. An example is the substantial extent of intra-industry trade taking place among developed nations.

Thus existence of scale economies allows for gains from trade from at least two sources. Consumers gain due to lower goods prices (owing to economies of scale) and they also gain from the greater variety in consumption afforded by the fact that owing to trade, different countries can specialise in the production of different varieties of goods.

#### **Check Your Progress 1**

1) What do you understand by the term 'free trade' ?

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- 2) How do countries benefit from free trade when domestic markets are perfectly competitive ?

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- 3) Do countries benefit from trade when there is monopoly in the domestic market ?

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- 4) Explain how the existence of economies of scale in certain industries can give rise to gains from trade.

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### **3.3 RECENT ARGUMENTS ON FREE TRADE POLICY AND LIBERALISATION AS A TOOL OF ECONOMIC DEVELOPMENT**

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A few decades back, the comparative performances of the Latin American and East Asian economies showed that the latter had not only outpaced their Latin American counterparts but had also been able to withstand external shocks while maintaining their growth performances over a considerable span of time. With limits of domestic markets emerging as impediments to growth in the East Asia and Latin America, the experiences of these countries were used to argue that import-substituting policies had failed and should be replaced by export-promotion which was supposed to achieve faster growth than import substituting strategy.

It was argued that the import-substituting regimes of the developing countries had resulted in low growth equilibrium, characterised by inefficient allocation of resources, artificial rents and parallel markets. It was also suggested that in the absence of global competition, protected domestic enterprises were compromising on efficiency concerns that resulted in availability of poor quality goods at unduly higher prices. Absence of the pressures of competition was also making these protected enterprises as less-enterprising and less-innovative. Thus, there was a need to aim at economic openness and in this context trade openness was considered as a tool for bringing economic development through export-led growth and consequent employment generation.

Building a case in favour of free trade coincided with the globalisation

process, partly brought about the technological revolution, impacting different economic activities. Globalisation describes the ongoing global trend toward the freer flow of trade and investment across borders and the resulting integration of the international economy. It expands economic freedom and spurs competition. It is further understood that globalisation raises the productivity and living standards of people in countries that open themselves to the global marketplace.

For developing countries, globalisation offers access to foreign capital, global export markets, and advanced technology while breaking the monopoly of inefficient and protected domestic producers. Faster growth, in turn, promotes poverty reduction, democratisation, and higher labour and environmental standards.

These arguments and global developments generally have strengthened the case for an open trading system. It is held that the historical record is very clear that free trade bestows many benefits. Those countries that lower trade barriers and open their markets enjoy higher economic standards of living. Consumers have access to a wider range of higher quality products at prices lower than they would otherwise pay if they were forced to buy them from domestic producers. The average person also benefits in terms of wages and job opportunities. When labour and capital flow freely to the most productive areas of the economy, workers are employed in better, higher quality jobs with higher wages. While there are inevitable short-term transition costs in some sectors of the economy, the long-term benefits of free trade for all far outweigh such costs.

Thus, as you have seen in earlier section, proponents of free trade suggest several **sources of gains from trade**. *First*, as the market potentially served by firms expands from a national to a world market, there are gains associated with declining per unit production costs (economies of scale). A *second* source of gains results from the reduction in the monopoly power- of domestic firms. Domestic firms, facing more pressure from foreign competitors, are forced to produce the output demanded by consumers at the lowest possible cost. *Third* is the gain to consumers from increased product variety and lower prices. Generally speaking, the gains from trade result from the increase in competitive pressures as the domestic economy becomes less insulated from the world economy. *Fourth*, when trade barriers are reduced, exports increase and they provide additional avenues for employment and scope for poverty-reduction. *Fifth*, there is the classical argument from the time of Smith and Ricardo regarding efficient allocation of resources.

Moreover, it has also been argued that protection to industries is not costless. For instance, it requires resources from other industries; hence, output in other domestic industries is reduced. Industries might also be less efficient and uncompetitive due to higher cost of imported inputs used in their production on account of high import tariffs. Since protected industries tend to produce at higher cost, consumers are subjected to high-priced products. Not only that they lose due to lesser consumption of costly protected goods but also consume less of other goods whose prices rise due to their lower production.

