**[Academic Script]**
**[International Trade Theory (Part-2)]**

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| **Lecture No. & Title:** | 2(Two):<br>International Trade Theory<br>(Part-2) |

## International Trade Theory (Part-2)

- **Opportunity Cost Theory**
- **Production Possibility curve with opportunity costs and relative commodity price**
- **The Basis for Gains from Trade under Constant Costs**
- **Production Possibility Curve with Increasing Costs**
- **Community Indifference Curves**
- **Equilibrium in Isolation**

## INTRODUCTION:

Ricardo's theory of comparative cost is based upon labor value. Ricardo measures cost of production in terms of labor hours used in the production of a commodity. It is very difficult to measure the cost in labor hours because labor is quite heterogeneous. Ricardo's theory exhibits that the price of a commodity depends on the amount of labor used in the production of that commodity. It means that labor is the only factor of production and it is assumed as homogeneous. Both the implications are impractical. The problem of this theory is, firstly, labor is not the only factor of production to produce the commodity. The production of different commodities requires various combinations of different factors of production. Secondly, If labor is homogeneous, wage rate is equal for all the laborers. But labor is heterogeneous and the wages of all laborers do not tend to be equal in the nation. To overcome this problem Haberler, in 1936, has developed the concept of opportunity cost to explain the theory of international trade.

## OPPORTUNITY COST THEORY:

Haberler has developed this theory to overcome the labor theory of value of international trade. He used opportunity cost to explain comparative cost difference instead of labor value. This theory is also known as neo-classical theory of international trade. No assumption is made here that labor is the only factor of production or labor is homogeneous. This theory explains that relative prices of different commodities are determined by the overall cost differential. Here cost is not measured in terms of labor value.

### Meaning of Opportunity Cost:

**The opportunity cost of a commodity is the amount of a second commodity that must be give up to release just enough resources to produce one additional unit of first commodity.**

Thus, opportunity cost measures the ratio of marginal cost of the two commodities.

**E.g.** If India must give up 5 units of cloth to free sufficient labor to produce an additional unit of wheat, then opportunity cost of wheat is 5 units of cloth.

We assume that there are two countries: India and Japan and two commodities: Wheat and Cloth. Both nations can produce both commodities.

Consider Table-1:

| Table-1: Opportunity Cost Theory of International Trade | | |
|---|---|---|
| Countries | Commodities (Units) | |
| | Wheat | Cloth |
| India | 3 | 2 |
| Japan | 1 | 2 |

**India**:

India can produce 3 units of wheat and 2 units of cloth with available resources.

**The opportunity cost of wheat also known as domestic exchange ratio is:**

3W = 2C

W = 2/3C

W= 0.66C

It means that the opportunity cost of wheat is two-thirds of a unit of cloth in India.

**The opportunity cost of cloth is:**

2C = 3W

C=3/2 W

C= 1.5W

It means that the opportunity cost of cloth is 1.5 units of wheat in India.

**Japan:**

Japan can produce 1 unit of wheat and 2 units of cloth with available resources.

**The opportunity cost of wheat is:**

1W = 2C

It means that the opportunity cost of wheat is twice of a unit of cloth in Japan.

**The opportunity cost of cloth is:**

2C = 1W

C= ½ W

It means that the opportunity cost of cloth is half of a unit of wheat in Japan.

Table-2 shows the whole analysis in terms of opportunity costs.

**Table-2: Opportunity Cost Theory of International Trade**

| Countries | Opportunity Cost | |
|---|---|---|
| | **Wheat** | **Cloth** |
| **India** | 0.6 | 1.5 |
| **Japan** | 2.0 | 0.5 |

**(1)** The opportunity cost of wheat is 0.6 and 2.0 units of cloth in India and Japan respectively. It means that opportunity cost of wheat is lower in India than Japan. Therefore, India would have a comparative cost advantage in the production of wheat.

