

[Academic Script]

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Extension of HO Theory

The HO theorem is based on highly restrictive assumptions that there are two countries where quantities of labour and capital are fixed, tastes are unchanged, technology and returns to scale are constant and transport costs are zero. In reality, all these factors which affect trade are constantly changing.it is therefore, useful to relax some of these assumptions in order to study the impact of changes in factor endowments, tastes, transport costs, technology, etc. on international trade.

Changes in factor endowments

When there are changes in factor endowments of a country, given no change in technology, they bring about changes in output, volume of trade, income, employment, terms of trade and gains from trade between the two trading countries. In order to analyze the impact of changes in factor endowments on these variables, let us consider a case in which the supply of only one factor increases in one country with no change in the supply of factor in the other country.

Impact on output



Let us consider the case of country A where there is an increase in only the supply of labour endowment. Commodity prices remaining constant, an increase in the supply of labour increases the output of the labour intensive commodity X and reduce the capital-intensive commodity Y. This is explained in terms of fig.1 where the horizontal axis measures quantities of the labour –intensive commodity X and the vertical axis of the capital –intensive commodity Y in country A. Its initial production possibility curve is KL and the production point is E where the price line PP is tangent to the KL curve and it produces OX of X and OY of Y .When the supply of labour alone increases ,the production possibility curve KL shifts upwards to K₁L₁.The price line P₁ is tangent to the curve K₁L₁ at the production point E₁,where country A produces OX₁ of X and OY₁ of Y.

The comparison of two points E and E₁ shows that after the increase in the supply of labour, the output of the labor –intensive commodity X has increased from OX to OX₁ and that of capital –intensive commodity has decreased from OY to OY₁, even though the supply of capital has remained unchanged.

Impact on volume of trade

If a country A exports commodity X, an increase in the supply of its relatively abundant labour endowment tends to increase the volume of its exports. This can be seen in fig 1. Suppose before the increase in the supply of labour, A was exporting OX quantity of X to country B. With an increase in the supply of labour, A's production possibility curve shifts upwards to K $_1L_1$ from KL and the new production point is established at E₁ on the P₁.As a result, its exports of labor-intensive commodity X increases from OX to OX₁.Thus it is able to increase the exports of X more than proportionately to the reduction in Y.

Impact on national income

An increase in the supply of labour and consequent outward shifting of the production possibility curve implies an increase in the national income of country A. This can be explained with help of figure 2. The initial PPC is KL with an equilibrium point A. When the supply of labour increases, the new PPC is K_1L_1 . The higher PPC K_1L_1 implies an increase in national income. The new equilibrium position is at A_1 where the price line P_1 is tangent to K_1L_1 and is parallel to price line P. But A_1 cannot possibly be an equilibrium point at the higher national income level, except if Y is an inferior good. At point A_1 , the output of X increases and that of Y decreases.



Therefore, the new equilibrium point must lie within the quadrant QAR on the K_1L_1 curve. Therefore, the point of equilibrium will be B where both X and Y are produced more.

Impact on employment



ven factor and commodity prices, when the supply of labour increases in country A, there will be transfer of labour from capital intensive to labour intensive industry. This is explained with the help of figure 3, where origin of commodity X is O and of commodity Y is O₁. Country A's factor endowments are measured by the box OLO₁C. With the increase in labour by LL₁, the new boxes OL₁O₂C. Initially A produces at point A on its contract curve OAO₁, where it produces OA of X and O₁A of Y. With the increase in labour supply it produces at A₁ on its contract curve OA₁O₂, where it increases its production of X from OA to OA₁ and reduces its production of Y from O₁A to O₂A₁ with no change in factor and commodity prices.

The increase in production of X by AA₁ has been possible by transferring some of labour from the capital intensive industry to the labour intensive industry X.

Impact on gains from trade and terms of trade



In figure 4, OA is the initial offer curve of country A. At the equilibrium point E with terms of trade OT, it exports OX of commodity X and imports OY of commodity Y. As a result of increase in supply of labour, its offer curve shifts from OA to OA_1 at constant terms of trade OT.

