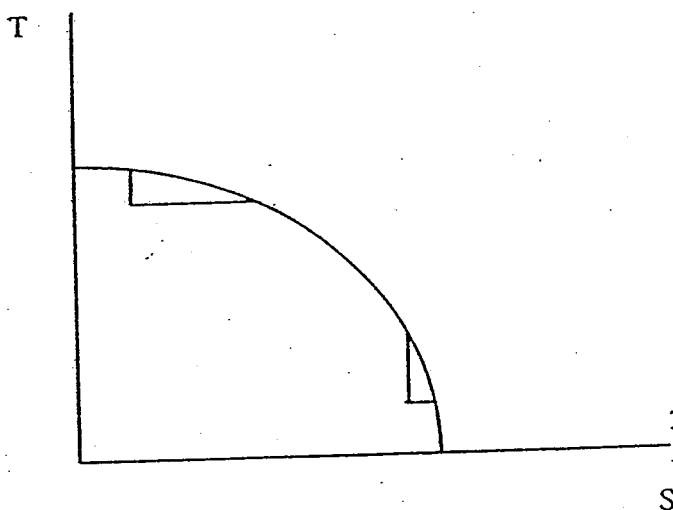


Patterns of Trade in H-O model. (The H-O Theorem)

1.) Construct a ppf for a country.

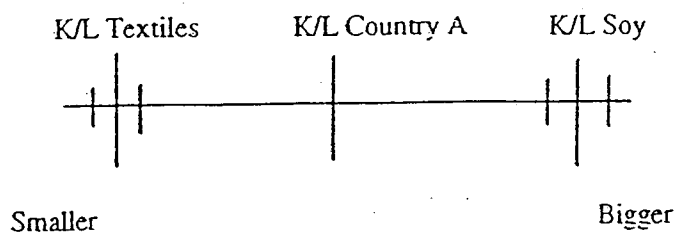
It will look like this:



Why the increasing opportunity cost shape?

Let's think about this.

A nice motivating picture of the H-O model is the following.



Think of the big lines as the preferred capital-labor ratios for each industry. The middle line represents the capital labor ratio for the country.

The industries don't have to operate at the preferred levels, but their productivity drops off fast as they move away from these points.

(Think about soy - 1 tractor/ 1 farmer. If we add more farmers or tractors the efficiency of the industry will start to fall off.)

Now think about the ppf. As we push the economy toward the production of just soy it is forced to produce at the capital labor ratio of the whole country. Producing additional units of soy is possible, but very inefficient. If the economy as a whole has a low capital labor ratio, then the soy industry will be forced to move toward that capital labor ratio.

This may give us the situation with 9 people/ tractor.

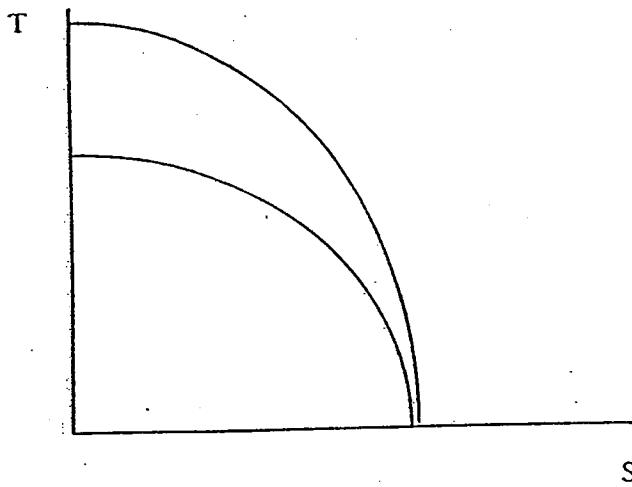
So the last units of soy will probably be very costly in terms of textiles given up.

The same thing will happen for textiles. As we move toward that all textile output the efficiency of the economy will be getting very low.

This leads to the shape of increasing opportunity costs.