In the modern trade arena many other initiatives besides tariffs have been called protectionist. For example some commentators, such as Jagdish Bhagwati, see developed countries' efforts in imposing their own labour and environmental

standards as protectionism. Also the imposition of restrictive certification procedures on imports are seen in this light. Like tariffs, these measures raise the cost of imported goods and make them less competitive. Such examples of protectionism are typically motivated by the desire to protect the livelihoods of individuals in politically important domestic industries, such as farmers in the United States and European Union, who in the absence of tariffs might be unable to compete with both lower-cost and untaxed foreign producers. Whereas formerly blue-collar jobs were being lost to foreign competition, in recent years there has been a renewed discussion of protectionism due to offshore outsourcing and the loss of white-collar jobs. Most economists view this form of protectionism as a disguised transfer payment from consumers (who pay higher prices for food or other protected goods) to local high-cost producers.

It was against this backdrop that the Uruguay Round of the GATT negotiations gained momentum and a new World Trade Organisation came into being in 1995. It envisaged laying down the foundations of a freer trade regime at the multilateral level with the commitment from its members to liberalise trade and other trade-related economic activities. The free trade proponents made different estimates of gains from multilateral liberalisation. As per one estimate, under the WTO, a complete dismantling of existing tariffs on imports worldwide could increase world economic output by approximately 3 per cent. In monetary terms, that amounted to the equivalent of US\$1.2 trillion boost to the world economy. It was further argued that the developing countries would gain the most.

Despite this, many of these countries still place protective and/or revenue tariffs on foreign products to protect some favoured or politically influential industries, or to reduce the taxation demands on their internal domestic manufacturing, making their products more competitive. The elimination of these tariffs remains a contentious political and diplomatic issue. China and Japan have been accused of protectionist policies that peg their currencies to the dollar and, thus, set prices of their exports lower than they would be if the market determined the relative prices of each currency. (You will be able to understand this better when you study exchange-rate policy in Unit no. 8, Block 3 of this course.)

However, the theoretical arguments and the empirical estimates have been contested by those who do not consider free trade as welfare-inducing. Critics argue that the very proponents of free trade actually practise protectionist policies. A critique of the free trade policy as a tool of development is presented in the following section.

### **Check Your Progress 2**

- 1) Critically discuss the the relationship between globalisation and the free trade.

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2) What are the gains associated with free trade?

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### **3.4 A CRITIQUE**

The critiques of the trade liberalisation policy have argued that despite the shifts from import substitution to economic liberalisation, the Latin American countries faced an economic crisis. Trade has been one of the major instruments of the globalisation process. Considering that exports play an important role in a country's growth process a vast body of literature emerged on an analysis of the relationship between trade openness, export orientation and growth. It is argued that exports as a part of the national income identity contribute to the economic growth or GDP growth process. However, it is argued that exports are only one component of the national income identity therefore their role in propelling growth cannot be over emphasised.

Several alternative explanations for export-to-growth linkage have emerged. It is also argued that the level and stage of economic development might determine a country's ability to foster export growth. Further the argument that trade liberalisation leads to exports and exports in turn contribute to growth and development was also challenged by putting forward an alternative explanation for export-growth linkage lying in terms of world economic environment. It was been found that, while there is a strong positive correlation between exports growth and GDP growth for countries facing positive world demand conditions, this correlation was very weak, or non existent, for countries facing below normal world demand. Thus it was concluded that outward-orientation cannot be considered as a universal recommendation under all conditions and for all types of countries. Some economists also point out that the present-day developed countries had not practiced free trade during their industrialisation in the nineteenth century, when they were at a comparable stage of development.

The foregoing details demonstrate that the causality issues between export growth and economic growth have remained inconclusive and debatable and thus trade liberalisation which is one of the major instruments of globalisation cannot be over-depended upon for achieving growth objectives and in turn, through growth, the developmental objectives of poverty eradication, etc.

