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SEMESTER-III   INTERNATIONAL ECONOMICS

PUNJABI UNIVERSITY PATIALA

Section - A

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Lesson No. :

Lesson No. 1.1

OPPORTUNITY COST THEORY OF INTERNATIONAL TRADE

One of the main drawbacks of the Ricardian comparative cost theory was that it was based on the labour theory of value which stated that the price of a good was equal to the amount of labour time going into the production of the good. Gottfried Haberler gave new life to the comparative cost theory by restating the theory in terms of opportunity costs in 1933. The opportunity cost of a good is the amount of a second good that must be given up in order to release just enough factors of production or resources to be able to produce one additional unit of the first good. For example, supposing that the resources required to produce one unit of good X are equivalent to the resources required to produce two units of good Y. Then, the opportunity cost of one unit of good X is two units of good Y. Haberler made use of opportunity cost curve to express the opportunity cost of one good in term of the other. The opportunity cost curve can be called as the 'transformation curve' or 'production possibility curve'. According to the opportunity cost theory, a country with a lower opportunity cost for a good has a comparative advantage in that good and a comparative disadvantage in other good.

 Haberler makes the following assumptions for his theory.

1. There are only two countries.

2. There are only two commodities in both the countries.

3. There are only two factors of production such as labour and capital.

4. There is perfect competition in both the factor and good markets.

5. Price of each good equals its marginal cost.

6. Price of each factor equals its marginal productivity.

7. Supply of each factor is fixed.

8. In each country, there is full employment.

9. No change in technology.

10. Factors are not mobile between two countries. But within countries, factors are totally mobile.

11. There is free and unrestricted trade between the two countries

On the basis of above assumptions, production possibility curve indicates the different combinations of two commodities that a country can produce with the given factor endowments and technology. The slope of production possibility curve or opportunity cost curve is determined by marginal rate of transformation (MRT). MRT is a rate at which marginal unit of good X is substituted for certain units of good Y.

$$MRT = -\frac{\Delta x}{\Delta y}$$

The opportunity cost curve may be a straight line, convex to the origin or concave to the origin, depending on whether MRT between X and Y goods is constant, increasing or decreasing respectively.
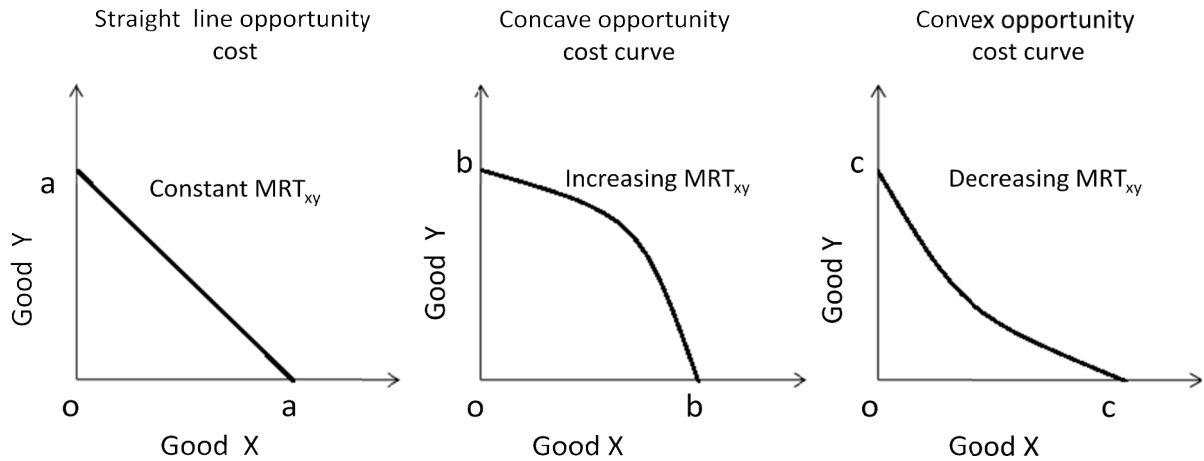
Figure 1

International trade between two countries can be analysed under various types of production possibility curves or opportunity cost curves.

a) **Constant opportunity cost and international trade**

When MRT between X and Y goods remains constant then opportunity cost curve will be a falling straight line. If the slopes of opportunity cost curves in two countries are the same, so that the opportunity cost curves are parallel to each other (as shown in Figure 2), no trade can be possible. It is because of the fact that in such cases the cost ratios of two goods in both the countries are equal.
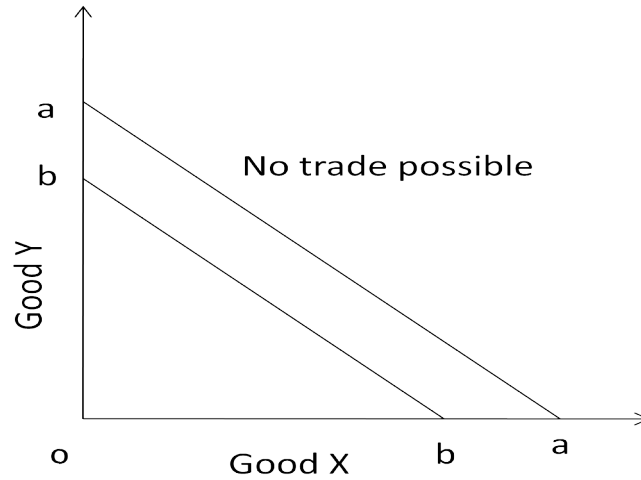
Figure 2

The trade is possible only when the slopes of the opportunity cost curves are different.
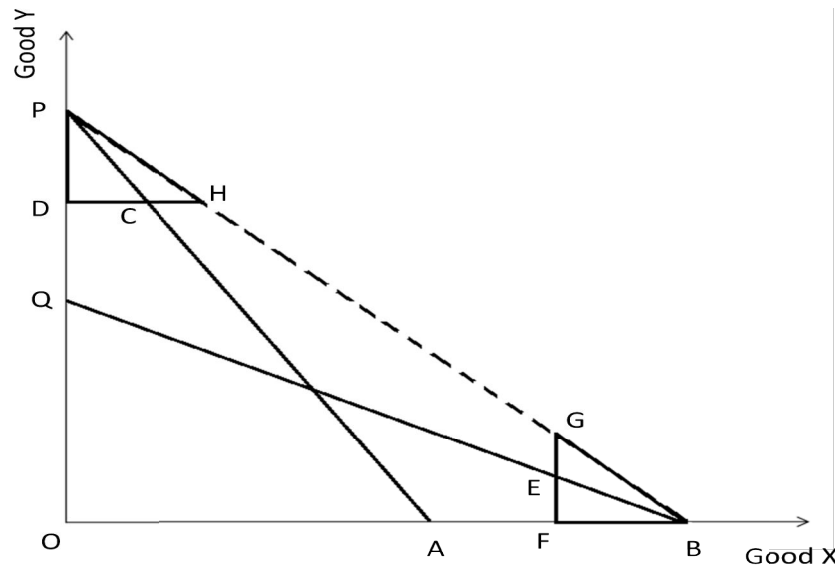

Figure 3

In Figure, PA and QB are the opportunity cost curves of country A and country B respectively. Under the situation of autarky, if county A produce and consume at point C at its opportunity cost curve, i.e, PA line then it will have DO

qunatity of good Y and DC qunatity of good X. However, if county B produce and consume at point E at its opportunity cost curve, ie., QB line then it will have FO qunatity of good X and EF qunatity of good Y. However, the relatively greater steepness of PA line shows that country A has a comparative adventage in the production of good Y, whereas the relatively greater flatter of QB line reveals that country B has comparative advantage of good X. Therefore, country A will specialise in the production of good Y and country B will specialise in the production of good X. If country A produce only good Y then it can produce maximum OP quantity of good Y at its opportunity cost line PA. Similarly, country B can produce maximum OB quantity of good X if country B produce only good X at its opportunity cost line QB. Both countries will exchange goods in the ratio indicated by the dotted international commodity-price line PB.

Suppose country A want to consume both comodities at point H. At this point, the country A will export PD quantity of good Y and import DH quantity of good X. After international trade, country A can consume more quantity of good X, ie., CH (=DH-DC). Similarly if country B want to consume both commodities at point G then it will export BF quantity of good X and import FG quantity of good Y. Therefore, the gain from trade for country B will be GE (=GF-EF) quantity of good Y.

b) Increasing opportunity cost and international trade

If MRT between X and Y goods goes on increasing, then opportunity cost curve or production possibility curve will be convex to the origin. In Figure 4, AA represents the production possibility curve of country A and BB in Figure 5, is the production possibility curve of country B. The comparison of the shape of the production possibility curves of both countries makes it clear that opportunity cost

of good X, in terms of good Y, is lower in country A and higher in country B. In other words, country A is better suited for the production of good X and country B for the production of good Y.

In the case of country A, under the absence of international trade the country is in equilibrium at E, where the production possibility curve AA tangents to the country' indifference curve, i.e, II curve. At this point, country A is producing and consuming OX quantity of good X and OY quantity of good Y. The slope of the production possibility curve AA at point E is donated by P_aP_a line. Similarly, country B will be in equilibrium at E_1 under the absence of international trade as shown in Figure 5 where the production possibility curve BB tangents to the country' indifference curve, i.e, I_1I_1 curve. At this point, country B is producing and consuming OX_1 quantity of good X and OY_1 quantity of good Y. The slope of the production possibility curve BB at point E_1 is donated by P_bP_b line. The slope of P_aP_a line is relatively flatter than that of P_bP_b line. This indicates that good X is cheaper in country A and good Y is in country B.
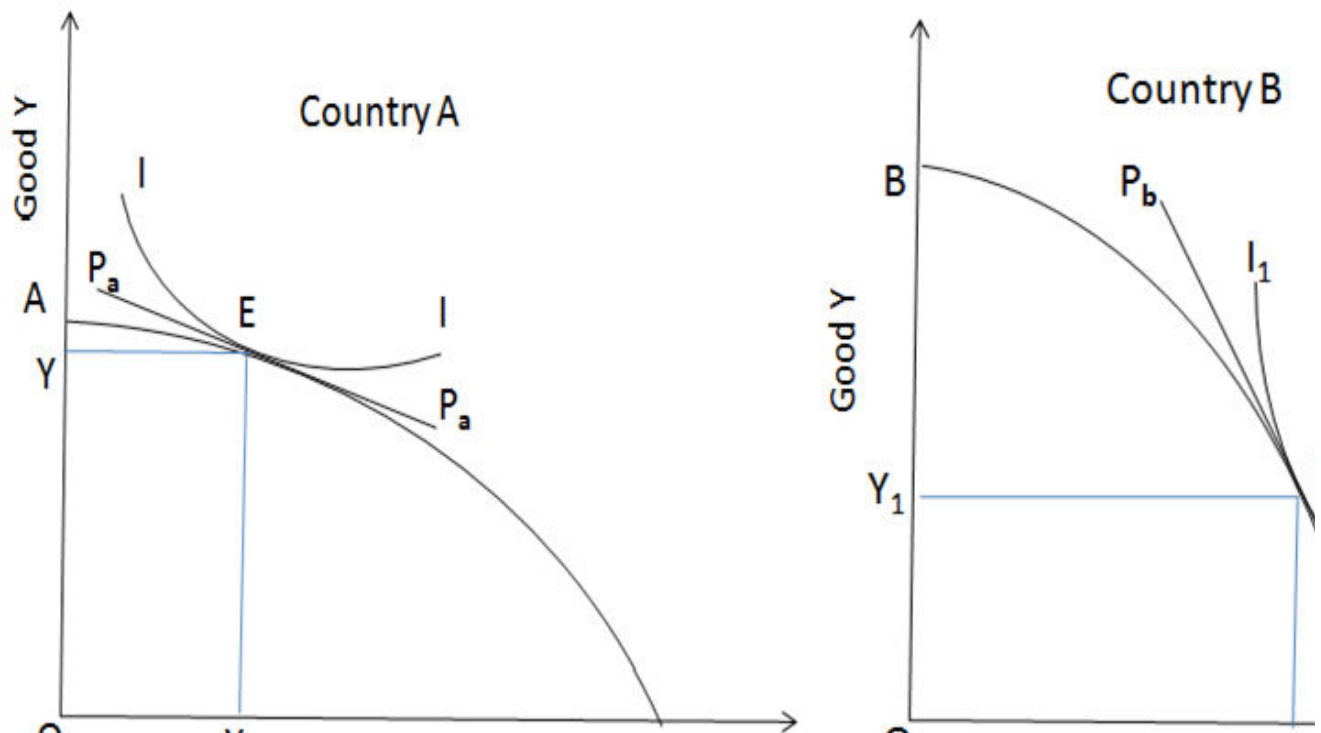
If both the countries enter into trade with each other, the international price ratio is most likely to be somewhere in between the pre-trade ratios in both the countries. In other words, the international price line would neither be as flat as price line P_aP_a of country A, nor be steep as the price line P_bP_b in country B. The slope of the international price line would be somewhere in between the price lines of both the countries. In Figure 6 and Figure 7, P_iP_i represents a possible international price line. If P_iP_i represents international price line, country A will produce at point N where its production possibility curve AA tangents to international price line P_iP_i. At this point it will produce more quantity of good X at the cost of good Y. Country A will expand the output of good X by MN by contracting the output of good Y by EM. If country A wishes to maintain

consumption of good X at the old level of OX, it can now export MN quantity of good X and get in exchange ME_2 quantity of good Y. Hence, the gain from trade to country A is equivalent to EE_2 of good Y. the country A is now able to be at a higher equilibrium point E_2 on its indifference curve I_2I_2. In the absence of trade, this point cannot be reached by country A as it is beyond its production possibility curve.
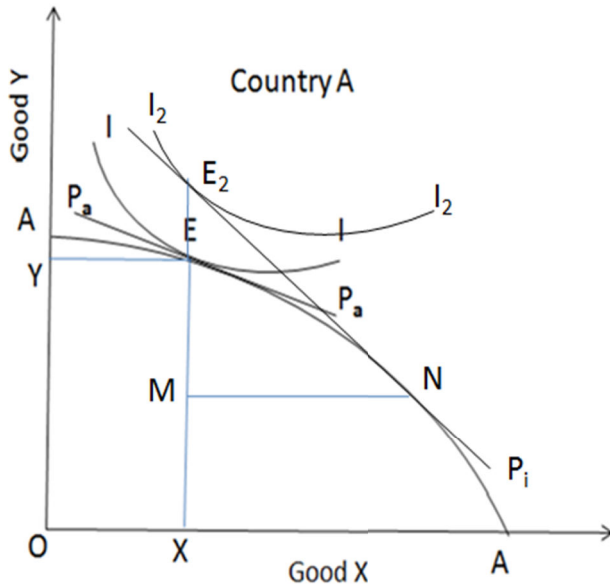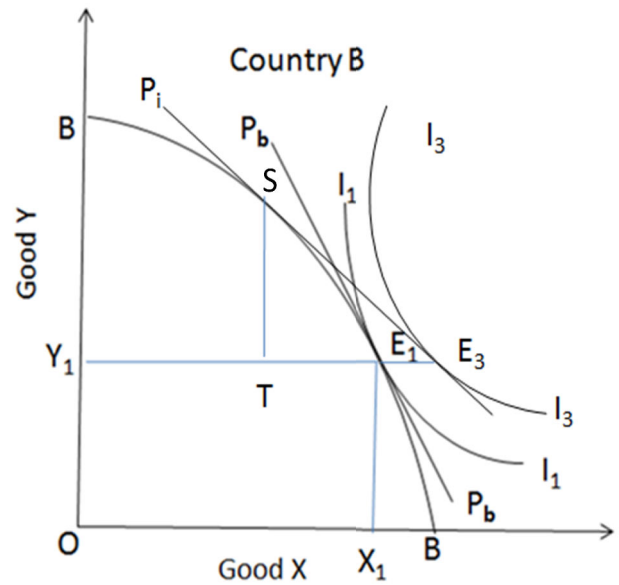
Figure 6   **Figure 7**

Similarly, under trade, country B would expand production of good Y by TS by contracting good X output by TE_1. If it would like to maintain pre-trade level of consumption of good Y, it can export TS quantity of good Y and obtain TE_3 quantity of good X and attain equilibrium at point E_3 which cannot be reached under the absence of international trade. The gain to country B will be equivalent to E_1E_3 of good X.

In the above analysis, it is assumed that the country A would wish to maintain the pre-trade level of consumption of good X and the country B the pre-

trade consumption of good Y. But the real situation may be different. Consumption of these commodities by the respective countries may be less or more than under the absence of international trade so that community welfare could be maximized.

c) Decreasing opportunity cost and international trade

If MRT between X and Y goods goes on decreasing, then opportunity cost curve or production possibility curve will be concave to the origin.
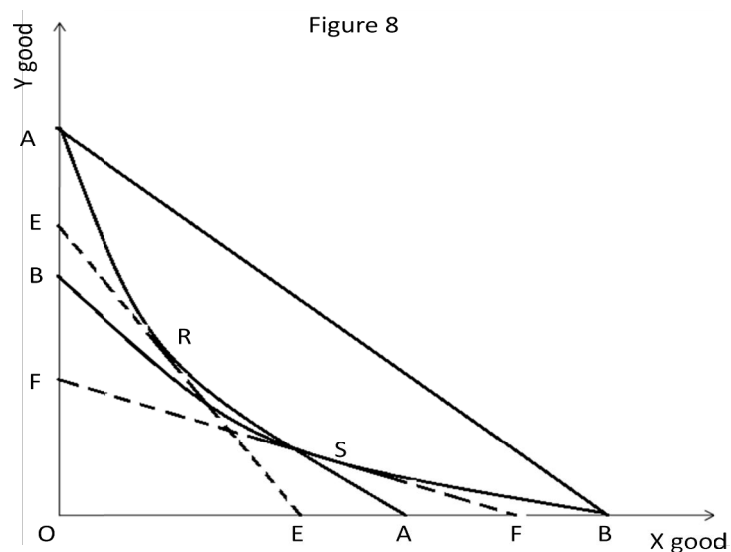
Figure 8

In Figure, AA and BB are the production possibility curves for country A and country B respectively. In the situation of autarky, production equilibrium of country A is determined at R point, where its domestic price line EE tangents to its production possibility curve AA. Similarly, the production equilibrium of country B is at S point. Under the situation of international trade, the international price ratio is depicted by AB line. The relatively greater steepness of EE line to international price line AB shows that country A will specialize in the production of good Y. On the other hand, the relatively grater steepness of international price

line AB than FF line indicates that country B will specialize in the production of good X. In other words, country A will export good Y and import good X; whereas country B will export good X and import good Y. The equilibrium point for both the countries, determined by tangency between community indifference curve and international price line will lie somewhere on AB line. Such point will indicate a higher level of satisfaction than either at R or S, signifying the gain from trade to the both countries.

Critical Appraisal

The critical appraisal of Haberler's opportunity cost theory can be discussed under two heads namely

1. Superiority over comparative cost theory, and
2. Criticisms.

1. Superiority over Comparative Cost Theory

Haberler's opportunity cost theory is regarded as superior to the comparative cost theory of international trade formulated by the classical economists like Adam Smith and David Ricardo. The arguments put for the superiority are summarized below:

a. **Dispenses with the Unrealistic Assumption of Labour Theory of Value:** The classical theory is based on the unrealistic assumption of labour theory of value. But Haberler's opportunity cost theory dispenses with such unrealistic assumption and is more realistic.

b. **Analyses the Pre-trade and Post-trade situations Completely:** The opportunity cost theory analyses pre-trade and post-trade situations under constant, increasing and decreasing opportunity costs, whereas the comparative cost theory is based on the constant cost of production within the country with comparative advantage and disadvantage between the two countries. Hence, Haberler's opportunity cost theory is considered to be more realistic over the

classical theory.

c. **Highlights the Importance of Factor Substitution:** The opportunity cost theory highlights the importance of factor substitution in trade theory. It is vital in the production process especially for a growing economy.

d. **Facilitates the Easy Measurement of Opportunity Cost:** The opportunity cost can be measured easily.

e. **Explains the time, reason etc. about Trade:** The opportunity cost theory explains why trade takes place or when it should take place, showing how the gains shared between the countries etc.

f. **Explain about the Complete Specialization:** It explains when complete specialization is possible and when it is not possible etc.

2. Criticisms

Haberler's opportunity cost theory is also not free from criticisms. It has been vehemently criticized by Jacob Viner in his ─Studies in the Theory of International Trade (1937) . Some of the important criticisms are listed below:

a. **Inferior as a Tool of Welfare Evaluation:** Jacob Viner says that opportunity cost approach is inferior as a tool of welfare analysis when compared to classical real cost approach. Further he says that the doctrine of opportunity cost fails to measure real costs in the form of Sacrifices or Disutilities.

b. **Fails to consider Changes in Factor Supplies:** Viner further criticizes that the production possibility curve or opportunity cost theory do not consider changes in the factor supplies.

c. **Fails to consider Preferences for Leisure against Income:** Viner also criticizes the opportunity costs theory on the ground that the production possibility curve does not take into account the preference for leisure against income.

d. **Unrealistic Assumptions:** Haberler's opportunity cost theory is based on many assumptions like two countries, two commodities, two factors, perfect competition, perfect factor market, full employment, no technical change etc. All these assumptions are unrealistic because they do not hold in the real world.

LESSON NO. 1.2   AUTHOR : DR. GOVIND KHANNA

THE THEORY OF COMPARATIVE COSTS

Though the Mercantilists, an early school of Economists, were the first to advocate a series of measures to regulate international trade, it was Adam Smith who provided the basic principles which influenced thinking on the subject for a long time. His method was to apply the benefits of specialisation to the international economy on the assumption that international trade was no different from internal trade of a country, if trade barriers were done away with. He wrote in "Wealth of Nations"[1], "It is the maxim of every prudent master of a family, never to attempt to make at home what it will cost him more to make than to buy. All of them find it in their interest to employ their whole industry in a way in which they have some advantage over their neighbours and to purchase with a part of it whatever else they have occasion for. What is prudence in the conduct of every private family can scarce be folly in that of a great kingdom. If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy of them with some part of the produce of our country employed in a way we have some advantage."

Adam Smith thus argued that relative advantage resulting from absolute differences in costs are the basis for international trade. But it was Ricardo who formulated the Law of comparative costs, which postulated that international trade would be possible even where absolute advantage did not exist. Ricardo's theory has been considerably refined and developed by later economists like Senior, Mill and Taussig.