The new equilibrium will be at point E_1 where country A exports XX_1 more of X and imports YY_1 more of Y. But at constant terms of trade it does not gain from trade because it must offer more X per unit of Y than before. In this situation the terms of trade move against country A from OT to OT₁. The new equilibrium is on OT₁ with the OA₁ offer curve at E_2 where A gains more from trade by exporting larger quantity XX_2 of X in exchange for lesser quantity YY_2 of Y. Thus its terms of trade also improve.

Economies of scale

The H.O theorem assumes constant returns to scale in the production of two commodities that are traded by two countries. It means that the average cost and the marginal cost of producing the two commodities remain constant as production increases. This is unrealistic because cost functions in many developed countries have decreasing costs or increasing returns to scale. Increasing returns to scale may be due to internal or external economies. External economies are consistent with perfect competition because these occur when all firms in an industry simultaneously experience a lowering in their average costs as their level of production expands.

Explanation



Given these assumptions, trade would not be possible, according to the H.O. theorem. But if both X and Y commodities are produced under decreasing costs or increasing returns to scale, trade is possible between the two countries. Country A will specialize in the production of X and B in the production of Y.A will exchange a part of its output of X with a part of the Y output of B. As a result, the level of consumption rises in both the countries. As total production of both X and Y increases due to external economies of scale, both A and B countries gain from trade. In fig 5 BNA is the production possibility curve of both B and A because both, countries are identical. Since they have identical tastes, they have the same community indifference curve CL. Thus in the pre-trade situation each country produces and consumes at point N. If the two countries trade, A completely specializes in the production of commodity X, shifting production from N to A, while B completely specializes in the production of Y, shifting production from N to B. Trade can take place between the two countries based on decreasing costs, even though the relative commodity prices are identical in both at point N. Given the international price ratio (terms of trade) BEA, a feasible equilibrium would be point E with trade triangles BEC and EAD. Country A exchanges DA of X with country B's CB of Y. Due to increased specialization, both countries consume more being at point E on the higher community indifference curve CL_1 . Thus both countries gain MD of X and LC of Y.

Changes in tastes

The H.O. Theorem is based on the assumption of constant tastes. But what happens if a country's tastes change, given its technology and factor endowments. A change in tastes will alter its volume of trade and terms of trade. If a country's tastes changes from its exportable to importable commodity, its volume of trade increases and its terms of trade declines.

On the contrary, a change in tastes from its importable to exportable commodity reduces its volume of trade and improves its terms of trade.



This is explained in terms of the offer curves in Fig.6, where OA is the offer curve of country A and OB of country B. With unchanged tastes A exports OX of X and imports XE of Y. Suppose tastes in country A changes from its importable commodity Y towards its exportable commodity X, its factor endowments, technology, etc. remaining unchanged. This shifts its offer curve OA to the left to OA₁ because its need for Y has become less intense. It will now offer less of X than before in exchange for Y to country B. Thus at its new equilibrium point E_1 where the offer curve OA₁ cuts the offer curve OB, country A exchanges OX₁ its exportable commodity X for X_1E_1 of Y. As a result, its volume of trade has declined with change in tastes:

 $\mathsf{OX}_1 + \mathsf{X}_1\mathsf{E}_1 < \mathsf{OX} + \mathsf{XE}$

But its terms of trade have improved as shown by the terms of trade line OT_1 whereby it exchanges less quantity OX_1 of X in exchange for a large quantity X_1E_1 of Y.

Differing demand conditions

Both the classical and H.O. theories do not consider the influence of demand on international trade. But given the supply conditions, differing demand pressures may lead to differences in price ratios in the two countries and to exchange of commodities between them at world price ratio.