**(2)** The opportunity cost of cloth 1.5 and 0.5 units of wheat in India and Japan respectively. It means that opportunity cost of cloth is lower in Japan than India. Therefore, Japan would have a comparative cost advantage in the production of cloth.

**(3) A Nation will specialize in the production of the commodity in which opportunity cost is relatively lower. Here, it is beneficial for India to specialize in wheat and for Japan to specialize in cloth.**

## OPPORTUNITY COST AND PRODUCTION POSSIBILITY FRONTIER:

Opportunity cost can be explained with the help of production possibility frontier. This curve is also known as transformation curve.

**Definition:** **Production Possibility Frontier is a locus of various combinations of two commodities that can be produced by a nation with a given amount of resources and technology. Here it is assumed that all resources are fully utilized.**

Table-3 gives the production possibility schedule of wheat and cloth in India and Japan.

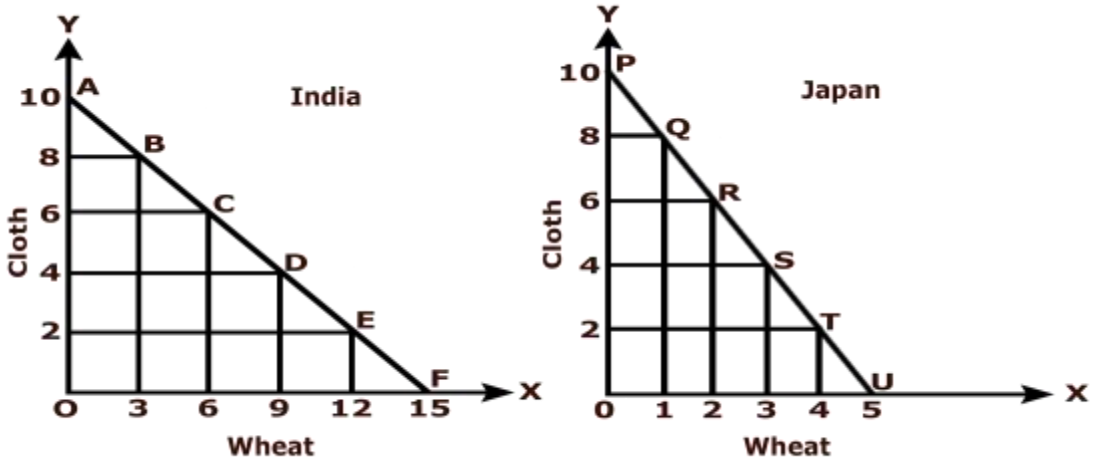
**Table-3: Production Possibility Schedule**

**(Units)**

| India | | Japan | |
|---|---|---|---|
| **Wheat** | **Cloth** | **Wheat** | **Cloth** |
| 15 | 0 | 5 | 0 |
| 12 | 2 | 4 | 2 |
| 9 | 4 | 3 | 4 |
| 6 | 6 | 2 | 6 |
| 3 | 8 | 1 | 8 |
| 0 | 10 | 0 | 10 |

The diagram of Production Possibility Frontier can be drawn from its schedule.

**Figure 1: Production Possibility Frontier of constant opportunity cost**




Wheat is measured on Y-axis and cloth is measured on X-axis.

**(1)** Each point on Production Frontier shows the various combinations of cloth and wheat produced by India and Japan. Suppose, at point C India can produce 6 units of cloth and 6 units of wheat. Similarly, at point R Japan can produce 6 units of cloth and 2 units of wheat.

**(2)** Do remember that points inside the production possibility frontier are possible but they are inefficient. If nation produces inside the production possibility frontier then we can say that resources are not fully utilized. Nation is not using its technology in an efficient manner.

**(3)** In the same way, points outside the production possibility frontier are not possible because nation cannot produce at that point due to technology or factors constraint.

**(4)** Production Possibility Frontiers of both nations have negative slope. It means that if nations want to produce on more unit of one commodity they have to reduce the production of another commodity. In other words, production of both commodities cannot increase together.