To take a simple example :

Commodity	Labour costs of output	
	Country A	Country B
Wheat (Kgs.)	10	8
Cloth (Meters)	20	10

According to Adam Smith's theory, trade could have taken place only if one country produced more of one commodity per unit of labour input than of the other commodity in which the second country was more productive. However, in our example, country A can produce more of wheat as well as cloth per unit of labour than country B. The comparative cost theorists show that even in such a situation trade would take place. For though, A has an absolute cost advantage in both, its comparative advantage is greater in cloth

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1.   Cannan Edition, 1937, pp. 423

than in wheat. Similarly, B is better placed in the production of wheat (relative to A) than in the production of cloth. Thus, 20 metres of cloth would buy 16 kgs. of wheat against only 10 Kgs. in A; while B could obtain 16 metres of cloth by exporting 8 Kgs. of wheat against only 10 in its domestic market. Thus, both sides can make a profit and trade will go on as long as relative production of wheat drops to 5 kgs. per unit of labour in B or alternatively, it rises to 16 Kgs. in A. We can restate our findings as follows :

"A country will tend to export the commodity whose relative cost or comparative cost of production is lower than it is in the other country. No international trade will occur if there are no differences in relative production costs between countries."[1]

Implicit in the above discussion is the Labour Theory of Value and hence the argument that prices equal labour costs. The labour theory of value is not generally accepted as valid because labour is neither homogenous nor the sole factor of production. Labour market consist of numerous qualitatively different sub-groups known as "non-competing groups." Even if labour were indeed homogenous and commended a single wage rate in a perfectly competitive market, there remains the more fundamental objection that labour is not the only factor of production. Goods are produced by various combinations of land, labour and capital, which may affect both productivity and profitability and, therefore, the structure of trade. Assumptions of labour theory of value also ignore money cost differences resulting from productivity differences. Nor does it take into account the causes underlying wage differences which may not always reflect real labour costs. Other economists have criticised the comparative cost theory for ignoring transport costs which can also effect the pattern and direction of trade. Equally valid criticism has been advanced against the implicit assumptions of constant costs and constant returns to scale.

We can conceive of trade taking place until a situation is reached when the ratio of the cost of producing the two commodities at home equals this ratio abroad. At this point trade will come to a stop for want of further gain from it. Obviously, the greater the disparity in cost ratios between the two countries, the larger is the volume of profitable trade.

It is not within the scope of this lesson to discuss the determinants and the role of international prices and foreign exchange rates. But it may be noted, in passing, that the rate of exchange between two national currencies serves to convert relative cost differences into prices and hence may be significant to the direction and volume of trade predicted by the law of comparative costs.

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1.   Robert Heller : International Trade—Theory and Expirical Evidence, p. 36

The foreign account explains the classical theory of comparative costs as formulated by Ricardo and refined by Taussig. However, the theory has been analysed further and as a result modified and extended. Its modern versions reject the labour theory of value and restate it in terms of opportunity costs. This was first done by G. Harberler in 1933.[1]

Since every country has a given factor supply and given technology, at least in the short period, therefore, some of the possible alternative commodities, which could have been produced, will have to be foregone. Thus, there is an opportunity cost represented by the next best combination of commodities which may have been produced but for the scarcity of the resources. For simplicity of exposition, we assume, as Haberler did that there are only two factors of production, viz., capital and labour which can be used to produce wheat and/or cloth. The economic problem is to decide which of the two, or what combination of the two commodities to produce, because with a given factor supply, a country's production possibilities are necessarily limited. The greater the quantity of wheat that is produced, the less cloth will be manufactured and vice versa.
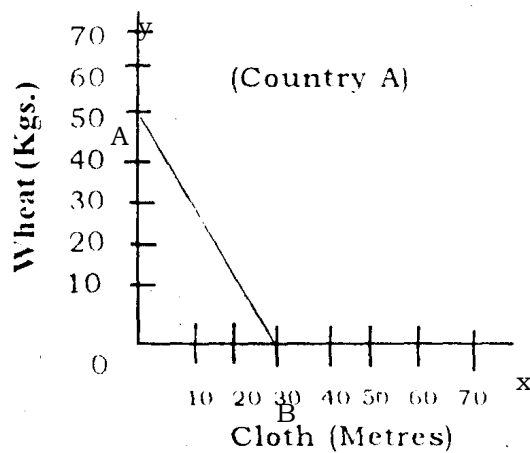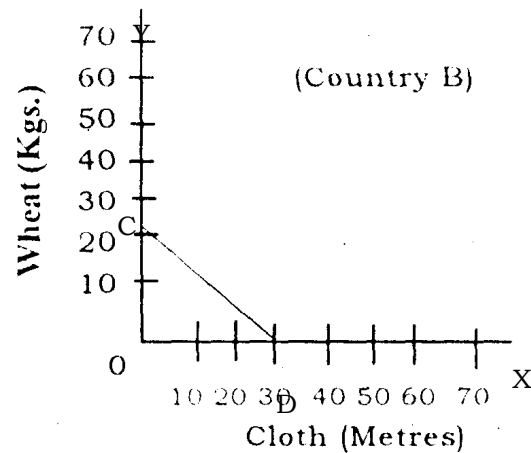
Fig. 1 (a)　　　　　　　　　　Fig. 1 (b)

In figures 1 (a) and (b), we have drawn hypothetical linear production frontier (or possibility) curves for countries A and B. These diagrams show that with given resources and optimum efficiency country A could produce either 50 Kgs. of wheat or 0 Metres of cloth or a combination of the two commodities indicated by the line AB, which shows the marginal rate of substitution (transformation) between the two commodities. Similarly, Combination of the

1.　　　The theory of International Trade.

two indicated by the curve CD for country B. Since the curves are linear, opportunity costs and so the rate of substitution (transformation) is constant. Therefore, 1 Kg. of wheat would exchange for 0.6 Metres of cloth in country A and 1.5 Metres of cloth in country B. It is apparent that A has comparative advantage in the production of wheat while B is relatively more efficient in the production of cloth and both the countries will gain if a specializes in wheat and B in cloth production. This can be illustrated with the help of the following figure which is derived from figure 1 (a) and (b).
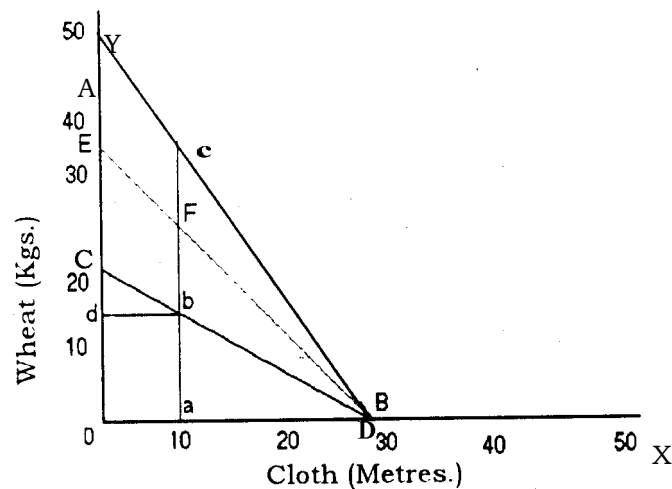
The initial consumption level in country B is at point b on the BC linear function which gives it Oa of cloth and Od of wheat. As trade between A and B begins the former will specialize in wheat production and latter in cloth. So B manufactures OB amount of cloth, of which it consumes Oa at home and exports B a to A in return for ac amount of wheat. Thus it adds bc to the previous level of wheat consumption which was ab, without any reduction in consumption of cloth. So B is a net gainer, but A is neither well off nor worse off. It simply moves from point P (not shown here) on A. B curve to point C representing a different combination of wheat and cloth than before, without loss or gain because the movement is along the same linear constant opportunity cost curve. This example, however, can be easily reversed to show the gains in favour of A. But international transactions are seldom based on the sided gain, and it often happens that as trade takes place between two products at the two domestic rations, represented by the line BE in our diagram. In this case, the two countries share the gains under the new terms of trade, the gain to B will be measured by bF and that of A by Fc.

Thus, to generalize from the above discussion of comparative

(opportunity) costs, trade results from different production functions and/or commodity exchange ratios between different countries. It leads to specialization by each country in the production of commodities in which it has a comparative (opportunity) cost advantage, and as a result of it, the combined production of all the commodities grows, enabling each country to consume more of it than before trade began. The ratio in which goods are exchanged between countries is known as "terms of trade" and in the present case they may be described without the intervention of money. The limit to the commodity terms of trade are set by the domestic exchange ratios prevailing in the two countries and the actuals are determined by the force of the internal demand. The terms of trade are relevant not merely for determining the quantity and pattern of trade between different countries but also between sectors within the same economy, e.g. between the agricultural and industrial sectors. The terms of trade between sectors within an economy determine relative costs, required level of consumption and the magnitude of import and export trade that can take place. Thus "internal terms of trade determine the "external" terms of trade and the environment in which trade takes place."

It may be noted that we have drawn a straight line curve because we have assumed constant (opportunity) costs. However, there is no reason that they must always be constant. If we have increased (opportunity) costs, the curve would be convex to the origin. It will be concave to the origin, if the costs are decreasing.
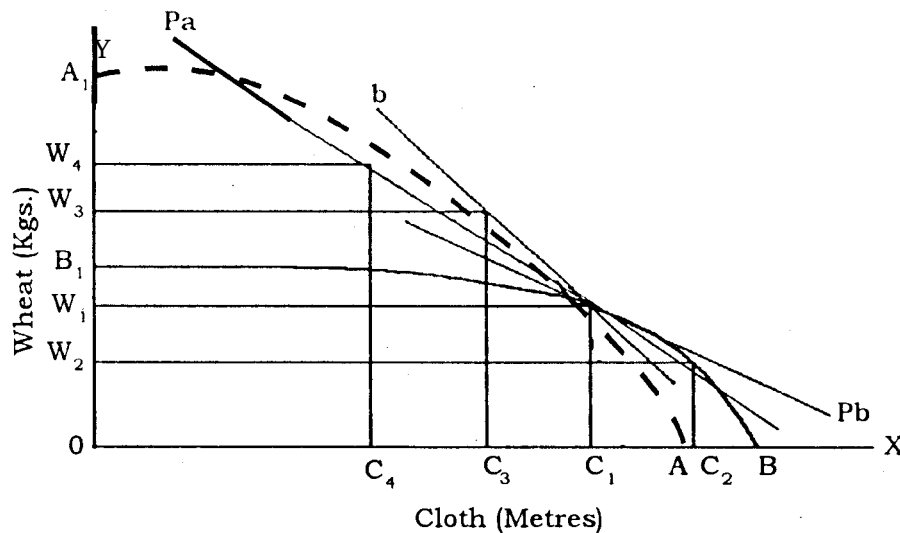
In the foregoing figure, we display the production possibilities and gains

from specialization based on increasing opportunity costs. The two curves A, and B, have different slopes because with identical marginal rates of substitution (transformation) no trade would be possible. The slopes of the tangents Pa and Pb represent the domestic terms of trade between the two commodities in the two countries before the trade opens. Country A produces OW_3 amount of wheat and OC_3 of cloth. B produces OW_1 of wheat and OC_1 of cloth. It is evident that A has comparative advantage in wheat and B in cloth production, and it will be mutually advantageous for them to specialize accordingly.

International prices are determined by the interaction of demand and supply in the same manner as domestic prices are. Thus the line PP-tangential to the production possibilities (substitution) curves of both the countries indicates the equilibrium points at which trade between them would stablize. It shows that B can profitably decrease its output of wheat from OW_1 to OW_2, and increase its output of cloth from OC_1 to OC_2. Keeping its domestic consumption of cloth constant and equal to OC_4. It can now export C_4C_2 amount of cloth of A, in return for W_2W_4 equivalent of wheat imports from that country. On the other hand, A will increase its output to wheat from OW_3 to OW_4 by reducing its output of cloth OC_3 to OC_4. But its total consumption of cloth will increase to OC_2 (i.e. OC_4 domestic output $+C_4 C_2$ imports from B). Likewise, in B the consumption of wheat, will rise to OW_4 i.e., OW_4 (domestic output) $+ W_2 W_4$ (imports from A). Thus both the countries are able to obtain and consume more of cloth or wheat, as the case may be, than they could obtain before trade began. But at the same time both had to reduce their consumption of other commodity-A had to reduce consumption of wheat from OW_3 to OW_2 and B of cloth from OC_1 to OC_4. It is, therfore, a moot point whether the two countries are better off on the whole, or not. The answer to this question would be that, if the gain from increased consumption of one commodity at a price lower than what would have prevailed in the absence of trade, outweigh the loss from reduced consumption of the other commodity whose comparative costs of production were higher than country as a whole gains from trade. Thus the final verdict involves careful weighting to benefits and costs.

So far we have assumed implicity, the absence of transport costs as a factor in determining comparative (opportunity) costs. We may now relax this assumption and consider the impact of transport costs (or to give it another name-economic distance) on the international trade flows. We may define transport costs as the difference between the value of the product ex-factory, and its value at the point of delivery to the buyer consumer. The first impact of transport costs is to raise the import (FOB) price of the commodities traded.

As a result, there will be a decline in consumption levels of the imported commodities in the trading countries, which in turn will bring about a shift in production pattern. Now the countries concerned will have to reduce their degree of specialization and the volume of trade between them will be reduced. The transport costs would modify the structure of their economies because they reduce the differences in comparative opportunity costs and thereby reduce the gains expected from international trade. Finally, transport costs do not effect the pattern of trade, except in cases, where they are so high as to completely nullify comparative advantages before absorption of transportation costs.

However, this loss of gain can be countered, if we consider the possibilities of decreasing (opportunity) costs-instead of constant and/or increasing (opportunity) costs, which we have considered till now. To analyse the implication of decreasing (opportunity) cost, we again assume zero transport costs for the sake of simplicity. Transportation costs can be introduced into the analysis, *mutatis mutandis,* as indicated in the preceding paragraph.
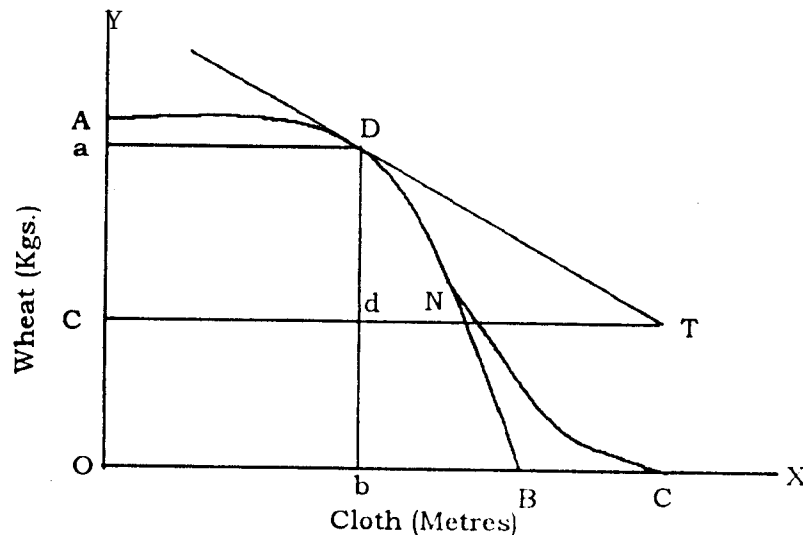
In the above figure, the ANC curve shows the transformation from increasing to decreasing opportunity cost. While wheat production is characterised by increasing opportunity costs throughout the stretch of ANB curve, cloth production is not if it is expanded beyond the critical point N at which the curve becomes convex to the origin. The country will then gain significant economies of scale which will alter the commodity terms of trade.

The tangent represents the existing terms of trade giving Oa output of wheat and Ob output of cloth. Export of wheat equals to dD and import of cloth dT, while consumption level is given by T which lies outside the marginal substitution (transformation) curve. But as output moves beyond N towards C, less and less of wheat would have to be sacrificed for each marginal increase in cloth output, which is now subject of decreasing costs. Thus there will be a rapid shift in production. Even if complete specialization does not take place, the country will gain by extending production of those commodities in which possibilities of economies of scale exist.

Now we must extend our analysis to cover multilateral trade. So far we have analysed the theory of comparative costs on a bilateral basis with commodities. No doubt it is often bilateral but not always so. India's trading arrangements with Communist block countries are under bilateral trade treaties, but that with other countries are generally on a multilateral basis and so is most of international trade around the world. As such we must now lift our analysis out of the two country straight jacket and extend it to explain multilateral trade.

However, this does not mean that we can simultaneously take into account all the countries of the world with whom a country may have trade relations in the numerous commodities which it may be manufacturing. For them by permutation and combination, the number of possible outcomes will be infinite and it would be practically impossible to find out the precise direction of world commodity trade, especially for the fact that comparative costs themselves are constantly changing due to economic and non-economic factors. We will, therefore, limit ourselves to a group of four major countries which we known have substantial trade relations, viz., India, Britain, USSR and USA. By comparing the domestic pre-trade price-ratios (terms of trade) for any groups of commodities, a ranking in order of comparative advantages can be derived. The following table gives a hypothetical ranking in respect of commodities X and Y on the basis of assumed price rations :

Country	Commodities & Ranking	
	X	Y
Britain	1	4
USSR	2	3
India	3	2
USA	4	1

On the basis of above ranking, it can be seen that the pattern of trade

expected would be something like the following diagram :
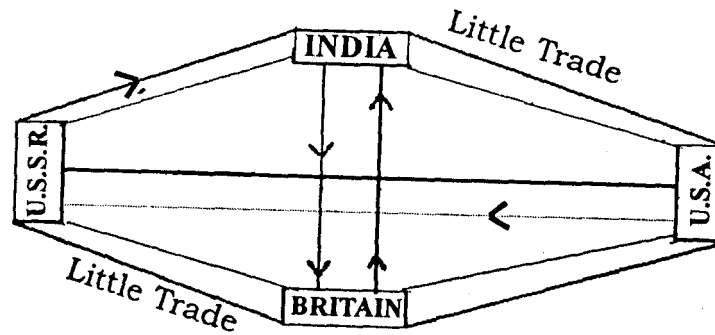
The foregoing table and diagram give an idea of the multilateral trade between four countries. It is possible to analyse the most probable commodity composition of any single country's trade with another country by similar ranking of the various commodities in terms of comparative costs. Thus, a general approximation can be made regarding the direction and commodity composition of trade among countries. But more remains to be known. No mention has yet been made of the factor endowments which affect comparative cost difference. To this we shall turn in the next lesson.

contrary to Heckscher Ohlin theory. But it ignores differences in production methods between the two countries.

Thus, though Heckscher-Ohlin theory explains why trade takes place, it is not accepted by modern economists as a full or complete explanation of the emerging pattern of trade in manufactured commodities between countries with similar economic structures. S.B. Linder has addressed himself to this problem. Explanation of trade pattern from comparative cost theories down to factor endowment theories have concentrated on the analysis of supply side. They have virtually ignored the implications of demand for international trade. If a country has a buoyant home market for a certain commodity it guarantees a substantial demand which enables production to expand with resulting economics of scale, and the possibility of a surplus over domestic consumption emerging for export. Since economies with similar structure and more specifically, similar income levels tend also to be competitive, they offer better prospects for export performance than dissimilar economies. Hence according to Linder, two specific conditions must be fulfilled for trade between two countries to grow. First, the economies of scale in the domestic economies

should be such as to enable costs of production to be reduced so that product becomes competitive abroad, and secondly, general economic conditions in foreign markets must be similar to those in domestic market.

In a somewhat different manner Kravis argues that determinant of the pattern of trade is the elasticity of supply within the trading countries. But he also argues that in the real world today, the volume and direction of the trade depends more on tariffs and foreign exchange and the nature of intervention by the state which regulate foreign trade and influence the terms of trade, rather than factor endowments and factor intensities.

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1.   Ekonomiks Tidsknift vol. XXI (Ap. 497-912) 1919 - Reprinted in Reading in "The Theory of International Trade" Edition.
2.   Inter-regional and International Trade (Harvard University Press), 1935.

Lesson No. 1.3

FACTOR ENDOWMENT THEORY OF INTERNATIONAL TRADE

The Factor Endowment Theory or modern theory of international trade was developed by two Swedish economists –Eli Heckscher in his article 'The Effect of Foreign Trade on Distribution of Income' in 1919 and his student Bertin Ohlin in his famous book 'Inter-regional and International Trade' published in 1933. In fact, the classical comparative cost theory did not satisfactorily explain why comparative costs of producing various commodities differ as between different countries. The modern theory explained that it is the differences in factor endowments of different countries and different factor-proportions needed for producing different commodities that account for difference in comparative costs. Further, since this theory is based on general equilibrium analysis of price determination, this is also known as General Equilibrium Theory of International Trade. In simple according to this theory, a country will export goods that use its abundant factors intensively, and import goods that use its scarce factors intensively. In the two-factor case, a capital-abundant country will export the capital-intensive good, while the labor-abundant country will export the labor-intensive good."

Assumptions

1)   There are two countries A and B. Country A is labour-abundant and country B is capital- abundant.

2)   There are two factors, labour and capital.

3)   There are two goods, i.e., X and Y. Good X is labour-intensive and good Y is capital-intensive.

4)   All production functions are homogeneous of the first degree. In other words, there are constant returns to the scale.

5)   There is perfect competition in both the commodity and factor markets.

6)   There are no transport costs or other impediments to trade.

7)   There is full employment of resources.

8)   There are quantitative differences in factor endowments in different countries.

9)   The production functions are different for different commodities, but are the same for each commodity in both countries.

10) Factor-intensity is non reversal.

11) There is perfect mobility of factors within each country but internationally they are immobile.

12) There is free and unrestricted trade between the two countries.

13) There is no change in technology.

On the basis of these assumptions, one country will specialize in the production and export of capital-intensive goods which has abundance of capital resources. On the other hand, other country will specialize in the production and export of labour-intensive goods which has abundance of labour resources. The H-O theorem can be explained in terms of two definitions:

(a) **The Price Criterion of Factor Abundance:**

According to the price criterion, a country having capital relatively cheap and labour relatively dear is regarded as relatively capital-abundant, irrespective of its ratio of total quantities of capital to labour in comparison with the other country. In symbolic terms, country A will be relatively capital-abundant and country B will be labour-abundant if:

$$\left(\frac{PK}{PL}\right)A < \left(\frac{PK}{PL}\right)B$$

Where P is the factor price, K is the capital, L is the labour, $\left(\frac{PK}{PL}\right)A$ stands for the ratio of the price of capital and labour in country A and $\left(\frac{PK}{PL}\right)B$ means the ratio of the price of capital and labour in country B.

It is easy to establish the H-O theorem on the basis of price criterion of factor abundance which has been shown in figure 1:
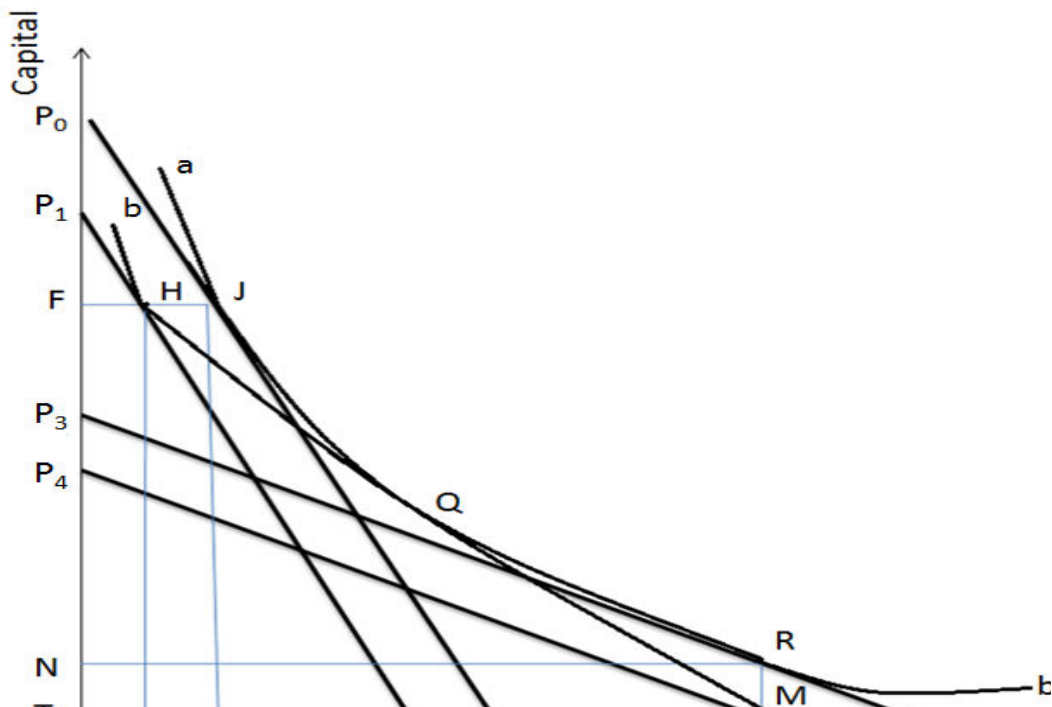
In the figure, P_0P_0 and P_1P_1 are the iso cost lines of country A; and P_3P_3 and P_4P_4 are the isocost lines of country B. The slopes of these lines reflect the factor price ratios in the both countries. The steepness of isocost lines, i.e., P_0P_0 and P_1P_1 of country A reflects that in country A, capital is cheaper and labour is dearer. On the other hand, the relative flatness of isocost lines, i.e., P_3P_3 and P_4P_4 indicate labour is cheaper and capital is dearer in country B.