2.) Two different countries

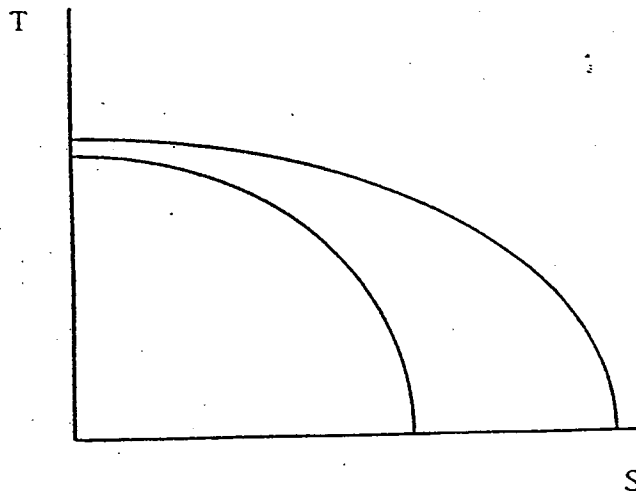
Think about the impact of the following experiment. Increase the amount of labor in country A. How does this effect the PPF?



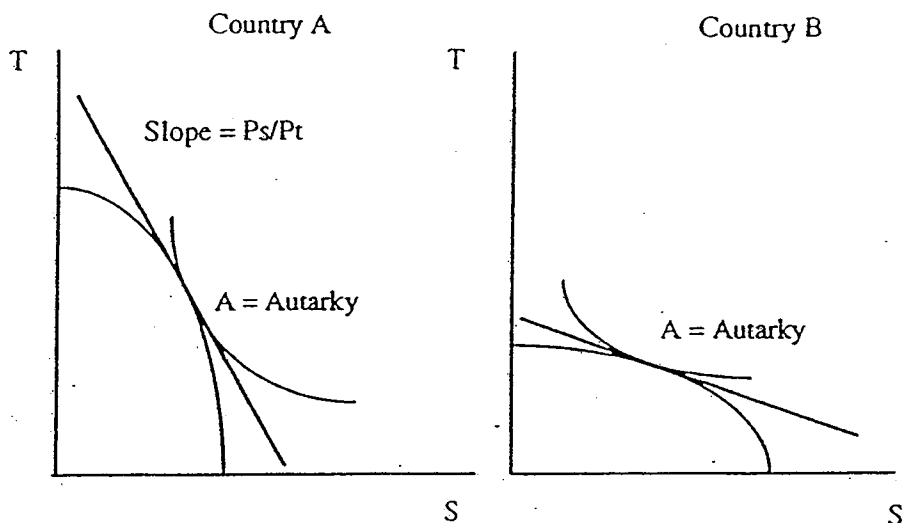
The ppf will shift out as we give the economy more factors of production, but the shift will be skewed toward the good which uses labor more intensively in production. (In this case that is textiles.)

Think about why this happens. Adding additional labor allows expansion of the production of textiles at the points which are close to the extreme of all textile production. At all S production where there is already too much labor around, adding more labor doesn't help very much in increasing S output.

We can do the same thing with capital. Adding capital helps out soy production a lot, but it doesn't do much good for the labor intensive textiles industry.