**(5)** The Production Possibility Frontiers of both nations are straight lines because opportunity costs are assumed to be constant. India needs to release 2/3 units of cloth to produce one more unit of wheat. It is constant throughout the frontier. Similarly, Japan needs to release 2 units of cloth to produce one more unit of wheat.

**(6)** The absolute slope of India's production possibility frontier is 10/15 = 2/3 i.e. India's opportunity cost of wheat in terms of cloth. Similarly, the absolute slope of Japan's production possibility frontier is 10/5 = 2 i.e. Japan's opportunity cost of wheat in terms of clothing.

**(7)** India's opportunity cost is lower than that of the Japan's. This is shown by the slope of the production possibility frontier of both nations. Production possibility frontier of India is flatter than the Japan's production possibility frontier.

## OPPORTUNITY COST AND RELATIVE COMMODITY PRICES:

The slope of the production possibility frontier is known as Marginal Rate of Transformation (MRT).

**(1)** The absolute slope of India's production possibility frontier is 2/3 i.e. India's opportunity cost of wheat in terms of cloth. Similarly, the absolute slope of Japan's production possibility frontier is 2 i.e. Japan's opportunity cost of wheat in terms of clothing.

**(2)** The opportunity cost of wheat is equal to the price of wheat relative to the price of cloth i.e. $P_w / P_c$. Similarly, the opportunity cost of cloth is equal to the price of cloth relative to the price of wheat i.e. $P_c / P_w$.

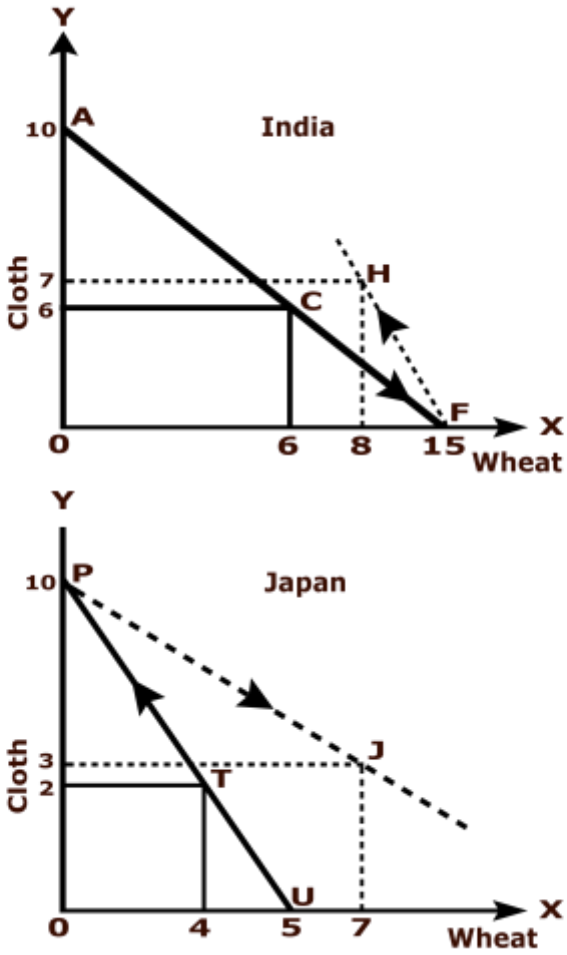
**(3)** Opportunity cost of wheat in India is 2/3. Therefore $P_W / P_C$ = 2/3 in India. Similarly, the opportunity cost of cloth in India is 1.5. Therefore, $P_c / P_w$ =1.5. It shows that the relative price of wheat is lower than the relative price of cloth in India. Hence, India has a comparative advantage in production of wheat.

**(4)** Opportunity cost of wheat in Japan is 2. Therefore $P_W / P_C$ = 2 in Japan. Similarly, the opportunity cost of cloth in Japan is 0.5. Therefore, $P_c / P_w$ =0.5. It shows that the relative price of cloth is lower than the relative price of wheat in Japan. Hence, Japan has a comparative advantage in production of cloth.