There are two isoquants, i.e., aa and bb which reveal all those combinations of labour and capital which are capable of producing same level of L-good and K-good respectively. These isoquants cut to each other only once and at point Q. It means that there is no reversal of factor intensity. In other words, one commodity is capital intensive and other commodity is labour intensive in both countries (ninth assumption of the theory).

It is clear from the figure that at point H, where country A's isocost line, i.e., P_1P_1 tangents to isoquant curve, i.e, bb, the cost of producing a given level of K-good is made up of HD amount of capital plus HF amount of labour. On the other hand, at the tangency point (at point J) of country A's isocost line P_0P_0 and isoquant curve aa, the cost of producing a given level of L-good consists of JE amount of capital (which is equal to HD) but more amount of labour, i.e., FJ amount of labour. Therefore, in country A to produce a given level of L-good, there is need to use the same amount of capital as in K-good (i.e., HD = JE) but more amount of labour (JF as against HF). It means that country A can produce K-good cheaper. Hence, a capital surplus country would specialize in the production and export of capital intensive goods (K-good).

Similarly in the case of country B, at the tangency point (at point M) of country B's isocost line P_4P_4 and isoquant curve aa, the cost of producing a given

level of L-good involves MG amount of capital and MT amount of labour. Whereas the point R indicates that a given level of K-good involves the cost of same amount of labour (because NT= MT) but more amount of capital, i.e., (RG as against MG). This means that country B can produce L-good at a relatively lower cost of production. Therefore, a labour surplus country B would specialize in the production and export of labour intensive good (L-good).

(b) Physical Criterion of Factor Abundance:

A country is called capital-abundant provided if the ratio of quantity of capital to quantity of labour in that country is greater than the corresponding factor quantity ratio in the other country. In symbolic terms, country A will be relatively capital-abundant and country B will be labour-abundant if:

$$\left(\frac{QK}{QL}\right)A > \left(\frac{QK}{QL}\right)B$$

Where Q is the factor quantity, K is the capital, L is the labour, $\left(\frac{QK}{QL}\right)A$ means the ratio of the quantity of capital and labour in Country A and $\left(\frac{QK}{QL}\right)B$ means the ratio of the quantity of capital and labour in Country B.

Under physical criterion of factor abundance, H-O states that if country A has relatively more amount of capital resource than that of labour resource then it will produce the capital-intensive goods whereas if country B has relatively more amount of labour resource than that of capital resource then it will produce the labour-intensive goods. It can be explained in Figure 2.
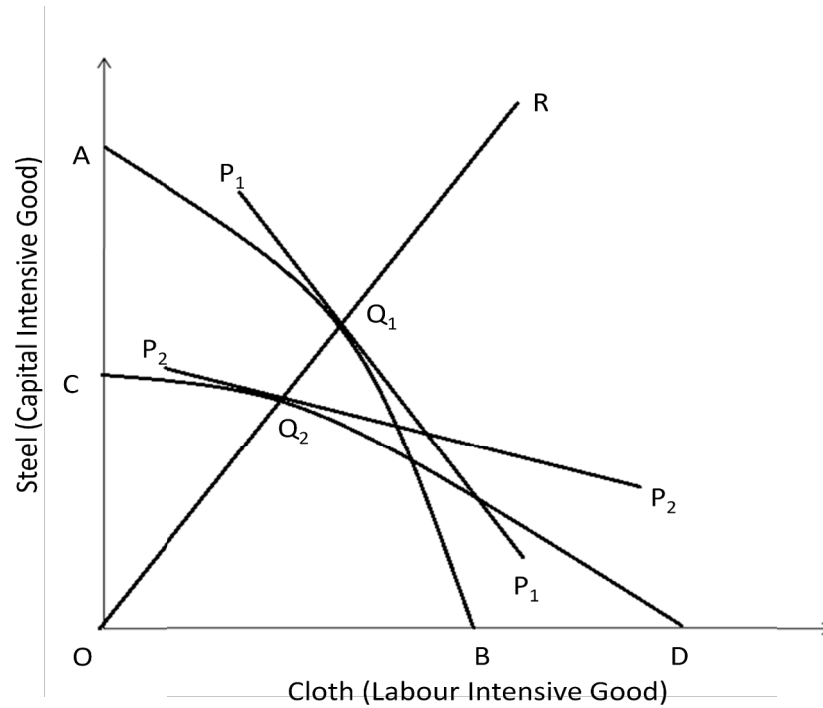
Figure 2

In the figure, the production possibility curve of country A is AB and that of country B is CD. We assume that steel is the capital intensive good and cloth is the labour intensive good. Suppose the two countries produce the both good in the same proportion- along the line OR- then country A would produce at Q_1 and country B would produce at Q_2 on their respective production possibility curve. The slope of country A's production possibility curve at Q_1 is steeper than the corresponding slope of country B's at Q_2. Same is the case of price lines P_1P_1 and P_2P_2. It implies that steel is cheaper in country A and cloth is cheaper in country B. Therefore, according to H-O theory, country A (capital surplus country) should produce and export steel (Capital intensive good) whereas country B (labour surplus country) should produce and export cloth (labour intensive good). But this all depends on the demand factors. Here two possibilities arise:

1) If the consumption bias and the production bias are in opposite direction, then Heckscher-Ohlin prediction would be valid. Country A (capital surplus country) would export steel and Country B (labour surplus country) would export cloth (labour intensive good).

2) If the consumption bias and the production bias are towards the same direction then country A (capital surplus country) would import rather than export steel (capital intensive good) and country B (labour surplus country) would import rather than export cloth (labour intensive good). The Heckscher Ohlin prediction would then be invalid.

The first possibility is illustrated in Figure 3:
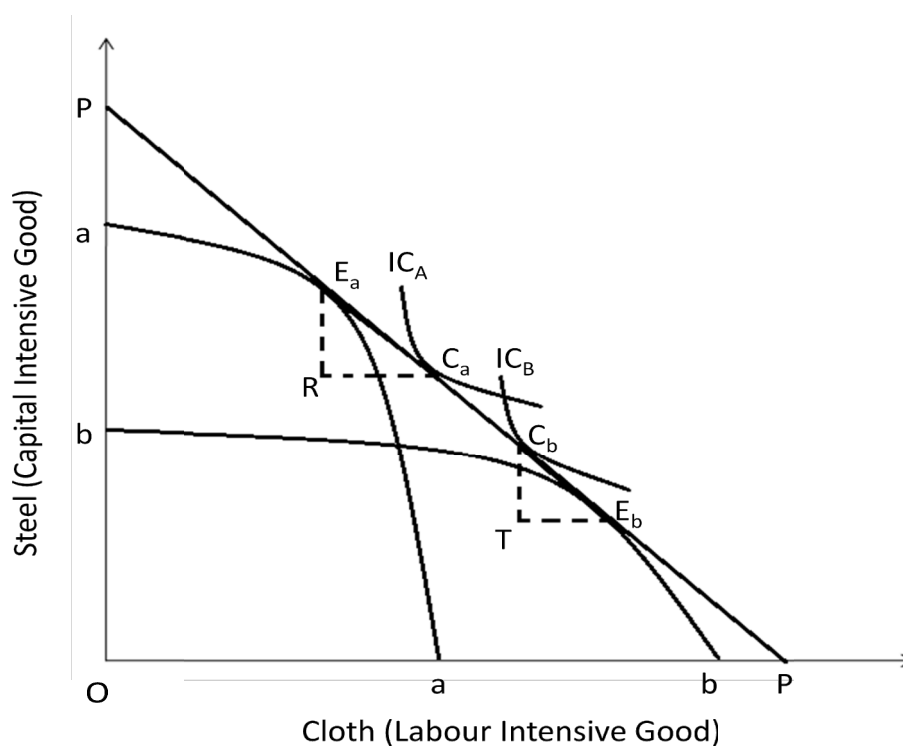
Figure 3

The figure shows that when consumption and production biases move in opposite direction, then H-O theory holds good. In this figure, PP is the international commodity price line. Curves aa and bb are the production possibilities curves of the countries A and B respectively. Point E_a and Point E_b are the production points for country A and country B respectively where international commodity price line PP tangents to production possibility curve of country A, i.e., aa and that of country B, i.e., bb. Point C_a and point C_b are the consumption points for country A and country B, respectively. Point C_a is right to the point E_a which means that country A need less of steel and need more of cloth than it is producing in home country. Therefore, country A will be willing to exchange E_aR amount of Steel with C_aR amount of cloth. Similarly, if point C_b is the consumption point for country B then it indicates that country B will also be willing to exchange E_bT amount of cloth with C_bT amount of Steel.

The Second possibility, i.e., If consumption and production biases move in same direction, is illustrated in Figure 4:
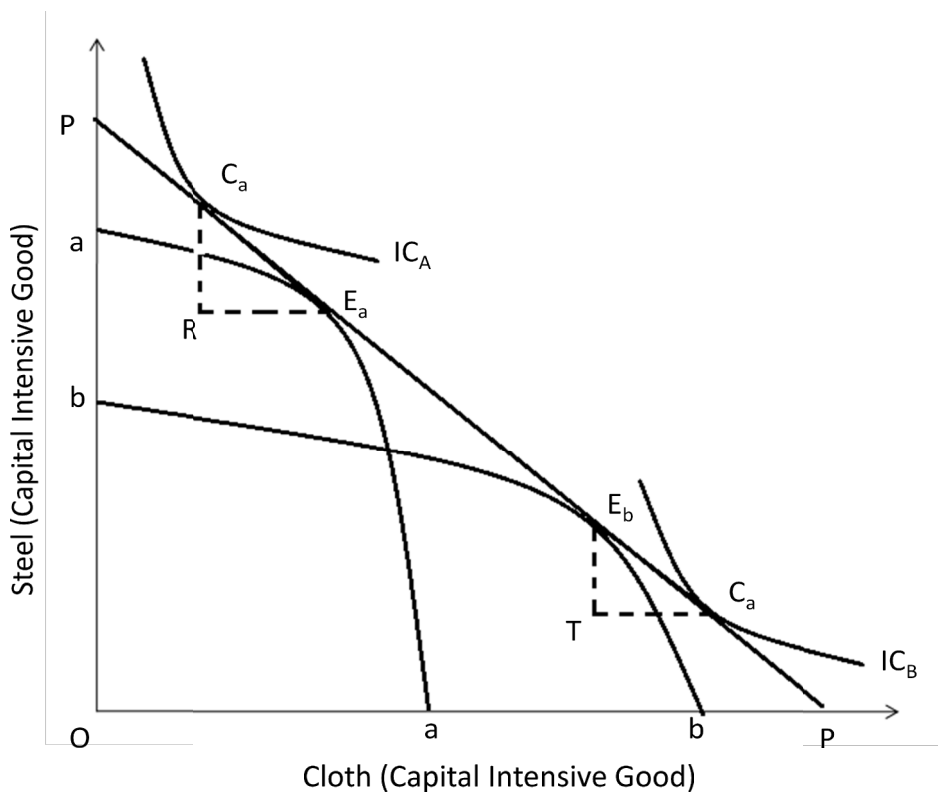
Figure 4

In the figure, points E_a and C_a are the production point and consumption point for country A, respectively. Point C_a is left to the point E_a which means that country A need more of steel and need less of cloth than it is producing in home country. Therefore, it will import steel and export cloth. Similarly, Point C_b is right to the point E_b which indicates that country B need more of cloth and need less of steel than it is producing in home country. Therefore, it will import cloth and export steel. In this case, the countries will export the goods in which they are not abundant.

Criticisms of the Heckscher-Ohlin Theory

Though the Heckscher-Ohlin theory has been found to be more precise,

scientific and superior to the classical theory of international trade, it has also been criticized by many economists on the following grounds.

1.   **Over Simplified Assumptions:** The Heckscher-Ohlin theory is based on over simplified assumptions such as perfect competition, full employment of resources, identical production function, constant returns to scale, absence of transportation costs and absence of product differentiations. Hence, it is considered as an unrealistic model.

2.   **Static analysis:** The Heckscher-Ohlin theory investigates the pattern of international trade in a static setting. Hence the conclusions derived from such analysis will not be relevant to a dynamic economic system.

3.   **Assumption of Homogeneous Factors:** The Heckscher-Ohlin theory assumed the existence of homogeneous factors in the two countries which can be measured for calculating factor endowment ratios. It is highly unrealistic because in practice no two factors are homogeneous qualitatively between the countries.

4. **Assumption of Homogeneous Production Techniques:** The Heckscher-Ohlin theory assumed that the production techniques for each commodity in both the countries are similar. This is also highly unrealistic because production techniques are different for the same commodity in the two countries.

5. **Unrealistic Assumptions of Identical Tastes and Demand Patterns:** The Heckscher-Ohlin theory unrealistically assumes that the tastes and demand patterns of consumed are the same in both the countries. But in practice it is not true. Tastes and demand patterns of consumers of different income groups are different. Further, due to the inventions taking place in consumer products, changes in tastes and demand patterns of consumers also occur. Hence, tastes are not similar in trading countries.

6. **Assumption of Constant Returns to Scale:** The Heckscher-Ohlin theory unrealistically assumed that the returns to scale are constant because a country having rich factor endowments often gets the advantages of economics of scale through lesser production and exports. Thus there are increasing returns to scale rather than constant returns.

7. **Ignores Transport Costs: The** Heckscher-Ohlin theory does not take into account transport costs in trade between two countries. This is another unrealistic assumption. When transport costs are included, they lend to difference in price for the same commodity in the two countries, which affect their trade relations.

8. **Neglects Product Differentiation:** The Heckscher-Ohlin theory overlooked the role played by product differentiation in international trade. It related cost to factor prices and neglected the influence of product differentiation on international trade. Hence, Heckscher-Ohlin theory is regarded as faulty.

9. **Assumes Relative Factor Proportions Determine the Specialization in Exports:** The Heckscher-Ohlin theory states that the relative factor proportions determine the specialization in export of different countries. It says that capital rich countries will export capital-intensive goods and labour rich countries will export labour-intensive goods. But it is not true. In fact, specialization is governed not only by factor proportions but also by various other factors like cost and price differences, transport costs, economies of scale etc.

10. **Only Part of the Partial Equilibrium Analysis:** Haberler regarded Ohlin's theory as less abstract. But, it has failed to develop a general equilibrium concept. It remains by and large, a part of the partial equilibrium analysis. It tries to explain the pattern of trade only on the basis of factor proportions and factor intensities, and several other influences are totally ignored.

11. **Ignores Factor Mobility:** The Heckscher-Ohlin theory assumed that factors are immobile internationally. This assumption is wrong because, the international mobility of factors of production actually more than the inter-regional mobility within a country.

12. **Vague Theory:** The Heckscher-Ohlin theory depends upon various restrictive and unrealistic assumptions. Hence it is considered as a vague and conditional theory. To quote with Haberler, —with many factors of production, some of which are qualitatively incommensurable as between different countries, and with dissimilar production functions in different countries, no sweeping a priori generalization concerning the composition of trade are possible.

From the above analysis, it can be concluded that factor endowment can be defined in two ways in Heckscher Ohlin model. According to the price criterion, the prediction of the model would be valid. If physical criterion is used, the prediction will be valid only if consumption and production biases move in opposite direction.

Lesson 1.4

Theory of Factor price equalization and reciprocal demand

1.4.1 Introduction
1.4.2 Objectives of the lesson
1.4.3 Factor Price Equalisation Theory
1.4.4 Samuelson's Analysis of Factor-Price Equalisation Theorem
1.4.5 Hicksian Analysis of Factor Price Equalisation Theorem
1.4.6 Lerner's Analysis of Factor Price Equalisation Theorem
1.4.7 Soderston's Analysis of Factor Price Equalisation Theorem
1.4.8 Obstacles to Equalisation of Factor Prices
1.4.9 The Rybczynski Theorem
1.4.10 Reciprocal demand
1.4.11 Short answer type questions
1.4.12 Long answer type questions
1.4.13 Recommended Books

1.4.1 Introduction
The economists relied mostly upon the Cobb-Douglas production function in their investigations upto 1961. Since this production function took the $E_{lasticity}$ of supply is equal to one in the production of all the commodities, it was considered unsuitable to measure the extent of factor-intensity reversal. After the development of Constant Elasticity of Substitution (CES) production function by Arrow, Chenery, Minhas and Solow, Minhas attempted to employ this production function for measuring the reversal of factor intensity in 1962. He made use of the comparative data for 19 industries and found factor reversal in 5 cases. It led to the conclusion that the factor-intensity reversal was fairly present. Minhas found that the factor reversal occurred in only 8 percent of the cases. When two natural resource intensive industries were removed out of them, the factor-intensity reversal fell down to 1 percent of the cases. This led Leontief to conclude that factor-intensity reversal was a rare occurrence and therefore, H-O model remains valid.

Minhas attempted another study based on 20 industries in the United States and Japan. He computed K-L ratio for these industries and ranked them according to the K-L ratio in each country. He found the rank

correlation co-efficient in the capital-intensities in industries in the two countries as +0-328 and concluded that the factor-intensity reversal was fairly common. D.P.S. Ball, however, pointed out that the exclusion of agriculture and two natural resource industries resulted in a steep rise in rank correlation to 0-77. It implied that the factor-intensity reversal was not a common phenomenon.

1.4.2 Objectives of the lesson
In this lesson we will study about factor price equalization theories given by different economists and obstacles of price equalization.

1.4.3 Factor Price Equalisation Theory
The factor price equalisation theory is an important corollary of the H-O theory of trade. If there is a free international movement of factors, the prices of the factors of production undisputably get equalised. However, the classical theorists as well as Heckscher and Ohlin had assumed an international immobility of factors. This led to the crucial question of how the international trade would affect the prices of the factors of production) Heckscher, on the one hand, suggested that international trade in commodities would act as a substitute for the international mobility of factors leading to a complete equalisation of the costs or factor prices. Ohlin, on the other hand, recognised that the international trade might result in only an incomplete or partial equalisation of prices of factors. The writers like Samuleson (1948) and Lerner (1953) discussed the possibility of a complete equalisation of factor prices.

The factor price equalisation picks up the argument that the labour-abundant country specialises in the export of the labour-intensive commodity because labour is a relatively cheaper factor compared with capital. On the other hand, the capital-abundant country specialises in the export of capital-intensive commodity on account of capital being a relatively cheaper factor there. The pressure of international demand renders the abundant factor scarce and its price starts rising.

At the same time, the import of the commodities that require more input of scarce factor relieves the domestic pressure of demand for that factor, resulting in a fall in its price. This process of change in prices of factors will ultimately bring about an equality in the prices of factors. It is in this sense that *free international trade in commodities acts as a substitute for the international mobility of factors.*

1.4.4 Samuelson's Analysis of Factor-Price Equalisation Theorem

Samuelson's analysis of the factor-price equalisation is based upon the following *assumptions*:

(i)   There are two countries, say A and B.

(ii)   These countries produce two commodities, say X and Y.

(iii)   The production of these commodities requires only two factors of production—labour and capital.

(iv)   There is free competition both in the product and labour markets.

(v)   There is an absence of tariff and transport costs.

(vi)   The production function related to each commodity is identical and homogeneous of degree first. It implies the production is governed by constant return to scale.

(vii)   The factor-intensities are different for the two commodities. For instance, the commodity X is labour-intensive, while commodity Y is capital-intensive. It means there is an absence of reversal of factor intensity.

(viii) Capital and labour are qualitatively identical in the two countries.

(ix)   The availability of factors is quantitatively different in the two countries. The country A is supposed to be labour-abundant whereas country B is capital-abundant.

(x)   There is absence of complete specialisation. It means both the countries continue to produce both the commodities even after trade takes place between them.

(xi)   The factor supplies are fixed in the two countries.

(xii)   In each country, there is full employment of both the factors.

(xiii) There is no mobility of factors between the countries.

(xiv)   The marginal physical product of each factor is diminishing.

(xv)   The tastes are identical in the two countries.

Before trade, there is low capital-labour ratio in country A and a high capital-labour ratio in country B. As trade commences, the labour-abundant country A exports the labour-intensive commodity X and country B exports the capital-intensive commodity Y. The export of labour-intensive commodity X by A creates relative scarcity of labour and consequent rise in wage rate. It also leads to a rise in capital-labour ratio. On the opposite, the export of capital-intensive commodity by country B will result in its scarcity there. It will cause a rise in the price of capital (rate of interest) and a consequent fall in the capital-labour ratio. These relative changes in K-L ratio will continue until the K-L ratios in both the countries

become exactly equal. Along with it, the prices of the two factors also undergo changes (rise in wage rate in country A and rise in interest rate in country B) in such a manner that there is ultimate equalisation of prices of two factors in both the countries.

1.4.5 Hicksian Analysis of Factor Price Equalisation Theorem

J.R. Hicks attempted to provide a proof for the *absolute* factor price equalisation. He retained all the assumptions taken by Samuelson, It is assumed that price of labour is low in the capital-abundant country while it is higher in country B which is capital-abundant. On the contrary, the price of capital is high in country A but it is low in country B. After trade, country A exports labour-intensive commodity X and B exports capital-intensive commodity Y. l_x and l_y are the labour co-efficients for X and Y commodities and k_x and k_Y are the capital co-efficients. w_a and w_b are the wage rates in the two countries. r_a and r_b are the rates of interest in these two countries. It is assumed that the unit cost of producing X and Y commodities becomes equal in the two countries after the determination of trade equilibrium.

Unit cost of commodity X
$$l_x w_a + k_x r_a = l_x w_b + k_x r_b$$
Dividing both sides by k_x
$$(l_x/k_x). w_a + r_a = (l_x/k_x) w_b + r_b$$
$$r_a - r_b = (l_x/k_x) w_b - (l_x/k_x) w_a$$
$$r_a - r_b = (l_x/k_x) [(w_b - w_a] \qquad \text{(i)}$$
Unit cost of commodity Y
$$l_y w_a + k_y r_a = l_y w_h + k_y r_b$$
Dividing both sides by k_y
$$(l_y/k_y) w_a + r_a = (l_y/k_y) w_b + r_b$$
$$r_a - r_b = w_b (l_y/k_y) - (l_y/k_y) w_a$$
$$r_a - r_b = (l_y/k_y)(w_b - w_a) \qquad \text{(ii)}$$
From (i and ii)
$$r_a - r_b = (l_x/k_x) (w_b - w_a) = (l_y/k_y) (w_b - w_a)$$

If trade results in the equalisation of factor-intensity in the two products X and Y and $r_a = r_b$. there will also be $w_a = w_b$. It shows that after-trade equilibrium results in the equalisation of factor prices.