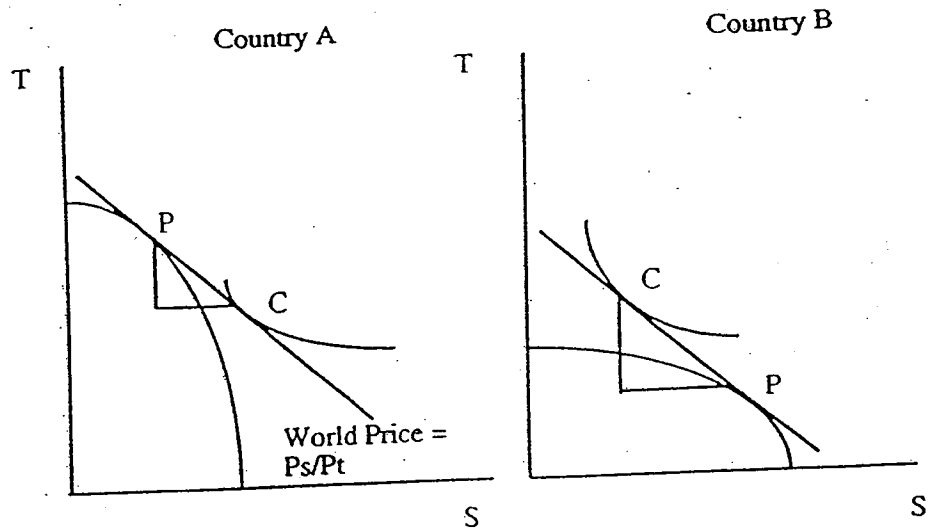


Now think about two countries (A and B) where B is relatively capital abundant, and A is labor abundant. The countries are close to the same size and have the same tastes.



In autarky (no trade) both countries are at points like A. The price of soy relative to textiles is lower in country B. This makes sense since A is relatively labor abundant and is better at producing the labor intensive good, textiles.

Now let's think about trade between the two countries. What happens when they open up to trade with each other.



In country A:

- 1.) Production shifts toward textiles production.
- 2.) Export textiles and import soy.
- 3.) PS/PT falls relative to autarky. (Soy gets cheaper now that they can buy from country B.)
- 4.) As the economy moves toward textile specialization wages (W) rise, and rentals (R) fall. The factor labor is better off, but the factor capital is worse off.

In country B:

- 1.) Production shifts toward soy production.
- 2.) Export soy and import textiles.
- 3.) PS/PT rises relative to autarky. (Textiles get cheaper now that they can buy from country A.)
- 4.) As the economy moves toward soy specialization wages (W) fall, and rentals (R) rise. The factor capital is better off, but the factor labor is worse off.

This picture of trade demonstrates several key parts of the H-O framework.

The HO Theorem:

Countries will export goods which intensively use the factors in which the country is abundant.

This is clear from the above example. Country A exports textiles and it has an abundance of labor.

Incomplete Specialization:

Unlike the Ricardian model, countries will often end up producing some of both goods after trade takes place. This comes from the increasing opportunity cost structure of the ppfs. (It would be very costly in terms of given up soy, for country A to move to complete textile specialization.)

Stolper-Samuelson Theorem:

Free trade benefits abundant factor, and hurts the scarce factor.

In this example it is clear that for both countries the abundant factor was helped by free trade and scarce factor is made worse off.

During the adjustment from autarky to free trade,

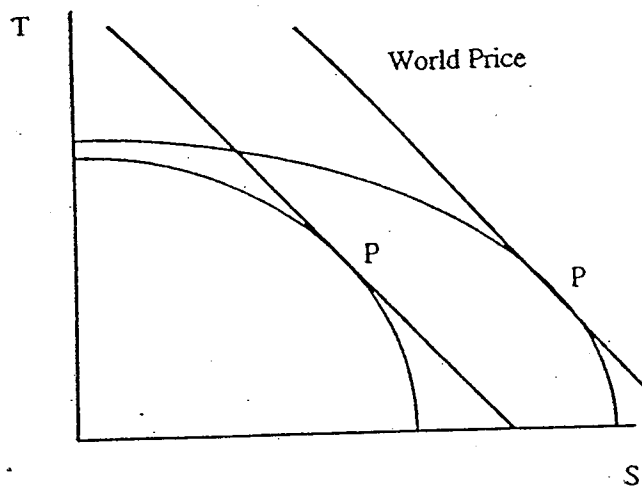
Country A will see w rising and R falling
Country B will see w falling and R rising

This can be thought of more generally. A factor is paid well because it is hard to find. Opening to trade exposes a country to countries where that factor is relatively abundant. This makes it scarcity less important. Even though there is no trade in factors importing the good that uses this relatively scarce factor is very similar to importing the factor itself.

For example: When country A imports soy from country B it is almost equivalent to importing capital.

Rybczynski Theorem:

At constant world prices when a country experiences growth in one factor it will produce more of the product that uses that factor intensively, and less of the other.



This economy has increased its capital stock. As it does so it increases output in the capital intensive good, soy, and actually reduces output in the labor intensive good, textiles.