## THE BASIS FOR AND THE GAINS FROM TRADE UNDER CONSTANT COSTS:

In the absence of trade production possibility frontier also represents consumption frontier because a nation can only consume the commodities that it produces. It means that production and consumption are equal in the absence of trade. In the absence of trade no nation will specialize because they want to consume both commodities. Consider Figure-2.

Figure 2: the Gains from Trade




## Autarky Situation:

**(1)** Suppose India chooses to produce and consume at point C i.e. 6 units of wheat and 6 units of cloth.

**(2)** Suppose Japan chooses to produce and consume at point T i.e. 4 units wheat and 2 units of cloth.

**With Trade:**

**(3)** India will specialize in wheat after having trade with Japan and produces at point F i.e. 15 units of wheat.

**(4)** Japan will specialize in cloth after having trade with India and produces at point P i.e. 10 units of cloth.

**(5)** Now we assume that India exchanges 7 units of wheat for 7 units of cloth with Japan.

**(6)** In this situation India will produce at point F i.e. 15 units of wheat and consume at point H i.e. 8 units of wheat and 7 units of cloth. Thus, India gains 2 units of wheat and 1 unit of cloth from trade.

**(7)** Similarly, Japan will produce at point P i.e. 10 units of cloth and consume at point J i.e. 7 units of wheat and 3 units of cloth. Thus, Japan gains 3 units of wheat and 1 unit of cloth from trade.

**(8)** The international production has also increased after having trade with each other. The total production of wheat in the absence of trade is 6 units in India + 4 units in Japan =10 units. After trade, total production of wheat is 15 units. Similarly, the total production of cloth in the absence of trade is 6 units in India + 2 units in Japan = 8 units. After trade, total production of cloth is 10 units.

## The Production Possibility Frontier with Increasing Costs:

The constant opportunity costs imply that opportunity cost of a commodity does not change. In this situation, production possibility frontier is linear with a constant slope. Neo-classical economists do not agree with the constant opportunity cost theory. Constant opportunity costs often lead to complete specialization. In our example, India will specialize in wheat and Japan will specialize in cloth. But this is highly impractical. Increasing opportunity costs are more realistic than constant opportunity costs.

### Increasing opportunity Costs:

**Increasing opportunity costs means that the nation must give up more and more of one commodity to release just enough resources to produce one more unit of another commodity.**

In case of increasing opportunity costs production possibility frontier is concave to the origin.

### The reasons of increasing opportunity costs:

**(1)** The factors of production are product specific.
**(2)** Factors of production are not homogeneous.
**(3)** All industries do not use factors of production in fixed proportions.

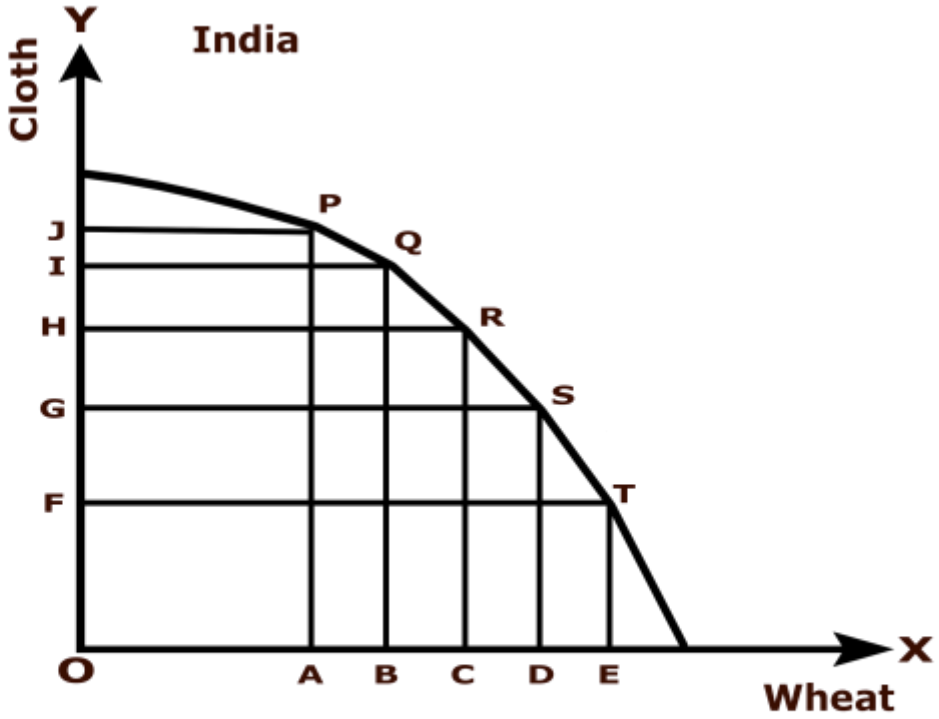
We assume:

**Two nations: India and Japan**

**Two commodities: Wheat and Cloth**

Figure-3 shows the production possibility frontiers of India and Japan with increasing opportunity costs.

**Figure 3: Production Possibility Frontier with Increasing Opportunity Costs**




Wheat is measured on X-axis and cloth is measured on Y-axis.

Suppose India wants to produce more of wheat.

**(1)** Let us assume that India starts from point P on its production possibility frontier.

**(2)** Since point P is on production possibility frontier all the resources are fully utilized.

**(3)** If India wants to produce more of wheat, it has to reduce the production of cloth. The production possibility frontier is concave from the origin which exhibits that India has to give up more and more unit of cloths to produce an additional unit of wheat.

**(4)** Marginal rate of transformation is increasing in case of increasing opportunity costs. As we move from point P to T, marginal rate of transformation increases.

## Community Indifference Curve:

The Ricardian theory deals with supply side only. It does not consider the demand side. Now we introduce the demand side of the theory through consumers' preferences. The preferences of the consumers can be explained through indifference curve.

### Community Indifference curve:

**It shows the various combinations of two commodities that give equal level of utility to the nation.**

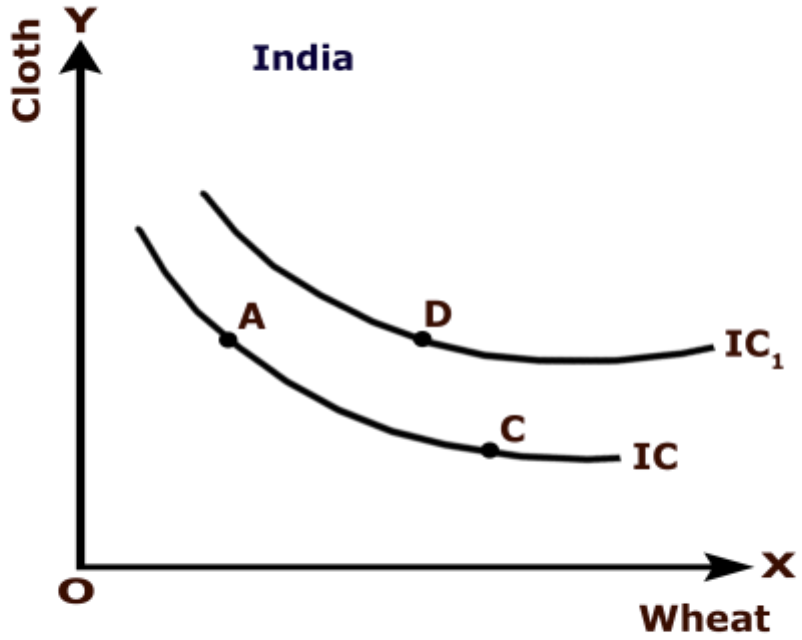
**The slope of the indifference curve is Marginal Rate of Substitution (MRS). It shows the amount of one commodity that a nation could give up for an extra unit of another commodity.**

The indifference curve of India is depicted in the Figure.