1.4.6 Lerner's Analysis of Factor Price Equalisation Theorem

Lemer has attempted an analysis about the factor price theorem on the basis of a series of *assumptions.*

(i) There are two countries A and B.

(ii)   Each country can produce two goods X and Y, given the factor endowments and techniques of production.
(iii)   There are two factors of production—labour and capital.
(iv)   The production functions are linear homogeneous in both the countries.
(v)   Country A is labour-abundant and B is capital-abundant.
(vi)   There are the conditions of perfect competition in both the countries.
(vii)   There is absence of transport costs.
(viii) Commodity X is labour-intensive while commodity Y is capital-intensive.
(ix)   There is no factor-intensity reversal.

In the labour-abundant country A, originally price of labour is lower relative to that of capital. On the opposite, the price of capital is lower in country B than that of labour. Consequently, country A will produce and export labour-intensive commodity X. As there will be greater substitution of labour for capital, the price of labour will rise and that of capital will decline resulting in equalisation of factor prices. Similarly the capital-abundant country B will specialise in production and export of capital-intensive commodity Y. The substitution of capital in place of labour will increase the price of capital in this country. Ultimately the factor prices ratio in this country will also get equalised.

However, if there is *factor-intensity reversal i.e., X* is labour-intensive in country A but capital-intensive in country B, both the countries will produce it through different techniques. But as they cannot export the same product to each other, the factor price equalisation will fail to take place.

Kindelberger's Analysis of Factor Price Equalisation
Kindelberger has explained the factor price, equalisation by involving factor proportions, product prices and factor prices. In this regard, he has relied upon the figure given below.

In Fig. 1 Part, wages and interest are measuredalong the horizontal scale and capital-labour ratio (K/L) is measured along the vertical scale. The horizontal lines AA| and BB, measure factor proportions in the capital-abundant country A and labour-abundantcountry B respectively. SS, is the schedule related to capital-intensive good steel and CC is the schedule related to labour-intensive good cloth. In Part *(ii)* of the Fig. 1, relative price of cloth is measured along the vertical scale. The curve PP, measures relative price of cloth.
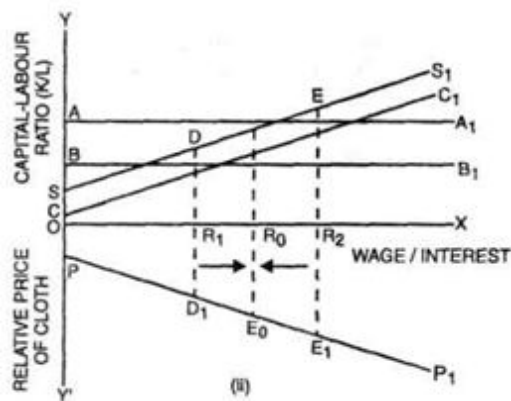
Figure: 1

The domestic demand conditions determine the production of steel and cloth before trade. Wage rate is lower in country A than in countryB, whereas the rate of interest is higher in A than in B. The relative price of cloth in A is R_1D_1 and it is R_2E in country B. As trade takes place, the wage rate will rise in country A and fall in country B. The interest rate, on the other hand, will fall in country A but rise in country B. The relative price of cloth in both the countries will tend to approximate to R_0E_0, when wage-interest ratio becomes equal at R_0.

1.4.7 Sodersten's Analysis of Factor Price Equalisation Theorem

Bo Sodersten recognises that the free trade can lead to the equalisation of *relative* factor prices in two countries if neither country specialises completely. It can be explained through Fig. 2. In this figure, factor price ratio (w/r) is measured along the horizontal scale. In Part *(i)* of the Fig., the commodity price ratio (P_x/P_y) is measured along the vertical scale. In part (ii) of the Fig., the factor intensity (K/L) is measured along the vertical scale.

Given that there is absence of complete specialisation in both countries A and B, the line OR in Part (i) of Fig. 2 shows a common factor price ratio $(w/r)_0$ and a common commodity price ratio $(P_x/P_y)_0$ In Part *(ii)* of Fig. 2., the lines X and Y represent the capital-intensity of X and Y commodities respectively. The commodity Y has greater capital-intensity (K/L) than the commodity X, in case of which the capital-intensity is low at (K/L).
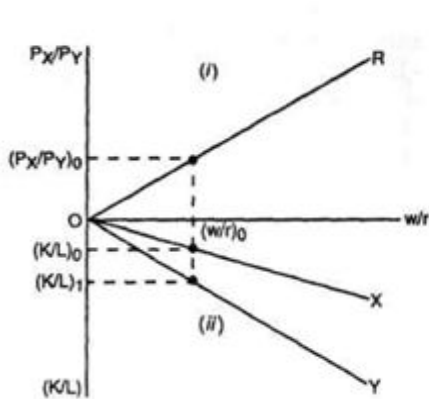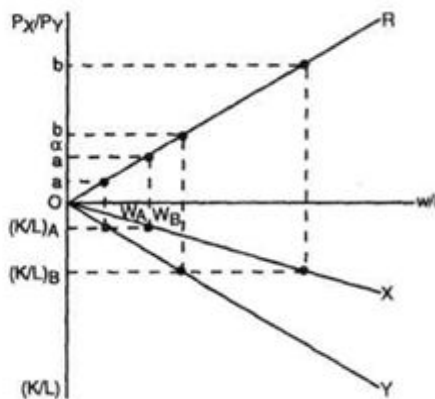
Figure: 2   Figure: 3

If there is complete specialisation in one or both the countries, there cannot be equalisation of absolute or relative factor prices. It can be shown through Fig. 3.

Under autarchy, the range of relative commodity prices for country A when both countries specialise completely is indicated by aa. In case of country B, the range of relative commodity prices is denoted by bb. These two ranges donot overlap, therefore at least one of the two countries must specialise completely. As both countries specialise completely, the free trade commodity price ratio is α which lies outside the autarchy price ranges. The relative wage rate in country A cannot rise above w_A, whereas that of country B cannot fall below w_B. In such condition, there cannot be relative factor price equalisation. So there cannot also be absolute factor price equalisation.

1.4.8 Obstacles to Equalisation of Factor Prices

The factor price equalisation theory developed by Samuelson has been found to be deficient by several economists including Meade and Ellsworth. They raised serious doubts about the validity of this theory on account of highly restrictive and unrealistic assumptions. They believe that there can only be partial equalisation of factor prices.

(i)   *Tariff and non-tariff barriers:* This theory rests upon the assumption that there are no tariff and non-tariff barriers to trade. In actual reality, such barriers do exist. It was on account of them that Ohlin ruled out the possibility of complete equalisation of factor prices.

(ii)   *Transport costs:* The factor price equalisation theory takes another unrealistic assumption that transport costs are absent. In fact, the import and export of commodities do involve transport costs which not only have restrictive effect on the product mobility but may also affect

the comparative advantages of the trading countries. The existence of transport costs are likely to prevent the equalisation of factor prices.

(iii) *Complete specialisation*: This theory assumes that the trading countries are engaged in the production of both the commodities. In other words, there is only partial or incomplete specialisation. When the trading countries are of unequal size, there is possibility that there is complete specialisation in at least the smaller country. In the event of complete specialisation, there is little possibility of complete factor price equalisation.

(iv) *Identical production function:* Samuelson's factor price equalisation theory assumes that production functions are identical in the two trading countries. Even if the two countries have the same resources, yet their productive capacities are different because of natural, technical and sociological differences between them. The diversities in their production functions may create hindrance in the equalisation of factor prices.

(v)   *Absence of perfect competition:* This theory rests upon the assumption that there are the conditions of perfect competition in the product and factor markets. In actual reality, the perfect competition does not exist. In the real market situations like oligopoly or monopolistic competition, there are rigidities in the product and factor markets that prevent the possibility of equalisation of factor prices.

(vi) *Increasing return to scale*: The factor price equalisation theorem assumes that there is a first degree homogeneous production function which implies that the production is governed by the constant returns to scale. If the economies of scale are present, according to Meade, the theory will become invalid for two reasons. *Firstly,* it will result in the emergence of monopolies and consequent breakdown of the apparatus based on the assumption of perfect competition. *Secondly,* the increasing return to scale will lead to complete specialisation which again rules out the possibility of equalisation of factor prices.

(vii) *Changes in factor supplies*: The theorem takes the assumption that the factor supplies remain fixed in the trading countries. In actual reality, however, there are changes in factor supplies and these changes will create difficulties in the equalisation of factor prices.

(viii) *Dynamic conditions*: The factor price equalisation theory assumes static conditions such as fixed factor endowments, techniques and same taste pattern in the trading countries. In the actual dynamic conditions, the continuous changes take place in all the relevant factors and variables and many often it is found that the differences in factor prices get widened rather than being eliminated. Such a trend has been confirmed

by economists like Kindelberger, Myrdal and Sodersten.

(ix) *Multi-country Multi-commodity and Multi-factor trade:* The theorem can deal efficiently only in respect of trade involving two countries, two commodities and two factors. The theory is likely to become indeterminate in the multi-country, multi-commodity and multi-factor trade situation. If the number of productive factors exceeds the number of commodities, the theory breaks down completely.

(x) *Factor-intensity reversal:* This theory assumes that there is an absence of factor-intensity reversal. It means the labour-surplus country will export only labour-intensive commodity and thecapital-surplus country will export the capital-intensive commodity. If there is reversal of factor intensity, the factor price equalisation theorem will fail to hold. If the labour-surplus country A specialises in the labour-intensive commodity X, the absolute and relative wage rates will rise in this country. If country B specialises in commodity Y but produces it through labour-intensive method, the demand for labour will increase even in this country resulting in a rise in the absolute and relative wage rate. As the wage rates rise in the two countries, whether the difference in absolute and relative wage rates will rise, fall or remain unchanged, will depend on the rates at which wages increase in the two countries. Thus the factor-intensity reversal can result in the invalidation of the factor price equalisation theory.

The above arguments suggest that factor price equalisation cannot take place in actual dynamic realities. It, however, does not mean that the theorem is completely invalid. It only means that the assumptions of this theorem, being unrealistic, lead to an unrealistic conclusion. There is little doubt that the movement of products from one country to another can at least reduce the factor price differentials. In the absence of trade, such differences are likely to be considerably large.

1.4.9 The Rybczynski Theorem

In both Heckscher-Ohlin theory and the factor-price equalisation theory, the assumption was taken that the factor endowments were fixed. T.M. Rybczynski, published a paper in 1955 to investigate the effect of an increase in the quantity of a factor of production upon production, consumption and the terms of trade.This theorem states that the increase in the supply of one of the factors of production, other factors remaining the same, causes the output of the good using the accumulating factor intensively to increase and the output of the other good to decrease in absolute amount, provided that commodity and factor prices remain

unchanged. Suppose in a labour-surplus country, the supply of labour gets increased. It will lead to an increased output of the labour-intensive commodity, say cloth and reduced output of the capital-intensive commodity, say steel.

Assumptions :

The Rybczynski theorem is based upon the following main assumptions :

(i)   The trade takes place between two countries. The case of only one of the two countries will
        be discussed here.

(ii)   The given country is labour-abundant and capital-scarce.

(iii)   This country produces two commodities—cloth and steel,

(iv)   The production of these commodities requires two factors—labour and capital,

(v)   Capital and labour are perfectly mobile, perfectly divisible and substitutable in some
        degree.

(vi)   Cloth is labour-intensive good and steel is a capital-intensive good.

(vii)   There are the conditions of perfect competition in the product and factor markets.

(viii) The production functions related to both the commodities are homogeneous of the first degree. That implies constant returns to scale in production.

(ix)   The factor and commodity prices are constant.

(x)   The supply of the factor labour expands while that of capital remains the same.

It is now clear that Rybczynski makes departure from H-0 theorem and factor-price equalisation theorem in respect of his abandoning the assumption of fixed factor supplies. He discusses the effect of an increased supply of the factor in which the country is abundant upon production, factor and commodity prices and the terms of trade. His theorem is explained through Fig. 4.
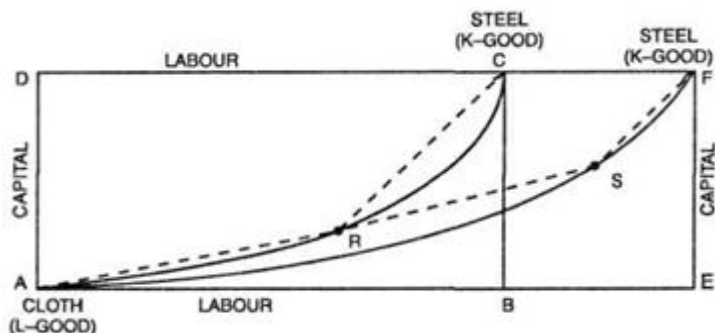
Figure: 4

ABCD is the Edgeworth box concerning the given country. It shows that this country is labour-abundant and capital-scarce. A is the origin of the commodity—cloth which is labour-intensive (L-good). C is the origin for the good—steel which is capital-intensive (K-good). AC is the non-linear contract curve sagging downwards. The production takes place at R. The K-L ratio in cloth is measured by the slope of the line AR and K-L ratio in steel is measured by the slope of the line RC.

It is now supposed that the supply of labour is increased by BE, capital stock remaining the same so that the new box diagram is AEFD. Now A and F are the points of origin for the goods cloth and steel respectively. AF is the non-linear contract curve. A is the origin for the L-good clothand F is the origin for K-good steel. Production, in this case, takes place at S. The K-L ratio in cloth is measured by the slope of (he line AS and the K-L ratio in steel is measured by the slope of the line SF. The factor intensity in the two commodities remains unchanged at the points R and S. Since R and S lie on the same straight line AS, the K-L ratio in cloth remains unchanged. On the other hand, the line RC is parallel to SF. Since the slope of RC and SF are equal, there is no change also in the K-L ratio in the capital-intensive commodity steel. When the factor-intensity in both the commodities remains the same, there will be no change in the prices of the two factors. It shows that the Rybczynski theorem refutes the possibility of factor price equalisation. As the increase in the supply of labour in the labour-abundant country and increase in capital stock in the capital-abundant country leaves the prices of two factors unchanged, there can be no equalisation in the factor prices.

When there is no change in the prices of the factors of production, the prices of two commodities will also remain the same as before.

The most significant effect of an, increase in the supply of factor will be upon the *volume of production.* The distance of the point of production equilibrium

from origin measures the quantity produced of a commodity. In case of cloth, the original production is measured by the distance AR. Subsequently, it is measured by the distance AS. Since AS is greater than AR, it signifies an increase in the production of cloth after there is an increase in the supply of labour. In case of steel, the production at R was originally indicated by the distance RC and subsequently it is measured by the distance SF. Since SF is shorter than RC, it follows that the production of K-good steel decreases after there is an expansion in the supply of labour in this country. Thus the conclusion can be drawn that the increased supply of one factor, keeping the other unchanged, will raise in absolute amount the production of good intensive in the increasing factor, while the production of the other good will get reduced in absolute amount.

The above analysis suggests that the *commodity prices* of the two commodities remain constant. This can happen only if the prices of two factors remain constant. It implies that the capital-labour ratio in the two industries remains constant. But how can all this be possible when the quantity of one of the two factors goes on increasing. In this connection, it may be stated that increase in the supply of labour will result in the entire additional labour going into the labour-intensive industry. There will also be diversion of labour from the capital-intensive industry (steel). Along with the diversion of labour, some amount of capital will also be diverted from the steel industry to the labour-intensive cloth industry. Consequently the production of cloth expands and that of steel contracts but the K-L ratios in two industries, factor prices and commodity prices still remain unchanged. If the labour force continues to expand indefinitely, the country will soon become completely specialised in the production of cloth.

The constancy of the commodity prices implies that the *terms of trade* will remain unaffected. However, the equilibrium with constant prices, when supply of one factor has been increasing, is not compatible with general equilibrium. It may be possible if one of the two commodities, particularly the commodity intensive in the other factor (capital) is *inferior.* But neither of the two commodities—cloth and steel can be considered inferior. The general equilibrium in such a situation can be possible only if the price of the commodity intensive in the expanding factor decreases. It means the terms of trade are likely to become worse for the country in which one factor has been expanding.

About the pattern of *consumption,* Rybczynski explained that the pattern of consumption may remain unaltered, or change in favour of one good or the

other despite the change in relative prices of the two commodities. If the marginal propensity to consume of the product intensive in the accumulated factor is equal to or greater than the average propensity to consume, the production and consumption pattern will change in the direction of the product intensive in that factor. When the marginal propensity to consume falls short of the average propensity to consume, the new production and consumption pattern may still change in favour of the commodity using much of the factor increased, or may remain unchanged or move in the direction of the other good. This depends upon the relative magnitudes of the average and marginal propensities to consume.

From the above analysis, it is obvious that the Rybczynski theorem has several implications related to production, factor and commodity prices, terms of trade and consumption pattern. However, its implication related to the factor price equalisation is most clear cut. When the supply of the abundant factor increases rapidly, the factor price ratio may remain unchanged preventing the equalisation of factor prices among the trading countries.

J. Mishan has raised two major objections against the theorem given by Rybczynski. *Firstly,* if the increase in the supply of one factor (labour) is accompanied by the increased supply of the other factor (capital), the results suggested by Rybczynski are not likely to follow. *Secondly,* there is technical difficulty in extending Rybczynski's two factor-model to a multi-factor system.

1.4.10 Theory of Reciprocal Demand

Ricardo expounded the theory of comparative advantage without explaining the ratios at which commodities would exchange for one another. It was J.S. Mill who discussed the latter problem in detail in terms of his theory of reciprocal demand. The term 'reciprocal demand' introduced by Mill to explain the determination of the equilibrium terms of trade. It is used to indicate a country's demand for one commodity in terms of the quantities of the other commodity it is prepared to give up in exchange. It is reciprocal demand that determines the terms of trade which, in turn, determine the relative share of each country. Equilibrium would be established at that ratio of exchange between the two commodities at which quantities demanded by each country of the commodity which it imports from the other, should be exactly sufficient to pay for one another.

To explain his theory of reciprocal demand, Mill first restated the Ricardian theory of comparative costs. "Instead of taking as given the output of each commodity in two countries, with the labour costs different, he assumed a given amount of labour in each country, but differing outputs. Thus his formulation ran

in terms of comparative advantage, or comparative effectiveness of labour, as contrasted with Ricardo's comparative labour cost."

Assumptions

Mill's theory of reciprocal demand is based on the following assumptions:

1. There are two countries, say, Bangladesh and India.
2. There are two commodities, say, linen and cloth.
3. Both the commodities are produced under the law of constant returns.
4. There are no transport costs.
5. The needs of the two countries are similar.
6. There is perfect competition.
7. There is full employment.
8. There is free trade between the two countries.
9. The principle of comparative costs is applicable in trade relations between the two countries.

Explanation of the Theory

Given these assumptions, Mill's theory of reciprocal demand can be explained with this example:

Suppose India can produce 10 units of linen or 10 units of cloth within one man-year and Bangladesh can produce 6 units of linen or 8 units of cloth with the same input of labour-time. This is because India has *an* absolute advantage in the production of both linen and cloth, while Bangladesh has the least comparative disadvantage in the production of cloth. This can be seen from their domestic exchange ratios and international exchange ratios.

Before trade, the domestic cost ratio of linen and cloth in India is 1:1 and in Bangladesh 3:4. If they were to enter into trade, India's advantage over Bangladesh in the production of linen is 5:3 (or 10:6), and in the production of cloth 5:4 (or 10:8). Since 5/3 is greater than 5/4, India possesses greater comparative advantage in the production of linen. Thus it is in India's interest to export linen to Bangladesh in exchange for cloth. Similarly, Bangladesh's position in the production of linen is 3/5 (or 6/10) and in the production of cloth is 4/5 (or 8/10). Since 4/5 is greater than 3/5, it is in the interest of Bangladesh to export cloth to India in exchange for linen.

Mill's theory of reciprocal demand relates to the possible terms of trade at which the two commodities will exchange for each other between the two countries. The terms of trade refer to 'the barter terms of trade' between the two countries, *i.e.,* the ratio of the quantity of imports for a given quantity of export of a country. And "the limits to the possible barter terms of trade (the international exchange ratio) are set by the domestic exchange ratios established by the relative efficiency of labour in each country."
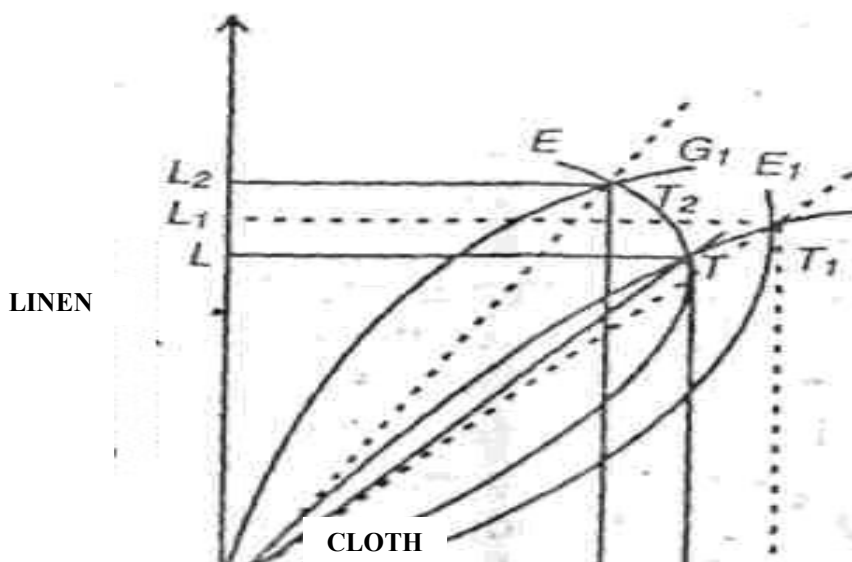
In India 2 inputs of labour-time produce 10 units of linen and 10 units of cloth, while in Bangladesh the same labour produces 6 units of linen and 8 units of

cloth. The domestic exchange ratio between linen and cloth in India is 1:1 and 1:1.33 in Bangladesh. Thus the limits of possible terms of trade are 1 linen: 1 cloth in India and 1 linen : 1.33 cloth in Bangladesh. Thus the terms of trade between the two countries will be between 1 linen or 1 cloth or 1.33 cloth.

But the actual ratio will depend upon reciprocal demand, i.e. "the strength and elasticity of each country's demand for the other country's product." If India's demand for Bangladesh's cloth is more intense (inelasic), then the terms of trade will be nearer 1:1. India will be prepared to exchange one unit of linen with one unit of cloth of Bangladesh. The terms of trade will move against it and in favour of Bangladesh. Consequently, India's gain from trade will be less than that of Bangladesh. On the other hand, if India's demand for Bangladesh's cloth is less intense (more elastic), then the terms of trade will be nearer 1:1.33. India will be prepared to exchange its one unit of linen with 1.33 units of cloth of Bangladesh. The terms of trade will move in favour of India and against Bangladesh. Consequently, India's gain from trade will be greater than that of Bangladesh.

