

**Lecture 3] Production Possibility Frontier (PPF)**

**1. Opportunity Cost Theory (Gottfried Haberler, 1936)**

According to the opportunity cost theory, the cost of a good is the amount of a second good that must be given up to release just enough resources to produce one additional unit of the first good. No assumption is made here that labor is the only factor of production or that labor is homogeneous. Nor is it assumed that the cost or price of a commodity depends on or can be inferred exclusively from its labor contents. Consequently, the nation with the lower opportunity cost in the production of a commodity has a comparative advantage in that commodity.

**2. Production Possibility Frontier (PPF or PPC) under Constant Costs**

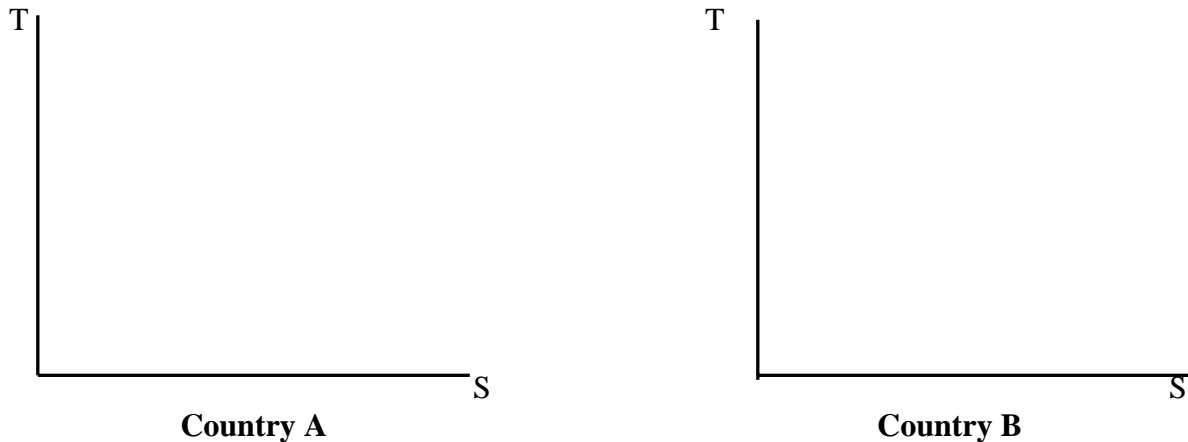
Opportunity cost can be illustrated with PPF (or transformation curve). PPF is a curve that shows the alternative combinations of the two commodities that a nation can produce by fully utilizing all of its resources with the best technology (efficiency).

		Country	
		A	B
Goods	Soybeans (S)	3	12
	Textiles (T)	6	8

Holding the same technology level in both of the countries, suppose A is endowed with enough workers so that in a given year, total hours worked would equal 12,000 hrs ( $L_A = 12,000$ ).

Therefore, the maximum amount of S in country A = ( ) and the maximum amount of T = ( ). Now, suppose country B is endowed with the workers so that in a given year, total hours worked is 9,600 hrs ( $L_B = 9,600$ ). Likewise, you can get the maximum S is ( ) and T is ( ).

Now, with the information, the country A's and B's PPFs are found by plotting these output levels on S and T axes.



Before we move any further, we have to ask why the PPF is a straight line. Can you answer this question?

In A, for every additional unit of S produced, the output of T must fall by ( ) unit(s). We should know this result. Of course, because the slope of A's PPF is ( ) in an absolute value, and it is A's pre-trade relative price  $P_S / P_T$ . Check that out!

(In microeconomics, you learned that under perfect competition,  $P = ( ) = ( )$ .) Summarizing what we have established so far, the autarky price of S is ( ) unit of T in country A, but ( ) units of T in country B. We found this out by graphing the PPFs for each country, using the labor requirements for the production of each commodity in the two countries and information on the size of each country's workforce.

If both countries live in autarky, competitive behavior will lead to general equilibrium solutions somewhere along each country's PPF.

### 3. Social Indifference Curve (SIC) (or Community Indifference Curve (CIC))

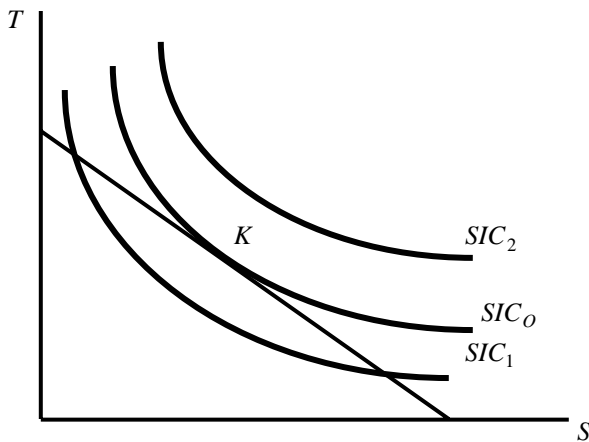
It's the core to accomplish trade equilibrium under certain terms of trade if the trade is allowed. But, Ricardo's Comparative Advantage Model cannot answer this question because it deals with only production sector. To explore the terms of trade, we need to know demand condition raised by John Stuart Mill (1844).

**Indifference curve (IC):** combination of the two goods that can give same level of satisfaction or utility

**Indifference Map:** Set of ICs

**Properties of IC:** (1) (2)  
(3) (4)

**SIC:** in international trade, we assume that there is indifference curve in a society that has above properties, which defines a combination of goods that gives same level of welfare to the entire society (we need to know individual demand and equity, distribution pattern. But it's impossible!). Assume, for convenience sake, that someone (government, political leader, or dictator) will distribute the goods to get the highest possible welfare as long as s/he is given the amounts of two goods.



At K, slope of  $SIC_0$  is equal to the slope of PPF.

$$MRS_{T,S} = -\frac{\Delta T}{\Delta S} = MRT_{T,S} = -\frac{P_S}{P_T}$$

The last expression means the relative price or price ratio.

What would happen to the general equilibrium solution for each country if the two were allowed to trade internationally? Let's consider the forces at work. We know that the autarky price of S is lower in A than in B, while autarky price of T is lower in B than in A. Can these price differentials continue to exist after we allow for trade? Given our assumptions, the answer is No. In particular, since there are no barriers to trade (free trade assumption!), the demand for S will go ( ) in A and go ( ) in B. As this happens, the relative price of S will begin to ( ) in A and ( ) in B. Thus, the relative price of  $P_S / P_T$  will continue to move until a new equilibrium is reached (*international trade equilibrium*).

Now, what are the characteristics of this equilibrium?

- (1) Only one world price (*terms of trade*)
- (2) Free trade leads each country to specialize completely in the production of its comparative-advantage good. So, production with a lower autarky price will expand because the country has a comparative advantage in that product.

**Now, how can we determine "terms of trade"?**

We want to use the previous numeric example for countries A and B. Due to the space problem, please use your note pad in drawing the three diagrams.