We measure wheat on X-axis and cloth on Y-axis.

**(1)** IC is the indifference curve of India. It shows the various combinations of wheat and cloth that give the equal utility to the consumers. Points A and C give the same level of satisfaction because they are on the same indifference curve. The movement from A to C shows that India now consumes more of wheat than cloth.

Figure 4: Community Indifference Curves




**(2)** It is a downward sloping curve, which indicates that there is a scarcity problem.

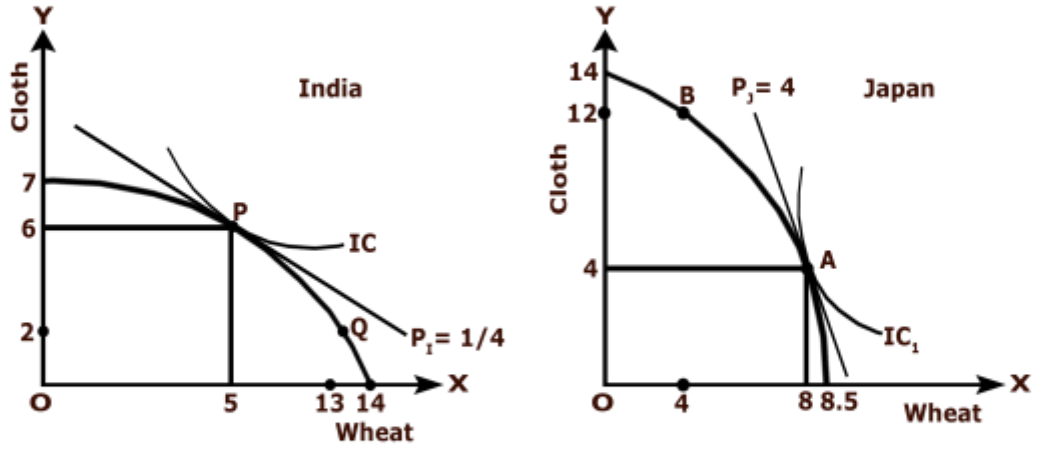
**(3)** The indifference curve is convex to the origin. The convexity of indifference curve explains the diminishing marginal rate of substitution.

**(4)** If India moves from IC to $IC_1$ the level of utility will increase. Therefore, we can say that, higher the indifference curve, higher the level of satisfaction.

## Equilibrium in Isolation:

In the absence of trade, nation wants to achieve higher indifference curve. A nation is in equilibrium when it reaches the highest indifference curve with given production technology. Consider Figure-5:

**Figure 5: Equilibrium in Isolation**




Wheat is measured on X-axis and cloth is measured on Y-axis.

### India:

**(1)** India is in equilibrium at point P where its highest possible indifference curve IC is tangent to its production possibility frontier.

**(2)** We can say that India produces and consumes at point P.

**(3)** The equilibrium relative price of wheat is given by the slope of the common tangent to its production possibility frontier and indifference curve IC at point P i.e. $P_I = ¼$.

**Japan:**

**(4)** Japan is in equilibrium at point A where its highest possible indifference curve $IC_1$ is tangent to its production possibility frontier.

**(5)** We can say that Japan produces and consumes at point A.

**(6)** The equilibrium relative price of wheat is given by the slope of the common tangent to its production possibility frontier and indifference curve $IC_1$ at point P i.e. $P_J = 4$.

Here, the relative price of wheat is lower in India than that of Japan. Therefore, India has a comparative advantage in production of wheat and Japan has a comparative advantage in production of cloth.

**Summary:**

Comparative cost advantage theory can be explained with the help of opportunity cost theory. Opportunity cost reflects forgone production of other commodities. A nation will specialize in the production the commodity in which opportunity cost is relatively lower. This theory does not assume the labor value as the cost of production. The opportunity cost is explained by production possibility frontier. The theory of constant opportunity costs is not useful in real world. Neo-classical economists have developed the theory of increasing opportunity costs.