Mill's theory of reciprocal demand is explained diagrammatically in terms Marshall's offer curves.

In fig. 13.1, Bangladesh producing only cloth is taken on the horizontal axis and India producing only linen is taken on vertical axis. The curve OE is Bangladesh's offer curve. It shows how many units of cloth Bangladesh will give up for a given quantity of linen. Similarly, OG is the offer curve of India which shows how many units of Linen India is prepared to give up in exchange for a given quantity of cloth. The point T where the two offer curves OE and OG intersect is the equilibrium point at which OC of cloth is exchanged by Bangladesh of OL of linen of India. The rate at which cloth is exchanged for linen is equivalent to the slope of the ray OT.

Figure 13.1

A change in the demand on the part of one country for the product of the other country brings about a change in the shape of its offer curve. Suppose Bangladesh's demand for India's linen increases. Bangladesh might now be prepared to exchange more cloth for India's linen. Consequently, Bangladesh's offer curve shifts to the right as OE_1 which intersects India's offer curve OG at T_1. Now Bangladesh trades OC_1 units of cloth for OL_1 units of linen. The terms of trade, as shown by the slope of the OT_1 indicate that they have deteriorated for Bangladesh and improved for India. This is evident from the fact that Bangladesh trades CC_1 units of cloth for LL_1 units of linen. CC_l is greater than LL_1

Similarly, if India's demand for Bangladesh's cloth increases, India's offer curve shifts to the left as OG_1 which intersects Bangladesh's offer curve OE at T_2. Now India exchanges OL_2 units of linen for OC_2 units of cloth. The terms of trade, as shown by the slope of the OT_2, indicate that they have deteriorated for India and improved for Bangladesh. This is clear from the fact that India exchanges LL_2 more linen for CC_2 less cloth, i.e. $LL_2 > CC_2$

But the actual terms of trade will depend upon the elasticity of demand of the offer curve of each country. The more elastic the offer curve of a country, the more unfavourable will be terms of trade for it in relation to the other country. On the contrary, the more inelastic is its offer curve, the more favourable will be its terms of trade in relation to the other country.

Its Criticisms

Mill's theory of Reciprocal Demand is based on almost the same unrealistic assumptions that were adopted by Ricardo in his doctrine of comparative advantage. Thus the theory suffers from similar weaknesses. Besides, there are some additional criticisms made by Viner, Graham, and others.

1.   Mill's theory of reciprocal demand does take into account the domestic demand for the product. As pointed out by Viner, each country would export its product only after satisfying its home demand. Thus the demand curve for India would not be below the line Og until the domestic demand was satisfied, and the same applies to Bangladesh.

2.   According to Graham, Mill's analysis is valid only if the two countries are of equal size and the two commodities are of equal consumption value. In the absence of these two assumptions, if one country is small and the other large, the small country gains the most on both counts: *First,* if it produced a high-value commodity, it will adopt the cost ratios of its big partner; and *Second,* the two trading countries being of unequal size, the terms of trade will be fixed at or near the comparative costs of the large country.

3.   Mill's theory is based on the unrealistic assumption of two-countries and two-commodities. Graham, therefore, favours several commodities, several countries and complex trade.

4.   Graham further criticises Mill for emphasising demand and neglecting supply in determining international values. According io him, the application of the reciprocal demand makes it appear that demand alone is of interest. He maintains that production costs (supply) are also of paramount importance in international trade. He thus attacked the Law of Reciprocal Demand "as appropriate only to trade in antiques and old masters."

5.   Another weakness of Mill's analysis of reciprocal demand is that it makes no allowance for fluctuations in incomes in the two trading countries which are bound to influence the terms of trade between them.

6.   Further, the theory is based on barter of trade and relative price ratios. Thus it 'neglects all stickiness of prices and wages, all transitional inflationary and overvaluation gaps, and all balance of payments problems'. No wonder, the theory is abstract and unrealistic. Graham, therefore, regards the theory "in its essence fallacious and should be discarded."

7.   Mill's theory is based on such unrealistic assumptions as two countries, two commodities, law of constant returns, lack of transport costs, full employment, perfect competition, etc. These make the theory unrealistic.

Conclusion:

     But there is little basis in the criticisms made by Graham which appear to be flimsy. As pointed out by Viner, "The terms of trade can be directly influenced by reciprocal demands and by nothing else. The reciprocal demands, in turn, are ultimately determined by the cost conditions together with the basic utility functions." The real fault in Mill's analysis is that it overemphasizes the basic utility functions and neglects the production costs.

1.4.11 Short answer type questions

1.   What is meant by factor-intensity reversal?
2.   In what situations can there be reversal of factor-intensity?
3.   What implications does factor-intensity reversal has for H-O Theory and factor price equalisation theorem?
4.   Explain factor price equalisation theory.
5.   What are the obstacles to equalisation of factor prices?
6.   Discuss Rybczynski theorem related to international trade.

1.4.12 Long answer type questions

1.   Discuss the factor intensity reversal.
2.   "The factor-intensity reversal is statistically not significant', elaborate.
3.   What is factor intensity reversal? What implications does it have for H-O theory and factor-price equalisation theorem?
4.   Explain clearly the Factor Price Equalisation Theory.
5.   "International trade in commodities is a substitute for international

movement of factors of production." Discuss.

6. Explain the factor price equalisation theorem. What are the obstacles to the equalisation of factor prices?

7. Explain clearly the Rybczynski theorem concerning international trade.

8. In what way does an increase in the quantity of one factor affect production, commodity prices, terms of trade and consumption?

1.4.13 Recommended Books

1. Sodersten, Bo and Read, G. : *International Economics*
2. Salvatore, D. *: International Economics*
3. Ethier, W.J. : *Modern International Economics*

Offer Curve analysis and determination of International prices

Offer curves were invented and introduced into international economics by Alfred Marshall and Ysidro Edgeworth. The theory behind Mill's Law of reciprocal demand has been portrayed graphically by Edgeworth and then by Marshall so called offer curves. An offer curve may be defined as the locus of various combinations of two commodities which a country find acceptable in trade. In other words, the offer curve of any country shows how much of its import commodity the country requires in exchange for various quantities of its export commodity. The offer curve of a country is derived from the production possibility line, indifference map and the various international commodity prices at which it would trade with other country. The offer curve of a country determines the relative commodity prices at which trade take place. Hence, let's see how the offer curve is obtained, given various hypothetical price ratio.

For the derivation of offer curve of a country, it is supposed that there are two countries A and B. These two countries produce two commodities. *X* is exportable commodity of Country A (and importable of Country B). *Y* is exportable commodity of Country B (and importable of Country A).

Offer Curve of Country A

In the left panel of Figure 1, commodity *X* (Country A's Exportable) is measured along horizontal scale and commodity *Y* (Country A's importable) is measured along the vertical scale. In the absence of trade domestic producers and consumers are in equilibrium. The slope of production possibility curve shows Country A to be possessing comparative

advantage in the production of commodity *X*, this country will export this commodity in exchange for the *Y*

commodity. Since, it has comparative advantage in production of commodity *X*. Country **A** starts at the no-trade (autarky price line) at point A. If trade take place at $P_B=P_X/P_Y=1$, Country A moves to point B in production, trades *60X* for *60Y* with Country **B**, and reaches point E on its indifference curve III. It will then produce at point B and consume at E on higher indifference curve III. Trade triangle BCE in the left panel of Figure 1 corresponds to trade triangle OCE in the right panel, and we get point E on Country A's offer curve. In the left panel of Figure 1, at $P_F=P_X/P_Y=1/2$, Country A would move instead from point A to point F in production, exchange *40X* for *20Y* with Country B, and reach point H on its indifference curve II. It will then produces at point F and consume at point H on indifference curve II. Trade triangle FGH in the left panel corresponds to trade triangle OGH in the right panel and we get point H on Country A's offer curve. Connecting the origin with points H and E and other points similarly obtained, we generated Country A's offer curve in the right panel. The offer curve of Country A shows how many imports of commodity *Y* Country A requires to be willing to export various quantities of commodity *X*.

To keep the left panel simple, we omitted the autarky price line $P_A=1/4$ and indifference curve I tangent to the production frontier and P_A at point A. Note that P_A, P_F and P_B in the right panel refer to the same P_X/P_Y as P_A, P_F and P_B in the left panel because they refer to the same absolute slope.

In the right panel of Figure 1, the offer curve of Country A lies above the autarky price line of $P_A=1/4$ and bulges toward the X-axis, which measures the commodity of its comparative advantage and export. To induce Country A to export more of commodity X, P_X/P_Y must rise. Thus, at $P_F=1/2$, Country A would export *40X*, and at $P_B =1$, it would export *60X*. There are two reasons for this: first, Country A incurs increasing opportunity costs in producing more of commodity X (for export), and second, the more of commodity Y and the less of commodity X that Country A consumes with trade. The more valuable to the country is a unit of X at the margin compared with unit Y.
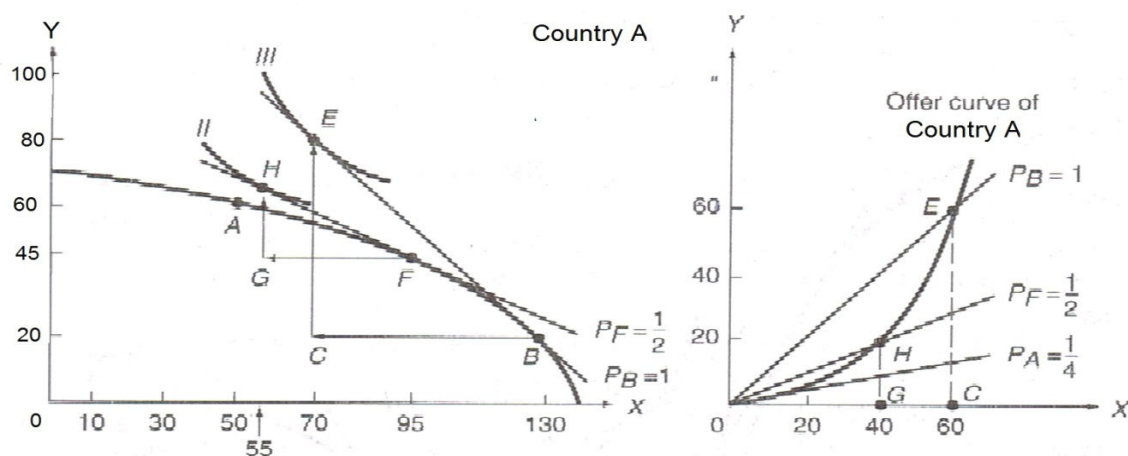
Figure 1: Derivation of the Offer Curve of Country A

In the right panel of figure 1, when Country A reached point E, then Country A will be unwilling to offer any more of commodity X for additional import of commodity Y. The offer curve of Country A is generated by joining the equilibrium point O, H and E. The offer curve of country shows the different quantities of her export which a country is willing to exchange for the different quantities of import at different barter term of trade.

Offer Curve of Country B

In the left panel of Figure 2, *X-axis* measures Country B's import while *Y-axis* measures country B's exports. Country B starts at autarky equilibrium point A′. In the absence of trade domestic producers and consumers are in equilibrium. The slope of production possibility curve shows Country B to be possessing comparative advantage in the production of commodity *Y*, this country will export this commodity in exchange for the *X* commodity. Since, it has comparative advantage in production of commodity *Y*. If trade take place at $P_B′=P_X/P_Y=1$, Country B moves to point B′ in production, exchange *60X* for *60Y* with Country A, and reaches point E′ on its indifferences curve III′. It will then produces at point B′ and consume at E′ on higher indifference curve III′. Trade triangle B′C′E′ in the left panel of Figure 2 corresponds to trade triangle O′C′E′ in the right panel, and we get point E′ on Country B's offer curve.

In the left panel of figure, at $P_F′=P_X/P_Y=2$, Country B would move instead of point F′ in production, exchange *40Y* for *20X* with Country A, and reach point H′ on its indifference curve II′. It will than produce at point F′ and consume at point H′ on indifference curve II′. Trade triangle F′G′H′ in the left panel corresponds to trade triangle O′G′H′ in the right panel and we get point H′ on Country B's offer curve. Connecting the origin with point H′ and E′ and other point similarly obtained, we generate Country B's offer curve in the right panel. The offer curve of Country B depicts how many imports of commodity *X* country B demands to be willing to export various quantities of commodity *Y*. Once again, we omitted the autarky price line $P_A′=4$ and indifference curve I′ tangent to production frontier and $P_{A′}$ at point A'. Note that $P_A′$, $P_F′$ and $P_B′$ in the right panel refer to

the same P_X/P_Y as P_A', P_F' and P_B' in the left panel because they refer to the same absolute slope.
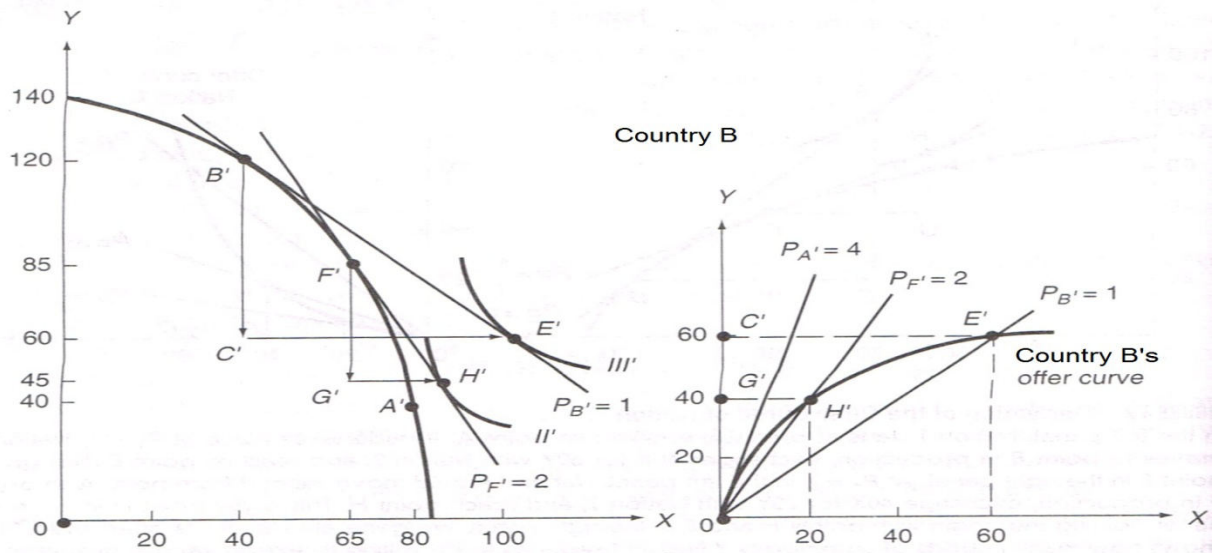

Figure 2: Derivation of the Offer Curve of Country B

In the right panel of Figure 2, the offer curve of Country B lies below its autarky price line of P_A'=4 and bulges towards the *Y-axis*, which measure the commodity of its comparative advantage and its export. To induce Country B to export more of commodity *Y*, the relative price of *Y* must rise. This means that its reciprocal (i.e., P_X/P_Y) must fall. Thus, at P_F'=2, Country B would export *40Y* and at P_B'=1, it would export *60Y*. Country B requires a higher relative price of *Y* to be induced to export more of commodity *Y* because Country B incurs increasing opportunity costs in producing more of commodity *Y* (for export), and the more of commodity *X* and the less of commodity *Y* that Country B consume with trade, the more valuable to the nation is a unit of *Y* at margin compared with a unit of *X*. The offer curve of Country B shows the export of commodity *Y* that will be offered in exchange for import of commodity *X*.

Trade Equilibrium

The interaction of the offer curves of the two countries defines the equilibrium-relative commodity price at which trade takes place between them. Only at this equilibrium price trade will be balanced between the two countries. At any other relative commodity price, the desired quantities of imports and exports of the two commodities would not be equal. This would put pressure on the relative commodity price to move toward its equilibrium level. This is depicted in Figure 3.

Figure 3: Trade Equilibrium
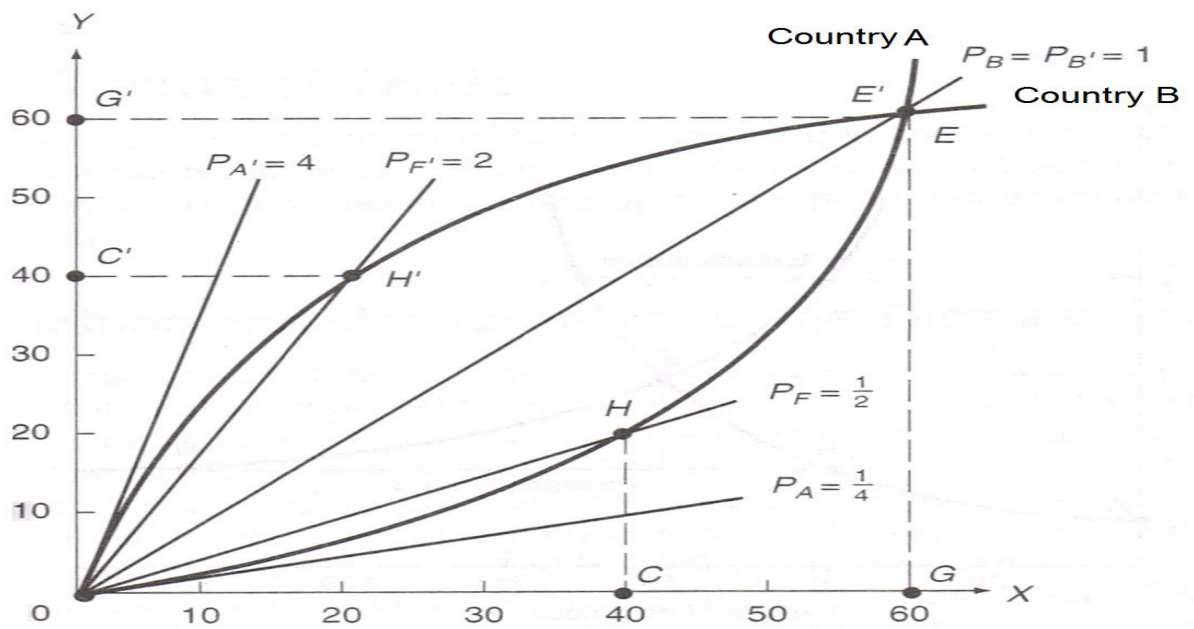
The offer curves of Country A and Country B in Figure 1 and 2 respectively intersect each other at point E or E′ in Figure 3. The offer curves intersect at point E defining the equilibrium-relative commodity price $P_B=1$. Trade is in equilibrium at P_B because Country A offer to exchange $60X$ for $60\ Y$ and Country B offers exactly $60Y$ for $60X$. Thus, trade is in equilibrium at P_B.

In the Figure 3, at any P_X/P_Y, trade would not be in equilibrium. For Example, at $P_X/P_Y<1$, the quantity of exports of commodity X supplied by Country A would fall short of the quantity of the import of commodity X demanded by Country B. this would drive the relative commodity price up to the equilibrium level. The opposite would be true at $P_X/P_Y>1$. At the equilibrium the value of total exports of each country must be equal to the value of her total imports, both countries happen to be gain equally from trade.

New Theories of International Trade

1.6.1 Introduction
1.6.2 Objectives of the lesson
1.6.3 Theory of economies of scale
1.6.4 Differentiated products and trade
1.6.5 Differences in tastes and trade
1.6.6 Technological gap and product cycle model and trade
1.6.7 Linder's theoryof demand and trade pattern
1.6.8 Short answer type questions
1.6.9 Long answer type questions
1.6.10 Recommended books

1.6.1   Introduction

The H-0 model stated that the pattern of trade was basically determined by factor proportions and the factor intensities. There is, however, a significant portion of international trade that is not explained by the basic H-0 model. To deal with these gaps, several new theories or hypotheses have been put forward. Some writers tend to view them as the *alternative* trade theories. But as these explanations are not of a comprehensive nature, these should be rightly treated as *complementary* to the H-O model rather than the alternative models of trade. Some of these prominent complementary trade theories are discussed below.

1.6.2 Objectives of the lesson

In this lesson we will study regarding new theories of international trade.

1.6.3 Economies of Scale and Trade

The H-0 model was based on the assumption that the two commodities were produced under constant returns to scale. It meant that the scale of production of individual firm or industry would leave the unit cost as well as the marginal cost unaffected. It is possible that the firm or industry operates under the conditions of increasing return to scale, *i.e.,* the average cost declines as there is an expansion of the size of firm or industry. The

increasing returns to scale may be the outcome of *internal* and *external* economies of scale. The former are not consistent with perfect competition and therefore, fall outside the framework of the H-0 theorem. As regards the external economies, these are consistent with perfect competition as they depend not upon the size of individual firms but rather upon the size of the whole industry. If it is recognised that the increasing returns to scale occur because of external economies, the basis of trade will be different from that suggested by the H-0 theory. The comparative cost difference, in that situation, will result not from the relative factor proportions but from the relative size of industry.

Assumptions:

The impact of external economies of scale upon trade can be explained on the basis of the following assumptions:

(i) Trade takes place between two countries, A and B.
(ii) Each country has identical factor endowments, tastes pattern and technology.
(iii) Each country can produce two commodities, X and Y.
(iv) In the two countries, relative factor and commodity prices are identical.

If the assumption of identical prices is valid, there is no possibility of trade between the two countries. However, if disturbance occurs in either country in respect of their domestic price ratio, the trade can start between them. Once the trade starts, it must lead to complete specialisation by both the countries. Although it is difficult to predict which country will produce which product, yet it can still be said that once a country undertakes the production of a specified good then it will gain a comparative advantage in that product. The producers in such a situation will find it profitable to divert more and more resources into its production.

Even when the production is governed by increasing returns to scale, the mutually beneficial trade can be possible between two countries. If it is assumed that the two countries are identical inevery respect, a single production possibility curve and a single indifference map can be employed for both the countries. The production possibility curve, in case of increasing returns, is negatively sloping convex curve to the origin. The international trade in this situation may be explained through Fig. 1.
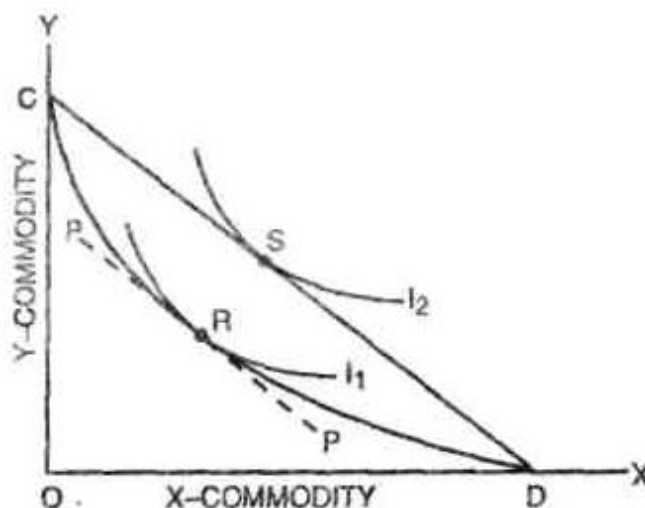
Figure 1

In Fig. 1. CD is convex to the origin identical production possibility curve for the two countries. Before trade, given the prices of X and Y commodities, PP is the price ratio line. The consumption and production equilibrium of each country occurs at R where CD and the indifference curve 1, touch the common tangent PP. If trade takes place, country A specialises completely in X-commodity and country B specialises completely in the production of Y commodity. Now country A is in production equilibrium at D, whereas country B is in production equilibrium at C. The international terms of trade or international exchange ratio is expressed by the slope of the line CD. It is tangent to a higher indifference curve I_2. It signifies that both the countries can reach a higher level of satisfaction through trade. It reflects the gain from trade from specialisation and trade for them.