There are various other arguments that have been advanced to contest the free trade doctrine. According to the national defence argument import barriers could be necessary to ensure the capacity to produce and store crucial goods in crisis. This argument need not be applicable to military-related goods but for some countries it could be in the areas such as oil and natural gas, food, pharmaceuticals etc. It may be also argued that since protectionist trade policies affect the distribution of income, a trade restriction might be defended on the grounds that it favours some disadvantaged group.

Yet another, the optimum tariff argument of protection applies to situations in which a country has the economic power to alter world prices. For example, by

imposing a tariff the country can make foreign goods cheaper. Since a tariff reduces the demand for foreign goods, if the tariff-imposing country has some market power, the world price for the good will fall. The tariff imposing country will gain because the price per unit of its imports will have decreased.

Many countries enact protectionist trade policies with the objective of eliminating or checking a balance of trade deficit or increasing a balance of trade surplus. The desire to increase a balance of trade surplus follows from the mercantilist view that larger trade surpluses are beneficial from a national perspective. Countries also want to keep the trade deficit as a proportion of national income within limits for avoiding unnecessary strain on their import-obligations and possibilities of default. The protection of jobs argument is closely related to the balance of trade argument. A domestic industry faced with increased imports from foreign competition is under pressure to reduce production and lower costs. Productive resources must move from this industry to other domestic industries. Workers must change jobs and, in some cases, relocate which puts pressure on them to accept jobs at lower wages.

The infant industry argument is advanced in terms of promoting a domestic industry. In a situation when an industry is being established in a specific country the country might not be able to realise its comparative advantage in this industry because of the existing cost and other advantages of foreign firms. Initially, while the infant firm is subject to incur losses until the firm develops its market and lowers its production costs to the level of its foreign competitors, it needs some protection. In order to assist this entrant, tariff protection can be used to shield the firm from foreign competition.

Recent theoretical developments have identified cases in which strategic trade policy is superior to free trade. As discussed in Unit 2, decreasing unit production costs i.e. economies of scale and market structures that contain monopoly elements are common in the industries involved in international trade. Market imperfections immediately suggest the potential benefits of governmental intervention. In the strategic trade policy argument, government policy can alter the terms of competition to favour domestic over foreign firms and shift the excess returns in monopolistic markets from foreign to domestic firms.

The concept of fair trade is technically referred to as reciprocity. As the name suggests the fundamental argument for fair trade is one of equity. Domestic producers in a free trade country argue that foreign trade barriers are unfair because it places them at a competitive disadvantage. The suggestion that a fair trade policy produces a trading environment with fewer trade restrictions allows proponents to assert that such a policy serves to promote both equity and efficiency. On the other hand, critics of a fair trade policy argue that such a policy is simply disguised protectionism as it simply achieves the goals of specific interest groups at the expense of the nation at large. In many cases, fair trade focuses on a specific practice that can be portrayed as protectionist while ignoring the entire package of policies that are affecting a nation's competitive position. In these cases, the foreign country is likely either not to respond or retaliate by increasing rather than reducing trade barriers. In the latter case, the escalation of trade barriers causes losses for both nations, which is exactly opposite to the effects of an activist fair trade policy. Providing level playing

field is yet another argument which is extended by domestic producers for protection against foreign imports.

There are various dimensions of the globalisation process and the adoption of a free trade policy that have not created a pro-poor economic climate. The structural adjustment programmes have overemphasised on the objectives of fiscal restraints that have resulted in a cut in spending on social sectors which, in turn, has adversely affected the poverty profiles, especially in the rural areas of the developing countries. Poverty levels have also been affected due to capital-intensive industrialisation necessitated by the imperatives of raising competitiveness in a liberalised global economy via its effects on greater unemployment. This is particularly important in the wake of the fact that such situations are not backed by adequate social security schemes, reflecting poorly on the development strategy.

Due to asymmetric market access, under the WTO regime, between North and South in both industrial and agriculture sectors and continuation of heavy subsidies in the agriculture sector in the developed world, the export prospects of the South have been marred, with ramifications on the employment prospects of the rural poor. FDI as a tool of globalisation process has not been observed to be always growth-propelling and on the other hand, short-term capital flows have led to crisis situations with catastrophic effects on the social dimensions of development. The technology market has become more segmented, inaccessible and unaffordable it has been increasingly becoming inappropriate for different sectors of the Southern economies.