This case is explained in Fig. 7. Suppose there are two countries A and B with a common production possibility curve AB. In the pre-trade situation, different demand conditions relating to commodities X and Y have different relative price ratios, as shown by P_1 in country A and P_2 in country B. The consumption and production point of A is F where its CL_1 curve is tangent to the production possibility curve. Similarly, the consumption and production point of B is K where its CL_2 curve is tangent to the production possibility curve. As precializes in the production of capital-intensive commodity Y and B in the labor-intensive commodity X. When trade begins at the international price ratio P both countries would specialize in the production of both commodities and their production equilibria would converge on point E. As a result, the consumption level of A shifts upwards along the price line P at point G where it is tangent to the higher CL_3 curve.

Similarly, the consumption level of B shifts to higher level L where P is tangent to the CL₄ curve. Both points G and L show the pressure of higher demand for both commodities in the two countries. Trade between the two countries will be on the basis of trade triangles GED and ELH. Now country A exports DE of X for HE of Y of country B. Thus with increase in demand the capital-intensive country A exports the labor-intensive commodity X and the labor-intensive country B exports the capital-intensive commodity Y. This is the case of demand reversal which also explains the Leontief Paradox.

Transport Costs

The H.O. theory assumes zero or no transport costs. This is unrealistic because transport costs are important in their impact on the price of a traded commodity, its production and consumption and volume of trade in two trading countries. Transport costs include all expenses incurred in transporting a commodity from one country to another. They include loading, unloading and freight charges, insurance premium and interest costs. With the inclusion transport costs, a commodity will be traded only if the price difference between two countries before trade is more than the cost of transporting it.

Explanation

The effects of transport costs on these trading countries are explained with the help of fig.8.



The price of steel is measured vertically on a common axis O. Ouantities of steel produced and demanded in country A are measured to the left for this exporting country (X) and to the right steel importing (M). The demand and supply curves are shown by DA and SA for country A and DB and SB for country B. Before trade, each country produces the quantity at price determined by the intersection of respective demand and supply curves. It is OQA quantity at QAE price in A and OQB quantity at QBE in B. When trade begins A will export steel to B. As a result, the price rises in A and falls in B. For the market to clear under perfect competition there has to be same price in both the countries. It is shown by the horizontal lines P₅P₅. This line cuts DA and SA curves of country A and A_1 and A_2 and S_b and D_b curves at country B at B_1 and B_2 respectively. Country A produces OS_X , consumes OD_X and exports $d_x s_x$ while country B produces OS_m , imports $s_m d_m (= d_x s_x)$ and consumes $O d_m$.

When transport costs are introduced, the exporting country regards them as equivalent to a reduction in the price of steel by the amount of transport costs. On the other hand, the importing country regards them as an increase in the price by the amount of transport costs. This decrease and increase in the price of steel is on the previous trading price (P_5P_5 in the figure), so that the volume of trade is in equilibrium in the two countries. This occurs when the price P_4P_4 cuts D_A and S_A curves of country A at A_3 and A_4 points respectively. Country A produces Osx_1 , consumes Odx_1 , and exports $dx_1 - sx_1$. On the other side, in country B, the price line is P_6P_6 which cuts its SB and DB curves at B_3 and B_4 points respectively. Country B produces Osm_1 , imports $sm_1-dm_1(=dx_1-sx_1)$ and consumes Odm_1 .

In the above case, the transport costs are shared equally by each country because the slopes of D and S curves in the two countries are the same. If the slopes of the D and S curves of one country in relation to the D and S curves of the other country are drawn more steeply, the share of the transport costs will fall on the first country.

SUMMARY

As we know according to H-O theory: A capital-abundant country will export the capital-intensive good, while the labor-abundant country will export the labor-intensive good.

But due to H-O model's highly restrictive assumptions it fails to explain the impact of changes in other factors such as changes in factor endowments, tastes, transport costs, technology, etc.

Thus friends we have seen in today's session that changes in factor endowments, differing tastes, transport costs, technology etc. do have an impact on output, volume of trade, income, employment, terms of trade and gains from trade between the two trading countries.