Recently, it has become evident that the economies of scale in industrialised countries result from the production of standardised or homogeneous products. For a few standard varieties, it is possible to develop more specialised and faster machinery for a continuous operation and a longer production run. That can help in keeping the unit cost low. Before the formation of EU, the unit costs in most of the European industries were higher compared with those in the United States essentially because there were many more varieties of products in the European countries than in the U.S.A. After the European integration, there has been greater production specialisation in these countries and the unit costs have fallen considerably. But that has not adversely affected the trade possibilities either for the countries of EU or the United States.

The explanation of trade in the conditions of increasing returns to scale, involves some problems. *Firstly,* it does not fit well into the framework that has been employed so far. *Secondly,* increasing returns to scale may be incompatible with perfect competition. It may, therefore, be better to consider the increasing returns to scale in the context of imperfect competition or monopolistic competition. *Thirdly,* the economies of scale as a potentially important cause of trade may be theoretically accepted, yet the empirical studies indicate that the phenomenon is of limited significance in the actual reality. Many empirical studies have found evidence that the returns to scale are generally constant. It means the doubt about the validity of constant return to scale is not well-founded. For practical purpose, the assumption of constant returns to scale may still be recognised as general first approximation to reality.

1.6.4 Differentiated Products and Trade

The basic H-0 model assumed perfect competition in the product market and the homogeneity of traded goods. However, the more realistic market situations like monopolistic competition and oligopoly are characterised by the differentiated products. Although differentiated products like automobiles, garments, soaps, toothpastes, detergents etc. are close substitutes, yet each brand has some specific characteristics because of which the consumers prefer one brand of a product to the other. A large part of the international trade involves the exchange of differentiated products. After the removal of tariff restrictions among the countries of EU, Belassa found in 1967 that there was considerable expansion of trade of differentiated goods. The German cars were exchanged forFrench and Italian cars; French washing machines were exchanged for German washing machines; and Italian typewriters for French typewriters and so on. It was estimated by Grubel and Lloyd that almost 50 percent of trade among the industrialised countries was that of differentiated products.

The trade in standardised or identical products is based on comparative cost differences in which relatively low cost goods are exported and relatively high cost goods are imported. The principle of comparative cost advantage does not apply in the case of trade in differentiated goods. The reason is that there are, at least, some people in each country who have the preference for particular foreign brands over the domestic brands of the same product, irrespective of cost considerations.

The trade models developed by Krugman, Lancaster, Helpman and others

since 1979 have pointed to some interesting considerations related to trade in differentiated products.

(i)   The trade, according to the H-O model, is based on different factor endowments of the countries but large volume of trade in different varieties of products exists among countries of almost similar size and factor endowments.

(ii) There is close connection between product differentiation and economies of scale. The advantage of economies of scale can be obtained, if there is product standardisation. The fact **that** countries enter into exchange of differentiated products shows that the factor of cost advantage does not carry much weight at least in the case of trade in such products.

(iii) The product differentiation can enable even a smaller country to under-sell the larger country in the same commodity.

(iv) The H-O model and factor price equalisation theorem suggest that trade will lower the return of nation's scarce factor. However, the exchange of differentiated products can create the possibility of gain for all the factors.

(v)   The trade in differentiated goods has brought about **a** sharp increase in the parts or components of a product. The assembling of parts is undertaken in different countries to minimise cost of production. For instance, German and Japanese cameras are assembled in Singapore to take advantage of the cheap labour there. The utilisation of each country's comparative advantage to minimise the total production cost can be regarded as an extension of basic H-O model to modern production conditions.

The trade in differentiated products enlarges the horizon of the consumers and allows them access to the best possible varieties internationally available. At die same time, it increases the level of competition among producers of the same class of products in various countries. These are socially beneficial effects which were not explicitly considered by the basic H-O model.

1.6.5 Differences in Tastes and Trade

The classical comparative costs theory and H-O theory both took the simplifying assumption that the taste pattern or demand pattern remains unchanged in the two countries. They did not investigate the impact of differences in demand conditions or tastes upon the international trade. In this connection, it may be pointed out that given the identical production function in the two countries, basis of trade exists so long as there are

differences in the pattern of demand or tastes in two countries.

Given the identical production function and factor proportions, the two countries A and B may have a common production possibility curve PP as shown in Fig. A_1 and A_2 are the community indifferences curves of country A and B| and B2 are community indifference curves of country B. The varying slopes of the community indifference curves of two countries indicate different demand patterns or tastes in the two countries. Before trade, P_1P_1, is the domestic exchange ratio line in country A. N is the point of consumption and production equilibrium of this country. $P_2 P_2$ is the domestic exchange ratio line of country B and *N* is the point of consumption and production equilibrium in this country. After trade commences, TT is the international exchange ratio line. It is tangent to the common production possibility curve PP at R. It is the point of production equilibrium for both the
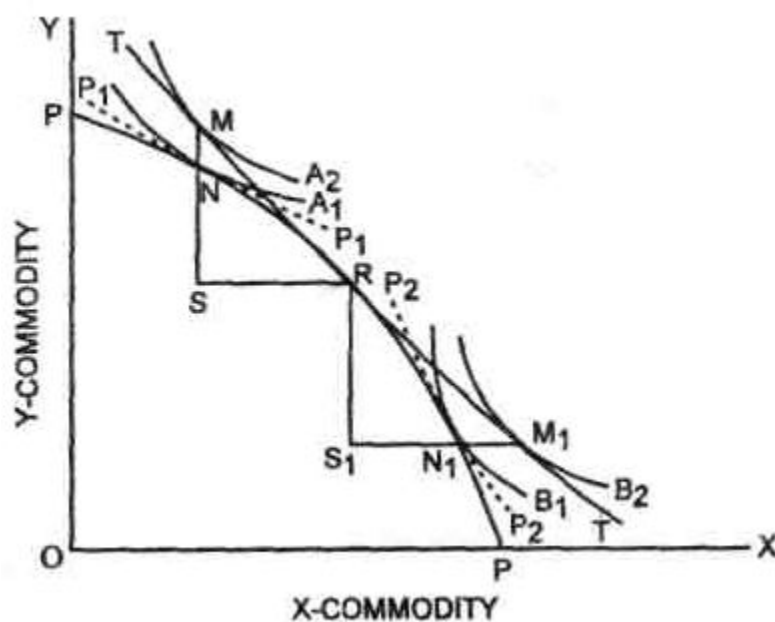
Figure 2

countries.

However, the consumption equilibrium of country A is determined at M where TT is tangent to the community indifference curve of country A. It will export SR quantity of X-Commodity and import SM quantity of Y-Commodity. In case of country B, the consumption equilibrium after trade is determined at M where TT is tangent to B_2, community indifference curve of country B. This country will export RS1 quantity of Y commodity and import S1M1 quantity of X commodity. After trade, both the countries

move to their respective higher community indifference curves. It means both the countries can make gain from trade even if their production functions are identical, provided there are differences in tastes or demand patterns in those countries.

1.6.6   Technological Gap and Product Cycle Models and Trade

The Heckscher-Ohlin theory, like the earlier theories of trade, assumed that the techniques of production were given and fixed. Such an assumption can be valid only in a static system. In actual dynamic realities, there can be no place for such an assumption. The technical changes have highly significant effects on production and trade. A technological change may be expressed in new methods of producing existing goods or in the production of new varieties of goods. The two prominent models that attempt to explain the international trade on the basis of technological changes are the technological gap model and the product cycle model.

Technological Gap or Imitation Gap Model:

The technological gap model was developed by M.V. Posner in 1961. Posner maintains that technological change is a continuous process. According to him, even if the countries have similar factor proportions and tastes, yet continuous process of inventions and innovations can give rise to trade.

According to this model, as a firm develops a new product, its first test is in the home market. After it is proved to be successful in the home market, the efforts are made to introduce it in the foreign markets. The new products confer a temporary monopoly position upon the producing firm or exporting country in the world trade. This monopoly position is often protected by the patents and copyrights. The exporting country enjoys comparative advantage over the rest of the world until the foreign producers imitate the new varieties of products or learn new processes of production.

Assumptions:

The main assumptions in Posner's theory are as follows:

(i)   There are two countries, A and B.
(ii)   The factor endowments are similar in two countries.
(iii)   Both the countries have similar demand conditions.
(iv)   The factor price ratios in the two countries are similar before trade.
(v)   There are different techniques in the two countries.

The lag existing between the appearance of new products and introduction of their substitutes by the foreign producer manifests the technological gap or imitation gap.

The *foreign reaction lag* is the time taken by the first foreign firm to produce the new variety of product. The *domestic reaction lag* signifies the time required by the domestic producers to introduce still newer varieties in order to establish their hold on the domestic market and sustain it in the foreign market. The *demand lag* means the time taken by the domestic consumers to acquire a taste for the new product.

Posner referred the integration of innovation and imitation lag as 'dynamism'. According to him, a dynamic country, in international trade is one which innovates at a greater rate and which imitates the foreign innovations at a greater speed. If one of the two trading countries has a greater degree of dynamism than the other, the latter will find the erosion of its markets and consequent deficit in trade balance.

According to Posner, if the two countries are otherwise identical, whether trade between them will be generated by technological innovation, will depend on the net effect of the demand and imitation lags. If the demand lag is longer than the imitation lag, the producers in the imitating country would adopt the new technology before the consumers in their home market had started demanding the new good. In this case, the technological innovation would not generate trade. On the other hand, if the imitation lag is longer than the demand lag, the international trade is likely to be generated by innovation. So the pattern of trade between the two countries will depend upon the relative duration of the two lags.
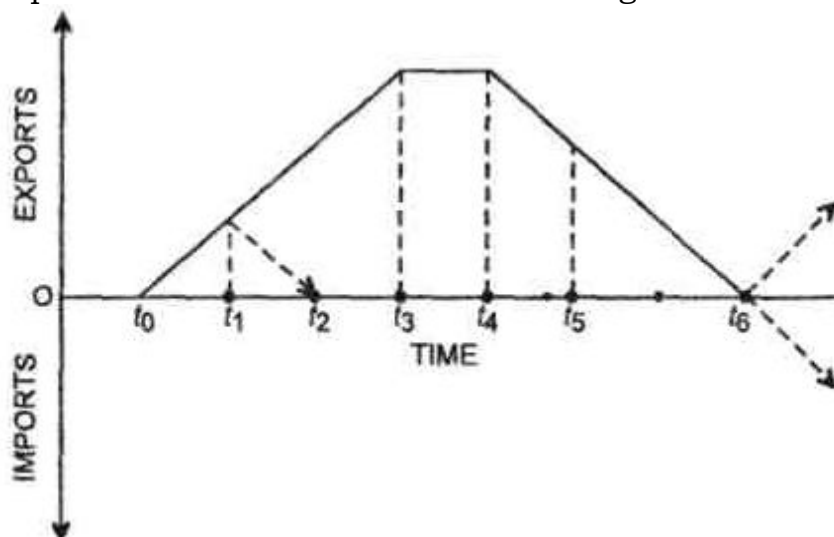

Figure 3

The trade theory given by Posner can be explained through Fig. In Fig, time is measured along the horizontal scale and the trade balance of country A, the innovating country, is measured along the vertical scale. Upto point t_0, no trade takes place between the two countries. At this point the innovating country A, introduces the new product. As the consumers in imitating country B become aware of the product, they start consuming it. Country A, therefore starts exporting it. In case, the country B were unable to adopt the new technology, the exports from country A would continue to rise until they reached the maximum level in time t_3. The period t_0 t_3 can be identified as demand lag. If new technology could be adopted by country B by the time t_2 the imports of the product in their market could be contained before they reached the maximum level. Country B then reversed them with trade ceasing at time t_2. If the imitation gap were longer and the producers in country B could not adopt the new technology until time t_4, exports from country A to country B would have continued at the maximum level until t_4. As country B started imitating the new technology, there would have been decline in exports from A to B and these would fall down to zero in time t_6. In this connection, two other possibilities can be discussed. If producers in country A fail to introduce new innovation in time t_6 and country B makes further innovations. Country B will start penetrating the domestic market of country A indicated by the arrow in the lower part of the Fig. The second possibility is that producers in country A may introduce new innovation in time t_6 leading to increase in its exports to country B. That is shown in the Fig. by the arrow in the upward direction.

This model has certain short comings, it does not explain the technological gap or imitation gap in a precise manner and it fails to explain why the technological gaps arise and how they get eliminated over time.

1.6.7 Linder's Theory of Demand and Trade Pattern

Staffan B. Linder, a Swedish economist attempted to explain the pattern of international trade on the basis of demand structure. This theory was propounded by him in 1961. According to Linder, a manufactured product will not generally be exported until after there is demand for it within the home country. The products are, in fact, produced basically to meet the domestic requirements. It is only subsequently that the product is exported to other countries. The theory maintains that the countries having identical levels of income have similar demand structure and propensity to trade with other countries.

Assumptions: This theory is based upon the assumptions given below:

(i)   The potential trade of a country is confined to these goods that have

domestic demand.

(ii) Two trading countries are engaged in the trade of such goods the demand for which exists within their domestic markets.

(iii) The domestic demand for goods is determined by the level of per head income.

(iv) Broadly similar levels of income influence the potential trade between two countries.

According to S. Linder, the trade in primary products is governed essentially by the relative abundance of natural resources. Trade in manufactured products, on the other hand, is governed by a complex of factors such as economies of scale, managerial skills, availability of capital and skilled labour, technological excellence etc. Linder has not dwelt upon the composition of trade between the two countries. His theory is concerned essentially with the volume of trade in manufactured goods between them.

The major emphasis in this theory has been placed upon the prime condition that the countries will trade in these manufactured goods for which domestic demand is present. It happens because foreign trade has always been regarded as an extension of domestic trade. Moreover, the possibilities of exports arise an account of the domestic demand. Since the foreign market is viewed as more risky than the home market, it is often considered not prudent to depend exclusively upon foreign market. A large domestic market induces an expansion in output ensuring the economies of scale and consequent reduction in costs. In those conditions, it is very opportune for the country to enter the foreign market.

A country, in the opinion of Linder, will export its products largely to such countries as have similar patterns of demand and levels of income. He terms it the *'preference similarity'*. As a result of preference similarity, the country will have overlapping demands. According to Linder, just as within a country consumers in high income groups demand the products of high quality and these in low income group demand products of low quality, in the international trade also, the low income country, on an average, will be inclined to demand products of low quality and high income countries will be inclined to demand high quality products. This, however, does not mean that low quality products will not be demanded by high income countries and vice-versa. In view of disparities in income distribution in all the societies, some measure of preference similarity and overlapping of demand patterns cannot be ruled out. The different varieties of manufactured products are produced by the different countries for meeting the domestic

demand and same products are exported to the foreign countries.
The preference similarity or overlapping demand pattern can be discussed
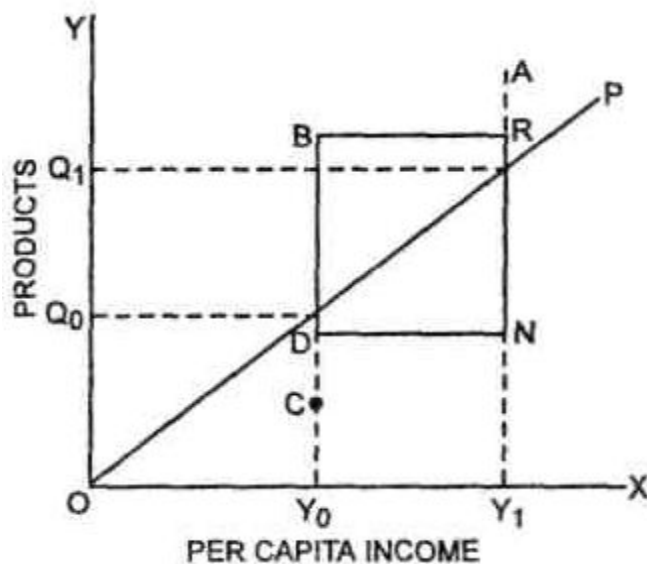through Fig 4.

Figure 4

In Fig., the per capita income is measured along the horizontal scale.
Products are measured along the vertical scale. The line OP starting from
origin expresses the relation between products and per capita incomes.
Country A has higher per capita income Y, and it demands the higher
quality product Q_1 Country B has lower per capita income Y_0 and it
demands the lower quality product Q_0 Since income distribution is unequal
in the two countries, each one of them has demand for both the products.
Let us suppose income distribution in country A leads to the demand for
two products taken together in the range of AN. The range of demand for
products in country B is BC. The range of overlapping demand in the two
countries is BD = RN. The existence of overlapping demand creates the
possibility of trade between them. There will be export of higher quality
product Q_1 from country A to meet the demand of high income group in
country B. Similarly the latter will export lower quality product Q_0 to meet
the demand for it from lower income group of people in country A. The larger
or smaller magnitude of demand overlap will determine correspondingly the
larger or smaller potential and actual volume of trade and the levels of
income in the two trading countries.

The H-O. theory had specified that trade would take place between the

trading countries, if their factor proportions were different. Linder's theory made an improvement upon the H-O theory as it specified that trade would take place between the countries even if the factor proportions were identical provided they had similar demand preferences.

This theory fails to explain why a country should develop the home market for a product that it has to export ultimately.

1.6.8 Short answer type questions
Write short notes on:
1. Economies of scale
2. Product differentiation
3. Market structure

1.6.9 Long answer type questions
1. Critically examine theory of economies of scale and trade.
2. Critically examine theory of product differentiation and trade.

1.6.10 Recommended books
1. Meier, CM.: *International Trade and Development*
2. Sodersten, B.:*International Economics*
3. Kindelberger, C.P.:*International Economics*
4. Salvatore D.: *International Economics*

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Lesson No 1.7

Gains from trade

1.7.1 Introduction

The gain from trade is the fundamental reason why different countries engage themselves in transactions with one another. Right from the time of the pre-classical Mercantilists, who maintained that export surplus enriched a country, upto the modern times, the writers of all shades of opinions, have believed that the consideration of gain alone is the basis of all international transactions. The present chapter is concerned with the meaning and measurement of gains from trade and some other issues related to them

1.7.2 Objectives of the lesson

In this lesson we will study meaning of gains from trade, different approaches of gains from trade, factors affecting gains from trade.

1.7.3 Meaning of Gains from Trade

The classical theorists believed that gains from trade resulted from increased production and specialisation. Jacob Viner pointed out that the gains from trade were measured by the classical economists in terms of increase in national income, differences in comparative costs, and terms of trade. The modern theorists considered the gains from trade as the gains resulting from exchange and specialisation.

Some approaches to the concept of gains from trade are discussed.In the opinion of Adam Smith, the gains from international trade are in the form of the increased value of product and improvement in the productive capacity

of each trading country. The international trade leads to export of the commodity which is less in demand in the home market and import of the commodity which is strong in demand. It enables each trading country to derive the maximum welfare and obtain maximum possible export earning. When each country specialises in the production of the commodity in which it has cost advantage, there is optimum allocation of productive resources. Coupled with increased division of labour, specialisation reduces the cost structure and enlarges the size of market for each trading country. As a consequence, the world production and welfare gets maximised through international trade.

Ricardo viewed the gain from trade as an objective entity. According to him, the specialisation in production and trade on the basis of the principle of comparative costs results in saving of resources or costs. Through the cheaper availability of commodities required by each country from abroad, every country can increase the 'sum of enjoyments' and also increase the 'mass of commodities. In the words of David Ricardo, "The advantage to both places is not that they have any increase" in value but with the same amount of value they are both able to consume and enjoy an increased quantity of commodities." Malthus had expressed in this regard views similar to those of Adam Smith. The gain from trade, according to him, consists of' 'the increased value which results from exchanging what is wanted less for what is wanted more." The international exchange on this basis increases "exchangeable value of our possession, our means of enjoyment and our wealth."

A serious deficiency in the Ricardian approach was that it could not explain the distribution of gains from trade among the trading countries. J.S. Mill attempted to analyse both the gains from trade and distribution thereof among the trading countries. He emphasised upon the concept of reciprocal demand that determines terms of trade which is a ratio of quantity imported to the quantity exported by a given country. The terms of trade decide how the gain from trade is distributed between the trading partners.

Suppose in country A, 2 units of labour can produce 15 units of X and 15 units of Y so that the domestic exchange ratio in country A is: 1 unit of X = 1 unit of Y. In country B, 2 units of labour can produce 10 units of X and 15 units of Y so that the domestic exchange ratio in this country is:1 units of X = 1-5 unit of Y. The domestic exchange ratios set the limits within which the actual exchange ratio or terms of trade will get determined.

The reciprocal demand or the strength of the elasticity of demand of the two trading countries for the products of each other will decide the actual rate of exchange of two commodities. If A's demand for commodity Y is less elastic, the terms of trade will be closer to its domestic exchange ratio: 1 unit of X = 1 unit of Y. In this case the terms of trade will be favourable for country B and against country A. The gain will be more for B than for A. On the contrary, if B's demand for X commodity is less elastic, the terms of trade will be closer to the domestic exchange ratio of country B: 1 unit of X = 1 -5 unit of Y. The terms of trade, in this situation will be favourable for A and against B. Country A will have a larger share out of the gains from trade than country

The distribution of gains of trade can be explained in terms of Marshall-Edgeworth offer curve through Fig.
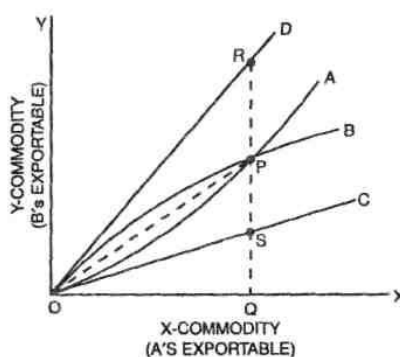

Figure 1

In Fig., OC and OD are the domestic exchange ratio lines of countries A and B respectively. OA is the offer curve of country A and OB is the offer curve of country B. The exchange takes place at P where the two offer curves cut each other. Country A imports PQ quantity of Y and exports OQ quantity ofX. The terms of trade for country A at P = Q_m/Q_x = PQ/OQ = Slope of line OP. If the line OP gets closer to OD, the terms of trade become favourable to country A and unfavourable to country B. On the opposite, if the line OP gets closer to the line OC, the domestic exchange ratio line of country A, the terms of trade turn against country A and become favourable to country B.

Country A was willing to exchange before trade SQ units of Y for OQ units of X. After trade, it gets PQ units of X for OQ units of Y. Therefore, the gain from trade for country A, out of the total trade gain of RS, amounts to PQ - SQ = PS units of Y. In case of country B, RQ units of Y were being exchanged for OQ units of X before trade. However, after trade it has to part with only PQ

units of Y to import OQ units of X. Therefore, the gain from trade for this country amounts to RQ – PQ = RP units of Y. As the point of exchange P gets closer to the line OD, the share of country A in the gain from trade will rise and that of country B will fall and vice-versa.