The final theorem is the most difficult, and we will only go through a short proof. The implications of this theorem are very strong, so it is important to think about it.

Factor Price Equalization Theorem

Under free trade and all of the H-O assumptions factor prices will be equalized across countries.

This is a very strong proposition. It says that all the factor prices will eventually be equal. Wages and Rentals will be the same in all countries. This just doesn't make sense empirically, but it is an implication of the model.

Let's try to get some intuition about why this works. The primary driving force behind factor price equalization is the assumption that technology is the same everywhere.

Before trade country A will have a lower wage than country B, and it will have a higher rental rate than country B. (Remember that capital is scarce and labor is plentiful in country A.)

After opening to trade the wage in A rises, and falls in B, driving them toward each other.

Also, the rental in A will fall, and the rental in B will rise, driving them toward each other.

Factor price equalization says that this adjustment will continue until the prices are equal.

What happens if it stops with the wage in country A slightly lower than the wage in country B, and the rental in A slightly higher than in B?

Competition will continue to drive them together. Since we have free trade and perfect competition:

$$Costs_T(\text{country A}) = P_T = Costs_T(\text{country B})$$

$$Costs_S(\text{country A}) = P_S = Costs_S(\text{country B})$$

If

$$W_A < W_B, R_A > R_B$$

Then the cost of producing T (labor intensive) will be less in the low wage country(A). Textile production will increase there and decrease in country B until the factor prices are equalized.

Also, the cost of producing S (capital intensive) will be less in the low rental country(B). Textile production will increase there and decrease in country B until the factor prices are equalized.

This is not a formal proof and there are still some loose ends that would have to be tied up, but it gives the general intuition.

Summary and Policy thoughts on HO:

1.) Patterns of Trade

Driven by factor endowments. Seems sensible. We'll look at tests of this implication later. Probably could be extended to more factors pretty easily.

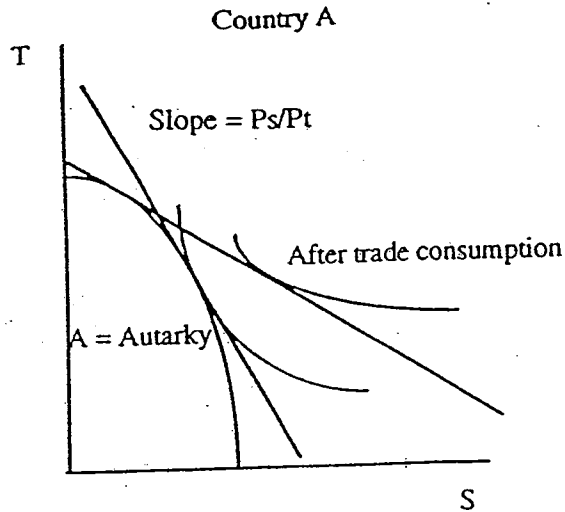
Warning: Trade is driven by differences in factor endowments. Trade will not occur between similar countries in this model. (US - Canada)

2.) Specialization

Countries will continue to produce many different goods, but will export those in which they have comparative advantage. Sensible.

3.) Factor payments, gains from trade, and policy

Factors will not be made uniformly better off when opening to free trade. Some will be better off some worse off. In general, the country as a whole will be better off. In the picture below there would be more of both goods in the country after free trade. This means that everyone could be made better off. There is a possible redistribution scheme that will help every one out. (Transfer from labor -> capital.) Whether the economy can find this scheme is a good question.



Another interesting policy question concerns who is lobbying for what policy. Let's think about opening to free trade for the U.S. (capital abundant) with Mexico (labor abundant). The H-O theorem predicts a complete alignment of factors.

Labor: against free trade
 Capital: for free trade

In the free trade debate during NAFTA organized labor was fairly well aligned against NAFTA, but some workers favored it.

Capital owners (firm owners) were very divided over it. Some favoring and some against.

H-O predicts more general agreement about public policy than we actually observe. (See extensions.)

Extensions and repairs:

- 1.) More factors
- 2.) Fixed factors - Labor mobile, capital fixed (changes slowly)