All these together have influenced the poverty levels adversely and contributed to increased inequalities between countries and within a country between different income strata. They have also affected the social sectors like health and education.

Towards the end, the ongoing pace and scope of negotiations at the WTO only suggest that free trade has largely been a policy strategy which the developed want the developing world to follow so that the former can get market access and economic space in the latter while at the same time the former keep pursuing the protectionist policies.

### **Check Your Progress 3**

- 1) Critically argue the export to growth trade linkage.

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- 2) What are the arguments given in favour of protectionist trade strategy? Discuss.

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- 3) Critically examine the fair trade argument propounded by the researchers in favour of developing countries.

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### **3.5 LET US SUM UP**

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In this Unit, you have learnt about the definition of free trade and benefits of trade. The Unit explained to you, how countries stand to benefit from free trade, using a cost-benefit analysis based on the concepts of consumer surplus, producer surplus and social welfare.

You have also learnt that free trade is beneficial for a country both under conditions of perfect competition and monopoly in the domestic market, especially when the country is a small open economy, compared to the rest of the world. Social welfare gains accrue because consumers have access to imported goods at a lower price than they'd have to pay if the goods were produced domestically. Further, with free trade domestic firms have forced to compete directly with foreign firms, which often forces them to become more efficient. Moreover free trade provides domestic consumers access to a wider variety of goods, which is another source of gains. The Unit also explains to you the arguments in favour of free trade policy and liberalisation as a tool of economic development. It also exposes you to a policy debate on free trade and protection.

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### **3.6 KEY WORDS**

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**Laissez-Faire Policies:** Laissez-Faire Policies are the policies of non-interference of government in the economy except in the cases as necessary to maintain economic freedom. It is referred to include the policy of free trade.

**Transfer Payments:** Transfer Payments are those payments made without any good or service being received in return. Most of the public spending goes on transfers, such as pensions and welfare benefits. Private-sector transfers include charitable donations and prizes to lottery winners and so on.

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### **3.7 SOME USEFUL REFERENCES**

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Bhagwati, J. and T. N. Srinivasan. 1975. *Foreign Trade Regimes and Economic Development: India*. New York: Columbia University Press.

Krueger, A. 1978. *Liberalization Attempts and Consequences*, NBER, New York.

Krugman, Paul. 1987. Is Free Trade Passe?, *The Journal of Economic Perspectives*, Vol. 1(2): 131-144.

Krugman, P. and M. Obstfeld. 2000. *International Economics : Theory and Policy*, Addison Wesley Longman : Singapore. Chapters 8, 9 and 10,

Little, I.M.D., Scitovsky, Tibor and Scott, Morris. 1970. *Industry and Trade in*

*Some Developing Countries*, Oxford: Oxford University Press.

Rodriguez, F. & Dani Rodrik. 1999. *Trade Policy and Economic Growth: A Skeptic's Guide to Cross-National Evidence*, NBER Working Paper 7081.

Sikdar, S. 2003. *Contemporary Issues in Globalization : An Introduction to Theory and Policy in India*, Oxford University Press : New Delhi. Chapter 6.

Sodersten, B. and Reed, G. 1994. *International Economics*, 3rd ed., London: Macmillan.

Stiglitz, J.E. 2002. *Globalization and Its Discontents*. W.W. Norton & Company.

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## **3.8 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES**

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### **Check Your Progress 1**

- 1) Read Section 3.2
- 2) Read Sub-section 3.2.1
- 3) Read Sub-section 3.2.2
- 4) Read Sub-section 3.2.2.3

### **Check Your Progress 2**

- 1) Read Section 3.3
2. There are several gains associated with free trade. These are economies of scale, efficient allocation of resources, declining monopoly power and so on. Please Read Section 3.3.

### **Check Your Progress 3**

- 1) Read Section 3.4
- 2) Read Section 3.4
- 3) Read Section 3.4