Taussig maintained that the gains from international trade can accrue to a trading country in the form of a rise in income. As trade brings about an expansion of the export industry, the employers, in order to absorb more labour in this industry, start offering higher wages. This leads to a rise in the money wages in other industries otherwise there will be accumulation of inefficiency in them. It signifies a general rise in money incomes. A higher level of income due to trade enables the people of a country to make larger purchases of both domestically produced and imported goods and reach a higher level of welfare.

The modern approach stresses that the introduction of international trade brings two types of gains, gains from exchange and gains from specialisation. These two gains together constitute the gains from international trade. When trade commences, consumers enjoy a higher level of satisfaction, partly because of improvement in terms of trade and partly on account of greater specialisation in the use of economic resources of the country.

1.7.4 Factors Determining the Gains from Trade
The size of gain from international trade is determined by several factors discussed below:

(i)   Terms of trade: (The terms of trade refer to the rate at which the commodity of one country is exchanged with the commodity of the other country. The terms of trade have the most significant influence on the size of gain from trade of a country. More favourable the terms of trade, large may be the gains from trade. If a country has unfavourable terms of trade, it does not mean that the country derives no benefit from trade. It simply implies that the share of such a country out of the total gains from trade is relatively smaller. Closer the terms of trade of a country to the domestic exchange ratio of two commodities lesser is the size of gain from trade for it and vice-versa.

(ii)   Differences in cost ratio: The difference in comparative cost ratios of producing two commodities in the two trading countries have much bearing upon the gain from international trade. If country A has comparative cost advantage in the production of cloth and B has cost

advantage in the production of steel, they will specialise in these respective goods and make gain from trade. If specialisation results in a relatively greater fall in the cost of cloth in country A than that in steel in country B, greater gain from trade will become available to A and vice-versa.

(iii) Reciprocal demand: The reciprocal demand refers to the elasticity of demand for the product of one country by the other country. If the demand for cloth (exportable of A) is less elastic in country B, the latter will offer more quantity of steel for one unit of cloth. It will cause the terms of trade to turn in favour of country A and this country will obtain a greater share from the total gain from trade. On the opposite, if the demand for steel in country A is less elastic or more intense, the term-of trade will move in favour of B and consequently greater gain from trade will become available to it. A country whose demand for the foreign products is more elastic but the demand for its products from the foreigners is less elastic, is likely to gain the most from international trade.

(iv) Level of income: The higher or lower level of money income of a country too determines the gain from trade for it. If the products of the home country command a strong and permanent demand, the expansion in its exports will raise the incomes from exports. The output in these industries will expand and the increased demand for labour will raise the money wages of workers. The employers in other industries will also raise wages to retain their more efficient workers. Thus there will be an overall increase in money incomes. The import of relatively cheaper commodities, while domestic money incomes are high, signifies the gain from trade. On the opposite, the low domestic money income due to low exports or larger imports from abroad, while import prices are high, will reduce the level of welfare and result in smaller gain from trade.

(v) Productive efficiency: If there is an improvement in the productive efficiency in the home country, the costs and product prices decline. As the foreigners can import commodities from this country at lower prices the terms of trade go in favour of foreign country. The larger proportion of gain from trade too goes to the latter. An increased efficiency in a foreign country will enable the home country to import goods at relatively lower prices. This will cause an improvement in the terms of trade for the home country and larger share out of gain from trade will become available to the home country.

(vi) Factor endowments and technological conditions: If a country is capital-abundant and advanced from economic and technological

viewpoints, it will have a large volume of foreign trade. Corresponding to the volume of its foreign trade, its share out of gain from international trade is also likely to be larger. On the contrary, a technically and economically backward labour-abundant country will have a small size of foreign trade. The gain from trade for such a country will also be relatively small.

(vii) Nature of products exported: If a country predominantly exports the primary products, the term of trade for it will be unfavourable and the gain from trade for it will be smaller. On the opposite, if the exports of a country are largely of manufactured goods, the terms of trade will be favourable for it. Such a country will obtain a relatively larger share out of the gains from trade.

(viii) Size of the country: A small country has a limited size of domestic market. Its productive resources too are limited and specific. The specialisation and exchange within the home country can bring very little benefits for it As international trade commences, this country may completely specialise in the production of such commodities in which it enjoys comparative advantage over the other countries. The greater the difference between the international price and domestic price of its exported products, greater will be the share out of gain from trade tor this country. A large country, on the opposite, possesses a large domestic market and diversified productive resources. If trade commences, it will have only incomplete specialisation. Since the small country can absorb very small quantity of the product available for export, it will have to dispose of a large part of its product in the home market. It may have substantial gain from specialisation and exchange within the home country but the gain from international trade will be very small.

In Fig. (i) for the large country A, the production possibility curve under the conditions of constant costs is AA_1. In the absence of trade, consumption and production takes place at R where the community indifference curve I is tangent to the production possibility curve. After trade takes place, there is no change in terms of trade for country A so that the international price ratio line remains AA_1. This country will, however, modify its production pattern in such a way that some imports are made from country B. It may decide to move to P where it exports PS quantity of X commodity and imports SR quantity of Y. Since the terms of trade remain unchanged for country A, it fails to make any gain from trade.
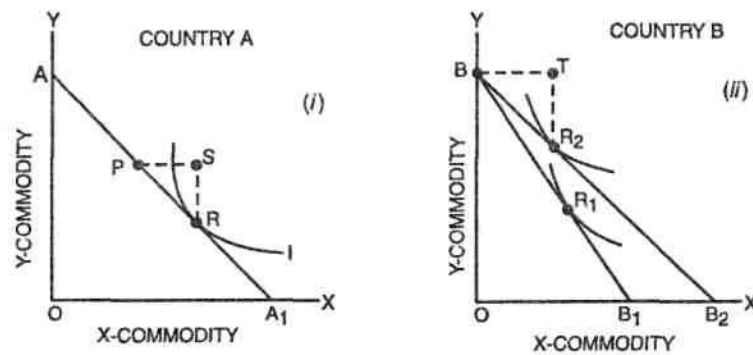
Figure 2

In Fig. (ii) for the small country B, the production possibility curve or domestic price ratio line under constant cost condition is BB_1. Its tangency with the community indifference curve I_1 shows that production and consumption in this country, in the absence of trade, takes place at R_1. As trade commences, this country specialises completely in the production of Y commodity. The international price ratio line is BB_2 which is parallel to AA_1. This country produces at B. The consumption equilibrium occurs at R1. So after trade it exports TR2 (= SR) of Y commodity to country A and imports BT (= PS) quantity of X from country A. The movement from R1 to R2 in country B reflects the gain from specialisation and exchange to the small country B from the international trade. Since this country is able to import X-commodity at the lower international price, the terms of trade turn in favour of it. That also shows that the gains from trade go to small country B alone and large country goes without any gain from trade.

1.7.5 Static and Dynamic Gains from Trade
The gains from international trade are of two typesStatic and dynamic gains.
Static Gains from Trade:
The static gains from trade are as under:
(i)   Expansion in production: International trade based on the principle of comparative cost advantage, according to classical economists, assures the benefits of international specialisation and division of labour. All the available productive resources in the trading countries get optimally utilised resulting in the maximisation of production not only for the individual trading countries but also for the whole world.
(ii)   Increase in welfare: International trade results in the increased production of consumable goods in both home country and foreign country due to large world demand for products. Specialisation also leads to improvement in the quality of consumer products. As cheaper

consumer products of superior varieties become easy available, there is definite rise in welfare of the people.

(iii)   Rise in national income: International specialisation results in expansion of production in all the trading countries. More and more employment opportunities become available to the people. The expansion of production and employment leads to a rise in national income of the trading countries.

(iv)   Vent for Surplus: According to Adam Smith, international trade leads to the fullest utilisation of productive resources of the country. It becomes capable of creating a surplus of goods which can be easily disposed of in the foreign market. Thus, the vent for surplus also constitutes a gain from international trade.

Dynamic Gains from Trade: The major dynamic gains from international trade are as follows:

(i)   Technological development: The international trade stimulates technical and scientific inventions and innovations as the producers in all the countries attempt to develop such techniques of production through which costs can be minimised and the speed of production can be accelerated. Trade facilitates the transfer of advanced technology from the developed to less developed countries. New ways of producing and organising production are spread to local economies through trade.

(ii)   Increased competition: Trade stimulates competition which makes the producers in all the countries to improve the quality of products and secure production at the least costs. The international competition promotes efficiency of all the industries in the trading countries.

(iii)   Widening of market: International trade enlarges the size of market. Consequently the producers are induced to expand the scale of production, volume of investment and employment. Consequently the production frontiers in the trading countries can continuously be expanded.

(iv)   Increase in investment: As the demand for the home produced goods increases due to international trade, there is strong impetus to investment. The growth of export sector leads to the expansion of several allied ancilliary industries creating more and more opportunities for investment. There is also substantial increase in foreign direct investments in the export sector of the economy.

(v)   Efficient use of resources: International trade paves the way for more efficient use of productive resources. The exploitation and use of the resources, previously considered economically non-viable, becomes

economically viable due to increased demand in the foreign markets.

(vi) Stimulus to growth: Production for exports and increased imports of goods bring about a series of adjustments within the economic system that ultimately have stimulating effect upon the overall growth in the trading countries. Trade not only induces the growth of export industries, but also promotes the growth of infrastructure and services sector.

1.7.6 Short answer type questions
1. Explain the meaning of gains from trade.
2. What are the factors that determine the gains from trade?
3. In what way are the gains from trade affected by the size of the country?
4. Make a distinction between potential and actual gain from trade.
5. Distinguish between static and dynamic gains from trade.

1.7.7 Long answer type questions
1. What is meant by gains from trade? In what way can terms of trade indicate the gains from trade?
2. Discuss the different approaches to the gains from trade.
3. Explain the meaning of gains of trade. What are die factors which determine the gains from trade?
4. What is gain from trade? In what way the size of a country has influence upon it?
5. What is the meaning of gain from trade? Distinguish between potential and actual gain from trade.

1.7.8 Recommended Books
1. Sodersten, B.: International Economics
2. Salvatore, D.: International Economics
3. Bhagwati, J.: Trade, Tariffs and Growth

Lesson No. : 1.8

The Terms of Trade , concepts and measurement

1.8.1 Introduction
1.8.2 Types of terms of trade

1.8.1 Introduction

      The terms of trade refer to the rate at which the goods of one country exchange for the goods of another country. It is a measure of the purchasing power of exports of a country in terms of its imports, and is expressed as the relation between export prices and imports prices of its goods. When the export prices of a country rise relatively to its import prices, its terms of trade are said to have improved. The country gains from trade because it can have a larger quantity of imports in exchange for a given quantity of exports. On the other hand, when its import prices rise relatively to its export prices, its terms of trade are same when a country is in trade there are many types of terms of trade which are as follows:

1.8.2.1   COMMODITY TERMS OF TRADE

      The commodity or net barter terms of trade is the ratio between the prices of a country's export goods and import goods. Symbolically, it can be expressed as $T = Px/P_m$, where T, stands for the commodity terms of trade, P for price, the subscript x for exports and m for imports.

      To measure changes in the commodity terms of trade over a period, the ratio of the change in export prices to the change in import prices is taken.

$$T_c = \frac{Px_1}{Px_0} \bigg/ \frac{Pm_1}{Pm_0}$$

where the subscripts 0 and 1 indicate the base and current periods. Taking 1991 as the base year and expressing India's both export prices and import prices as 100, if we find that by the end of 2001 its index of export prices had fallen to 90 and the index of import prices had risen to 110. The terms of trade had changed as follows:

$$T_c = \frac{90}{100} \bigg/ \frac{110}{100} = 81.82$$

It implies that India's terms of trade declined by about 18 per cent in 2001 as compared with 1991, thereby showing the worsening of its terms of trade.

If the index of export prices had risen to 180 and that of import prices to 150, then the terms of trade would be 120. This implies an improvement in the terms of trade by 20 per cent in 2001 over 1991.

This concept has been used by economists to measure the gain from international trade.

Despite its use as a device for measuring the direction of movement of the gains from trade, this concept has important limitations.

Usual problems associated with index number in terms of coverage, base year and method of calculation arise. The commodity terms of trade are based on the index numbers of export and import prices. But they do not take into account changes taking place in the quality and composition of goods entering into trade between two countries. Another serious difficulty in the commodity terms of trade is that it simply shows changes in export and import prices and not how such prices change. The concept of the commodity terms of trade throws no light on the "capacity to import" of a country. Suppose there is a fall in the commodity terms of trade of India. It means that a given quantity of Indian exports will buy a smaller quantity of imports than before. Along with this trend, the volume of Indian exports also rises, may be as a consequence of the fall in the prices of exports. The commodity terms of trade also ignore a change in the productive efficiency of a country.

1.8.2.2 GROSS BARTER TERMS OF TRADE

The gross barter terms of trade is the ratio between the quantities of a country's imports and exports. Symbolically, $Tg = Qm/Ox$ where Tg stands for the gross terms of trade, Qm for quantities of imports and Qx for quantities of

exports. The higher the ratio between quantities of imports and exports, the better the gross terms of traded.

To measure changes in the gross barter terms of trade over a period, the index numbers of the quantities of imports and exports in the base period and the end period are related to each other.

$$Tg = \frac{Qm_1}{Qm_0} \Big/ \frac{Qx_1}{Qx_0}$$

Taking 1991 as the base year and expressing India's both quantities of imports and exports as 100, if we find that the index of quantity imports had risen to 160 and that of quantity exports to 120 in 2001, then the gross barter terms of trade had changed as follows:

$$Tg = \frac{160}{100} \Big/ \frac{120}{100} = 133.33$$

It implies that there was an improvement in the gross barter terms of trade of India by 33 per cent in 2001 as compared with 1991.

If the quantity import index had risen by 130 and that of quantity exports by 180, then the gross barter terms of trade would be 72.22. This implies deterioration in the terms of trade by 18 per cent in 2001 over 1991.

The concept of gross barter terms of trade has been criticised for lumping together all types of goods and capital payments and receipts as one category in the index numbers of exports and imports. There are no units applying equal to rice and to steel, or to export (or import) of capital and the payment (or receipt) of a grant. It is, therefore, not possible to distinguish between the various types of transactions which are lumped together in the index.

1.8.2.3   INCOME TERMS OF TRADE

Dorrance has improved upon the concept of the net barter terms of trade by formulating the concept of *income terms of trade.* This index takes into account the volume of exports of a country and its export and import prices (the net barter terms of trade). It shows a country's changing import capacity in relation to changes in its exports. Thus the income terms of trade is the net barter terms of trade of a country multiplied by its export volume index. It can be expressed as on the next page :

$$Ty = Tc.Qx = \frac{PxQx}{Pm} = \frac{\text{Index of export prices} \times \text{Export quality}}{\text{Index of import prices}}$$

$$\left(\because Tc = \frac{Px}{Pm} \right)$$

Where, *Ty* is the income terms of trade, *Tc* the commodity terms of trade and *Qx* the export volume index.

A rise in the index of income terms of trade implies that a country can import more goods in exchange for its exports. A country's income terms of trade may improve but its commodity terms of trade may deteriorate. Taking the import prices to be constant, if export prices fall there will be an increase in the sales and value of exports. Thus while the income terms of trade might have improved, the commodity terms of trade might have deteriorated. The income terms of trade is called the capacity to import. In the long-run, the total value of exports of a country must equal its total value of imports, i.e. *PxQx=PmQm* or *Px.Qx/Pm=Qm.* Thus *PxQmlPm* determines *Qm* which is the total volume that a country can import. The capacity to import of a country may increase if other things remain the same the price of exports *(Px)* rises, or the price of imports *(Pm)* falls, or the volume of its exports *(Qx)* rises. Thus the concept of the income terms of trade is of much practical value for developing countries having low capacity to import.

But the index of income terms of trade fails to measure precisely the gain or loss from international trade. When the capacity to import of a country increases, it simply means that it is also exporting more than before. In fact, exports include the real resources of a country which can be used domestically to improve the living standards of its people. Moreover, the income terms of trade index is related to the export-based capacity to import and not to the total capacity to import of a country which also includes its foreign exchange receipts. For example, if the income terms of trade index of a country has deterierated but its foreign exchange receipts have risen, its capacity to import has actually increased, even though the index shows deterioration.

1.8.2.4 SINGLE FACTORAL TERMS OF TRADE

The concept of commodity terms of trade does not take account of productivity changes in export industries. Professor Viner has developed the concept of single factoral terms of trade which allows changes in the domestic export sector. It is calculated by multiplying the commodity terms of trade index by an index of productivity changes in domestic export industries. It can be expressed as:

$$Ts = Tc.Fx = \frac{Px.Fx}{Pm} \qquad \left(\because Tc = \frac{Px}{Pm} \right)$$

where Ts is the single factoral terms of trade, Tc is the commodity terms of trade, and Fx is the productivity index of export industries.

It shows that a country's factoral terms of trade improve as productivity improves in its export industries. If the productivity of a country's export industries increases, its factoral terms of trade may improve even though its commodity terms of trade may deteriorate. For example, the prices of its exports may fall relatively to its import prices as a result of increase in the productivity of the export industries of a country. The commodity terms of trade will deteriorate but its factoral terms of trade will show an improvement.

This index is not free from certain limitations. It is difficult to obtain the necessary data to compute a productivity index. Further, the single factoral terms of trade do not take into account the potential domestic cost of production of import industries in the other country. To overcome this weakness, Viner formulated the double factoral terms of trade.

1.8.2.5   DOUBLE FACTORAL TERMS OF TRADE

The double factoral terms of trade take into account productivity changes both in the domestic export sector and the foreign export sector producing the country's imports. The index measuring the double factoral terms of trade can be expressed as

$$Td = Tc.\frac{Fx}{Fm} = \frac{Px}{Pm}.\frac{Fx}{Fm} \qquad \left(\because Tc = \frac{Px}{Pm} \right)$$

where Td is the double factoral terms of trade, Px/Pm is the commodity terms of trade, Fx is the export productivity index, and Fm is the import productivity index.

It helps in measuring the change in the rate of exchange of a country as a result of the change in the productive efficiency of domestic factors, manufacturing exports and that of foreign factors manufacutirng imports for that country. A rise in the index of double factoral terms of trade of a country means that the productive efficiency of the factors producing exports has increased relatively to the factors producing imports in the other country.

In practice, however, it is possible to calculate an index of double factoral terms of trade of a country. But it has not been possible to construct a double factoral terms of trade index of any country because it involves

measuring and comparing productivity changes in the import industries of the other country with that of the domestic export industries

1.8.2.6   REAL COST TERMS OF TRADE

This index is calculated by multiplying the single factoral terms of trade with the reciprocal of an index of the amount of disutility per unit of productive resources used in producing export commodities. It can be expressed as:

$$Tr = Ts.Rx = \frac{Px}{Pm}Fx.Rx \qquad\qquad \left(\because Ts = \frac{Px}{Pm}.Fx \right)$$

where Tr is the real cost terms of trade, Ts is the single factoral terms of trade and Rx is the index of the amount of disutility per unit of productive resources used in producing export commodities.

A favourable real cost terms of trade index shows that the amount of imports received is greater in terms of the real cost involved in producing export commodities. But this index fails to measure the real cost involved in the form of goods produced for export which could be used for domestic consumption to pay for imports.

1.8.2.7 UTILITY TERMS OF TRADE

The utility terms of trade index measures "changes in the disutility of producing a unit of exports and changes in the relative satisfactions yielded by imports, and the domestic products foregone as the result of export production." In other words, it is an index of the relative utility of imports and domestic commodities foregone to produce exports. The utility terms of trade index is calculated by multiplying the real cost terms of trade index with an index of the relative average utility of imports and of domestic commodities foregone.

$$u = \frac{Um_1}{Ua_1} \left/ \frac{Um_0}{Ua_0} \right.$$

where u is the index of relative utility of imports and domestically foregone commodities. Thus the utility terms of trade index can be expressed as:

$$Tu = Tr.u = \frac{Px}{Pm}.Fx.Rx.u$$

Since the real terms of trade index and utility terms of trade index involve the measurement of disutility in terms of pain, irksomeness and sacrifice, they are elusive concepts. As a matter of fact, it is not possible to measure disutility (for utility) in concrete terms.

Hence like the single and double factoral terms of trade concepts, the concepts of real and utility terms of trade are of little practical use. They are only of academic interest. That is why the concepts of the commodity terms of trade and of income terms of trade have been used in measuring the gains from international trade in developed as well as developing countries.

1.8.3 FACTORS AFFECTING TERMS OF TRADE

The terms of trade of a country are influenced by a number of factors which are discussed as under:

1.   Reciprocal Demand

The terms of trade of a country depend upon reciprocal demand, i.e. "the strength and elasticity of each country's demand for the other country's product". This also relates to the determination of the equilibrium terms of trade.

Suppose there are two countries, India and Bangladesh, which produce linen and cloth respectively. If India's demand for Bangladesh's cloth becomes inelastic, the price of cloth rises more than the price of linen, the commodity terms of trade will move against India and in favour of Bangladesh. On the other hand, if Bangladesh's demand for India's linen becomes more intense, the price of linen will rise more than the price of cloth, and the commodity terms of trade will move in favour of India and against Bangladesh.

2.   Changes in Factor Endowments

Changes in factor endowments of a country affect its terms of trade. Changes in factory endowments may increase exports or reduce them. With tastes remaining unchanged, they may lead to changes in the terms of trade.

3.   Change in Technology

Technological changes also affect the terms of trade of a country. The effect of technological change on terms of trade is favourable for the country which has improved its product technically.

4.   Changes in Tastes

Changes in tastes of the people of a country also influence its terms of trade with another country. Suppose Bangladesh's tastes shift from India's linen to its own cloth. In this situation, Bangladesh would export' less cloth to India and its demand for India's linen would also fall. Thus Bangladesh's terms of trade would improve. On the contrary, a change in Bangladesh's taste for India's linen would increase its demand and hence the terms of trade would deteriorate for Bangladesh.

5.   Economic Growth

Economic growth is another important factor which affects the terms of trade. The raising of a country's national product or income over time is called economic growth. Given the tastes and technology in a country, an increase in its productive capacity may affect favourably or adversely in terms of trade.

6.   **Tariff**

An import tariff improves the terms of trade of the imposing country and for other country it will be unfavourable.

7.   Devaluation

Devaluation raises the domestic price of imports and reduces the foreign price of exports of a country devaluing its currency in relation to the currency of another country. The commodity terms of trade will deteriorate only when export prices fall more than import prices in terms of domestic currency. In reality, the elasticities of demand and supply for exports and imports of a devaluing country determine deterioration or improvement in its terms of trade. If both the foreign demand for exports and home demand for imports are highly elastic and supplies both to home exports and foreign imports are highly inelastic to price movements, devaluation leads to an improvement in the commodity terms of trade.

1.8.4 Short Answer Type Questions

1.   Examine critically the various concepts of terms of trade.
2.   Distinguish between Gross Barter Terms of Trade and Barter Terms of Trade or Income Terms of Trade and Net Barter Terms of Trade.
3.   Discuss the factors which determine the terms of trade.

1.8.5.   Long Answer Type Questions

1.   Name different kinds of terms of trade. Which of these concepts is most helpful in indicating 'gains from trade'? And why?
2.   Analyse the nature and significance of the principle of reciprocal demand in the theory of comparative costs.
3.   Critically discuss Mill's theory of reciprocal demand in the theory of comparative costs.

1.8.6. **Theory of Reciprocal Demand**

Ricardo expounded the theory of comparative advantage without explaining the ratios at which commodities would exchange for one another. It was J.S. Mill who discussed the latter problem in detail in terms of his theory of reciprocal demand. The term 'reciprocal demand' introduced by Mill to explain the determination of the equilibrium terms of trade. It is used to indicate a country's demand for one commodity in terms of the quantities of the other commodity it is prepared to give up in exchange. It is reciprocal demand that determines the terms of trade which, in turn, determine the relative share of each country. Equilibrium would be established at that ratio of exchange between the two commodities at which quantities demanded by each country of the commodity which it imports from the other, should be exactly sufficient to pay for one another.

To explain his theory of reciprocal demand, Mill first restated the Ricardian theory of comparative costs. "Instead of taking as given the output of

each commodity in two countries, with the labour costs different, he assumed a given amount of labour in each country, but differring outputs. Thus his formulation ran in terms of comparative advantage, or comparative effectiveness of labour, as contrasted with Ricardo's comparative labour cost."

Assumptions

Mill's theory of reciprocal demand is based on the following assumptions:

1. There are two countries, say, Bangladesh and India.
2. There are two commodities, say, linen and cloth.
3. Both the commodities are produced under the law of constant returns.
4. There are no transport costs.
5. The needs of the two countries are similar.
6. There is perfect competition.
7. There is full employment.
8. There is free trade between the two countries.
9. The principle of comparative costs is applicable in trade relations between the two countries.

Explanation of the Theory

Given these assumptions, Mill's theory of reciprocal demand can be explained with this example:

Suppose India can produce 10 units of linen or 10 units of cloth within one man-year and Bangladesh can produce 6 units of linen or 8 units of cloth with the same input of labour-time. This is because India has *an* absolute advantage in the production of both linen and cloth, while Bangladesh has the least comparative disadvantage in the production of cloth. This can be seen from their domestic exchange ratios and international exchange ratios.

Before trade, the domestic cost ratio of linen and cloth in India is 1:1 and in Bangladesh 3:4. If they were to enter into trade, India's advantage over Bangladesh in the production of linen is 5:3 (or 10:6), and in the production of cloth 5:4 (or 10:8). Since 5/3 is greater than 5/4, India possesses greater comparative advantage in the production of linen. Thus it is in India's interest to export linen to Bangladesh in exchange for cloth. Similarly, Bangladesh's position in the production of linen is 3/5 (or 6/10) and in the production of cloth is 4/5 (or 8/10). Since 4/5 is greater than 3/5, it is in the interest of Bangladesh to export cloth to India in exchange for linen.

Mill's theory of reciprocal demand relates to the possible terms of trade at which the two commodities will exchange for each other between the two countries. The terms of trade refer to 'the barter terms of trade' between the two countries, *i.e.,* the ratio of the quantity of imports for a given quantity of export of a country. And "the limits to the possible barter terms of trade (the
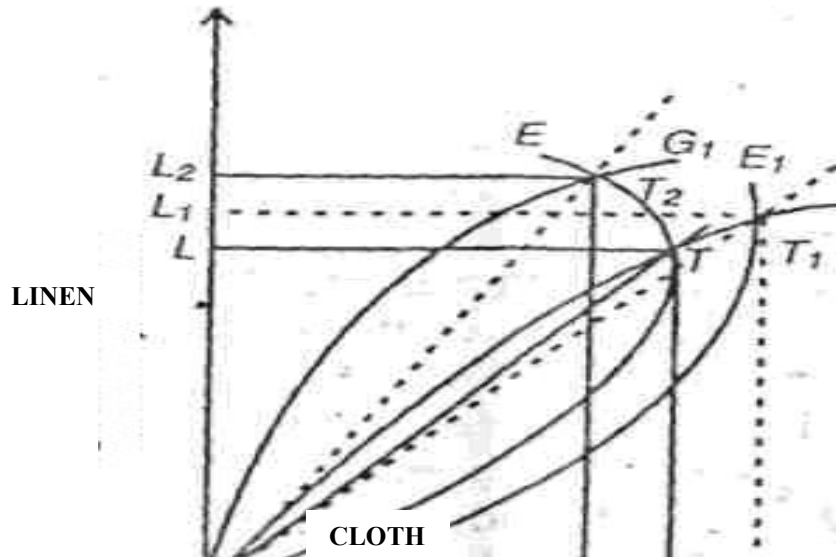
international exchange ratio) are set by the domestic exchange ratios established by the relative efficiency of labour in each country."

In India 2 inputs of labour-time produce 10 units of linen and 10 units of cloth, while in Bangladesh the same labour produces 6 units of linen and 8 units of cloth. The domestic exchange ratio between linen and cloth in India is 1:1 and 1:1.33 in Bangladesh. Thus the limits of possible terms of trade are 1 linen: 1 cloth in India and 1 linen : 1.33 cloth in Bangladesh. Thus the terms of trade between the two countries will be between 1 linen or 1 cloth or 1.33 cloth.

But the actual ratio will depend upon reciprocal demand, i.e. "the strength and elasticity of each country's demand for the other country's product." If India's demand for Bangladesh's cloth is more intense (inelasic), then the terms of trade will be nearer 1:1. India will be prepared to exchange one unit of linen with one unit of cloth of Bangladesh. The terms of trade will move against it and in favour of Bangladesh. Consequently, India's gain from trade will be less than that of Bangladesh. On the other hand, if India's demand for Bangladesh's cloth is less intense (more elastic), then the terms of trade will be nearer 1:1.33. India will be prepared to exchange its one unit of linen with 1.33 units of cloth of Bangladesh. The terms of trade will move in favour of India and against Bangladesh. Consequently, India's gain from trade will be greater than that of Bangladesh.

Mill's theory of reciprocal demand is explained diagrammatically in terms Marshall's offer curves.

In fig. 13.1, Bangladesh producing only cloth is taken on the horizontal axis and India producing only linen is taken on vertical axis. The curve OE is Bangladesh's offer curve. It shows how many units of cloth Bangladesh will give up for a given quantity of linen. Similarly, OG is the offer curve of India which shows how many units of Linen India is prepared to give up in exchange for a given quantity of cloth. The point T where the two offer curves OE and OG intersect is the equilibrium point at which OC of cloth is exchanged by Bangladesh of OL of linen of India. The rate at which cloth is exchanged for linen is equivalent to the slope of the ray OT.

Figure 8.1

A change in the demand on the part of one country for the product of the other country brings about a change in the shape of its offer curve. Suppose Bangladesh's demand for India's linen increases. Bangladesh might now be prepared to exchange more cloth for India's linen. Consequently, Bangladesh's offer curve shifts to the right as OE_1 which intersects India's offer curve OG at T_1. Now Bangladesh trades OC_1 units of cloth for OL_1 units of linen. The terms of trade, as shown by the slope of the OT_1 indicate that they have deteriorated for Bangladesh and improved for India. This is evident from the fact that Bangladesh trades CC_1 units of cloth for LL_1 units of linen. CC_l is greater than LL_1

Similarly, if India's demand for Bangladesh's cloth increases, India's offer curve shifts to the left as OG_1 which intersects Bangladesh's offer curve OE at T_2. Now India exchanges OL_2 units of linen for OC_2 units of cloth. The terms of trade, as shown by the slope of the OT_2, indicate that they have deteriorated for India and improved for Bangladesh.This is clear from the fact that India exchanges LL_2 more linen for CC_2 less cloth, *i.e.* $LL_2 > CC_2$

But the actual terms of trade will depend upon the elasticity of demand of the offer curve of each country. The more elastic the offer curve of a country, the more unfavourable will be terms of trade for it in relation to the other country. On the contrary, the more inelastic is its offer curve, the more favourable will be its terms of trade in relation to the other country.

Its Criticisms

Mill's theory of Reciprocal Demand is based on almost the same unrealistic assumptions that were adopted by Ricardo in his doctrine of comparative advantage. Thus the theory suffers from similar weaknesses. Besides, there are

some additional criticisms made by Viner, Graham, and others.

1. Mill's theory of reciprocal demand does take into account the domestic demand for the product. As pointed out by Viner, each country would export its product only after satisfying its home demand. Thus the demand curve for India would not be below the line *Og* until the domestic demand was satisfied, and the same applies to Bangladesh.

2. According to Graham, Mill's analysis is valid only if the two countries are of equal size and the two commodities are of equal consumption value. In the absence of these two assumptions, if one country is small and the other large, the small country gains the most on both counts: *First,* if it produced a high-value commodity, it will adopt the cost ratios of its big partner; and *Second,* the two trading countries being of unequal size, the terms of trade will be fixed at or near the comparative costs of the large country.

3. Mill's theory is based on the unrealistic assumption of two-countries and two-commodities. Graham, therefore, favours several commodities, several countries and complex trade.

4. Graham further criticises Mill for emphasising demand and neglecting supply in determining international values. According io him, the application of the reciprocal demand makes it appear that demand alone is of interest. He maintains that production costs (supply) are also of paramount importance in international trade. He thus attacked the Law of Reciprocal Demand "as appropriate only to trade in antiques and old masters."

5. Another weakness of Mill's analysis of reciprocal demand is that it makes no allowance for fluctuations in incomes in the two trading countries which are bound to influence the terms of trade between them.

6. Further, the theory is based on barter of trade and relative price ratios. Thus it 'neglects all stickiness of prices and wages, all transitional inflationary and overvaluation gaps, and all balance of payments problems'. No wonder, the theory is abstract and unrealistic. Graham, therefore, regards the theory "in its essence fallacious and should be discarded."

7. Mill's theory is based on such unrealistic assumptions as two countries, two commodities, law of constant returns, lack of transport costs, full employment, perfect competition, etc. These make the theory unrealistic.

Conclusion:

But there is little basis in the criticisms made by Graham which appear to be flimsy. As pointed out by Viner, "The terms of trade can be directly influenced by reciprocal demands and by nothing else. The reciprocal demands, in turn, are ultimately determined by the cost conditions together with the basic utility functions." The real fault in Mill's analysis is that it

overemphasizes the basic utility functions and neglects the production costs.

Suggested Books

1. International Economics: Bo Soderston
2. International Economics: Kindelberger
3. International Economics: Sadama Singh and Vaish.

Lesson No. : 1.9

Secular Deterioration in Terms of Trade

1.9.1 Introduction

There is empirical evidence related to the fact that the terms of trade have been continuously moving against the developing countries. On the basis of exports statistics concerning the United Kingdom between 1870 and 1940, Raul Prebisch demonstrated that the terms of trade had secular tendency to move against the primary products and in favour of the manufactured and capital goods.This view point has been strongly supported by H.W. Singer. The essence of Prebisch-Singer thesis is that the peripheral or LDCs had to export large amounts of their primary products in order to import manufactured goods from the industrially advanced countries. The deterioration of terms of trade has been a major inhibitory factor in the growth of the LDCs.

1.9.2 Objectives of the lesson

In this lesson we will study about secular deterioration of terms of trade, its reasons and criticism.

1.9.3 Explanation

Prebisch and Singer maintain that there has been technical progress in the advanced countries, the fruit of which have not percolated to the LDCs. In addition, the industrialised countries have maintained a monopoly control over the production of industrial goods. They could manipulate the price of manufactured goods in their favour and against

the interest of the LDCs. Except the success of OPEC in raising the prices of crude oil since mid 1970's, there has been a relative decline in the international prices of farm and plantation products, minerals and forest products. Consequently, the terms of trade have remained unfavourable to the developing countries.

Assumptions:
The main assumptions in the Prebisch-Singer thesis are as under:
(i)   As income rises in the advanced countries, the pattern of demand shifts from primary products to the manufactured products due to Engel's law.
(ii)   There is slow rise in demand for primary products in the developed countries
(iii)   The export market for products of LDCsis competitive,
(iv)   The export market for products of developed countries is monopolistic.
(v)   Wages and prices are low in LDCs.
(vi)   The appearance of substitutes for products of LDCs reduces demand for them.
(vii) The benefit of increased productivity is not passed by the producers of manufactured products in advanced countries to the LDCs through lower prices.
(viii) The economic growth in theLDCs is indicated by income terms of trade.

Singer has pointed out that the recent increase in debt problem of the LDCs has imparted another twist to the hypothesis of secular deterioration of terms of trade for them in two ways. *Firstly,* a high proportion of proceeds from exports are not available for imports. *Secondly,* there is an increased pressure upon the LDCs to raise exports in order to repay external debts on account of IMF-induced adjustment policies. These pressures make the debt-ridden LDCs to compete with other poor countries to enlarge their export earnings. It results in decline in the prices of export products of these countries.

1.9.4 Reasons for Secular Deterioration of Terms of Trade
The secular deterioration in the terms of trade of the developing countries has occurred onaccount of the following reasons:
(i)   *Absence of qualitative improvement of products:* According to Raul Prebisch, the principal reason for the lower prices of primary

products relative to those of manufactured goods is that the LDCs continue to produce and export goods like coal, iron ore, tea, coffee, copper, rice, sugar etc. The quality of these products has remained roughly the same as fifty years back. In contrast, there has been tremendous improvement in the quality of manufactured goods almost in every industry. Consequently, the demand for the latter has maintained a strong upward trend and their prices relative to the prices of primary products have remained high. This argument has, however, been refuted by the writers like Lipsey, J. Viner and H.G. Johnson on the ground that the empirical evidence has not supported it.

(ii) *Distribution of gains from technical progress:* In the opinion of H.W. Singer, the secular deterioration in the terms of trade in the LDCs can be attributed to the fact that the gains from technical progress in the developing countries have been passed on to the consumers in the advanced countries through exports of primary products at lower prices. In contrast, the gain from technical progress in the latter has been retained by the producers themselves in the form of higher incomes. Singer could not provide proper explanation for this phenomenon.

(iii) Immiserizing growth: The worsening of the international terms of trade in the case of less developed countries may be on account of the process of "immiserizing growth" explained by Jagdish Bhagwati. The excessive emphasis on ultra-export biased growth and the lack of complementary resources for the expansion of import-competing industries tend to lower not only the consumption equilibrium but also cause the deterioration in the terms of trade.

(iv) Low income elasticity of demand: The deterioration in the terms of trade of the LDCs can be explained also in terms of Engel's law. There is predominance of the production of food crops in these countries. As the income elasticity of demand is low, the aggregate expenditure as the proportion of national income incurred on the agricultural products falls relative to the proportion of spending on manufactured goods. This results in large exportable surplus which is disposed of in the foreign markets at relatively lower prices. The increasing demand for manufactured goods results in more imports of such products at relatively higher prices. Consequently, the terms of trade remain unfavourable for the developing countries.

(v) Impact of import on the import-competing industries: The worsening of the terms of trade for the LDCs has resulted also from the destructive

effect of foreign imports upon the indigenous import-competing industries. For instance, the competition from cheap mill made cloth from Britain in the 19th century caused the decline of Indian handicrafts. As the surplus labour fell back on agriculture, the exports of primary products increased. The excessive dependence on exports on primary goods as a source of income depressed the prices of these products relative to manufactured imported goods.

(vi) *Large surpluses of farm products*: The advanced countries have large surpluses of farm products such as foodgrains, cotton, oilseeds and dairy products. These products are transferred on a larger scale to the scarcity-ridden countries of Asia and Africa. It has depressing effect on the international prices of agricultural products. As a consequence, the terms of trade remain persistently unfavourable for the developing countries.

(vii) *Shortage of intermediate goods*:Linder has attributed the adverse terms of trade in LDCs to the shortages of intermediate goods. As a result of lesser availability of intermediate products, the process of diversification and transformation remains hindered in these countries. In view of the increased pressure of demand for such products to push ahead the process of expansion, the imports of such products have to be made at relatively higher prices. The higher import prices relative to export prices make the terms of trade unfavourable for these countries.

(viii) Impact of foreign investment: According to Singer, the opening of the economies of LDCs to trade and foreign investment has resulted in the cumulative multiplier effect upon the economies of advanced countries in the form of large scale expansion of exports of intermediate and producer goods and heavy remittances of profits from those investments. The foreign direct investments in LDCs have been directed to plantation industries and mining sector and have not contributed in the growth of manufacturing industries. Apart from depressing the overall growth process, they have reinforced the secular deterioration of the terms of trade of the LDCs.

(ix) Growth of synthetic products: The technological developments in both the advanced and LDCs have resulted in the production of synthetic rubber, artificial silk, rayon, plastic products etc. That has hit hard the production of traditional items of exports of the LDCs. As the prices of traditional exports have declined relative to imports of manufactured goods, the terms of trade have turned against the

LDCs.

(X) *Regional economic groupings:* The growth of regional economic groupings among the advanced countries such as the European Union has promoted trade among themselves. As a result, the growth of exports of LDCs has slowed down, worsening their terms of trade.

(xi) *Protectionist policies:* As some of the developing countries have started developing their industries, the advanced countries have adopted the protectionist policies. They have raised tariffs against the manufactured products of the developing countries. Consequently the terms of trade have turned against the developing countries.

1.9.5 Criticism of Prebisch-Singer Thesis

The Prebisch-Singer Thesis has come to be criticised on several grounds:

(i) *Not firm bash for inference:* The inference of secular deterioration of terms of trade for the LDCs rests upon the exports of primary vis-a-vis manufactured products. In this regard, it should be remembered that the LDCs export wide variety of primary products. Sometimes they export also certain manufactured products. They, at the same time, do not import only manufactured products but also a number of primary products. It is, therefore, not proper to draw a firm inference about terms of trade just on the basis of primary versus manufactured exports.

(ii) *Faulty statement of gains and losses of primary exporters:*Jagdish Bhagwati has pointed out that the index of terms of trade employed in this thesis understates the gains of exporters of primary products. At the same time, there is over-statement of losses of primary producers.

(iii) *Faulty Index of TOT:* The Prebisch-Singer hypothesis rests upon the index which is the inverse of the British commodity terms of trade. This index overlooks the qualitative changes in products, appearance of new varieties of products, services like transport etc.

(iv) *Neglect of supply conditions:*In the determination of terms of trade, the Prebisch-Singer thesis considers only demand conditions. The supply conditions which are likely to change significantly over time, have been neglected. The relative prices, in fact, depend not only upon the demand conditions but also on the supply conditions.

(v) *Little effect of monopoly power:* One of the arguments in support of this thesis was that the higher degree of monopoly power existing in

industry than in agriculture led to secular deterioration of terms of trade for the developing countries. In this connection, it was also argued that the monopoly element prohibited the percolation of benefits of technical progress to the LDCs. The empirical evidence has not supported such a line of argument.

(vi) *Inapplicability ofEngel's Law:* The secular decline in the demand for primary products in developed countries was attributed to Engel's Law. But this is not true because this law is applicable to food and not to the raw materials which constitute sizeable proportion of exports from the LDCs.

(vii) *Benefits from foreign investment:* The deterioration of the terms of trade for the LDCs is sometimes linked not to non-transmission of productivity gains to them by advanced countries through lower prices of manufactured goods, yet the benefits from foreign investments have percolated to the LDCs through the product innovations, product improvement and product diversification. These benefits can amply offset any adverse effects of foreign investment upon terms of trade and the process of growth.

(viii) Difficult to assess variation in demand for primary products: The secular deterioration in terms of trade of the LDCs was supposed to be on account of the declining world demand for primary products. During that period, there were tremendous changes in world population, production techniques, living standards and means of transport. Given those extensive developments, it is extremely difficult to assess precisely the changes in world demand for primary products and the impact of these changes upon the terms of trade.

(ix) Export instability and price variations: The Prebisch-Singer thesis suggested that export instability in the LDCs was basically due to variations in prices of primary products relative to those of manufactured products. Mc Been, on the contrary, held that the export instability in those countries could be on account of quantity variations rather than the price variations.

(X) *Development of export sector not at the expense of domestic sector:* In this thesis, Singer contended that foreign investments in poor countries, no doubt, enlarged the export sector but it was at the expense of the growth of domestic sector. This contention is, however, not always true because the foreign investments have not always crowded out the domestic investment. If foreign investments have helped exclusively the growth of export sector, even that

should be treated as acceptable because some growth is better than no growth. It is far-fetched to relate worsening of terms of trade to the non-growth of domestic sector.

(xi) Faulty policy prescriptions: Prebisch prescribed the adoption of protectionist policies by LDCs to offset the worsening terms of trade. Any gains from tariff or non-tariff restrictions upon imports from advanced countries can at best be only short-lived because they will provoke retaliatory actions from them resulting still greater injury to the LDCs.

(xii) Lack of Empirical Support: The studies made by Morgan, Ellsworth, Haberler, Kindel-berger and Lipsey have not supported the secular deterioration of terms of trade hypothesis. This objection of lack of empirical support against the Prebisch-Singer hypothesis is actually not very sound. A number of more recent empirical studies have, in fact, gone in favour of this hypothesis.

Despite all the objections raised against the Prebisch Singer thesis, the empirical evidence hasaccumulated in support of it.

1.9.6 Impact of Deterioration of Terms of Trade on Developing Countries

The continuously deteriorating terms of trade for the developing countries in the post-war period have created serious adverse effects for them. Some of these effects are as below:

Low capacity to import*:* As the prices of exported primary products have remained lower relative to prices of manufactured products, the capacity of the developing countries to import goods per unit of the exported capacity has become less and less.

Balance of payments deficits: The deteriorating terms of trade of the developing countries have enlarged the gap between their export earnings and import bills. As a consequence, most of the LDCs countries have been facing mounting balance of payments deficits.

Enforcement of stiff borrowing conditions: The adverse terms of trade and consequent balance of payments deficit have led to the increasing dependence of the developing countries upon the borrowings from the advanced countries and the international financial institutions. The borrowings from the financial institutions are made available under

increasingly stiff conditionally. These include the adjustment in exchange rate of home currency, borrowing from commercial banks in advanced countries, liberalisation of structure of tariff, larger imports from advanced countries, internal monetary and tax adjustments, changes in plan and development priorities etc. Such conditions, imposed under the pressure of advanced countries, are likely to have adverse economic and other consequences for the developing countries.

Debt trap: The continuous deterioration in the terms of trade has landed many a developing country in a state of debt trap. The burden of international borrowing upon some of the countries such as Brazil and Mexico has increased to such a large extent that the export receipts are insufficient to pay for debt servicing.

Adverse effect on growth: The persistent BOP deficits, decline in the capacity to import, mounting external debt and increasing restrictions on the inflow of capital in the wake of deteriorating terms of trade have serious depressing effect upon the growth process in the developing countries.

1.9.7 Short answer type questions
1.   What is Prebisch-Singer thesis? What are its assumptions?
2.   What are the reasons for secular deterioration of TOT for the LDC's?
3.   What objections are raised against the Prebisch-Singer thesis?
4.   What is the impact of deterioration of TOT on the developing countries?

1.9.8 Long answer type questions
1.   Explain clearly the Prebisch-Singer Thesis.
2.   Account for the secular deterioration in the terms of trade of the developing countries.
3.   Critically examine the Prebisch-Singer Thesis.
4.   What is meant by terms of trade? Analyse the impact of adverse terms of trade upon the less developed countries.

1.9.9 Recommended books
1.   Meier, CM.: *International Trade and Development*
2.   Sodersten, B.:*International Economics*
3.   Kindelberger, C.P.:*International Economics*
4.   Salvatore D.: *International Economics*