

MICROECONOMICS AND POLICY ANALYSIS - U8213
 Professor Rajeev H. Dehejia
 Class Notes - Spring 2001

Trade

Mon, January 29th, Wed, January 31st, and Mon, Feb 5th, 2001

Reading: PR Chapter 16.5, Krugman/Obstfeld, Bhagwati

International Trade - The Ricardian Model of Comparative Advantage

Simple model. Assumes labor is the only input, two goods, and two countries

Assumes fixed proportion technology - it takes a fixed amount of labor to produce one unit of output, also known as the **unit labor requirement**. The unit labor requirement for a home and foreign country are outlined in the following table for the production of cheese and wine.

	Cheese	Wine
Home	$a_{LC} = 1$	$a_{LW} = 2$
Foreign	$a_{LC}^* = 6$	$a_{LW}^* = 3$

It takes one unit of labor for the home country to produce one unit of cheese.

It takes 6 units of labor for the foreign country to produce one unit of cheese

- The foreign country is less efficient than the home country since their unit labor requirements are higher. This is because their technology is less efficient.
- The home country has an **absolute advantage** in the production of both goods. The country that has the lowest unit labor requirements has the absolute advantage. Therefore, in the production of cheese, it takes the home country
- However, to determine which good each country should specialize in depends on which country has the **comparative advantage**. Country A has a comparative advantage over Country B in producing a good if the cost of producing that good in Country A, relative to the costs of producing other goods in A, is lower than the cost of producing that good in B relative to the cost of producing other goods in B (Pindyck and Rubinfeld, p.585). In other words, which country has lower **opportunity costs**?

Ex:

Home country takes 2 units of labor from wine (gives up 1 wine) and makes 2 cheeses.

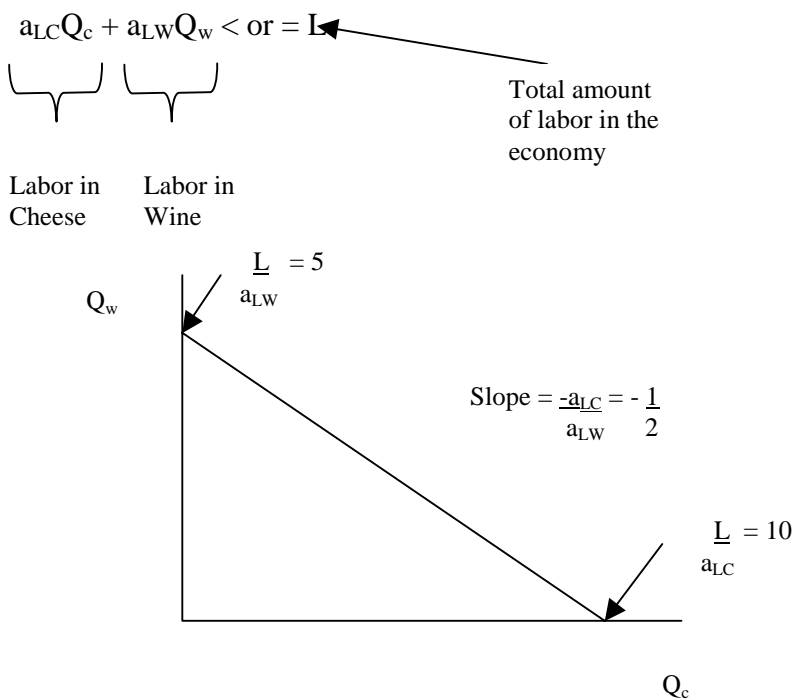
Foreign country takes 12 units of labor from cheese (giving up 2 cheeses) to make 4 wines.

This increases the global production of output. More wine has been produced. There are a variety of transactions that would be mutually beneficial. Here, the home country is indifferent and the foreign country is happier with trade.

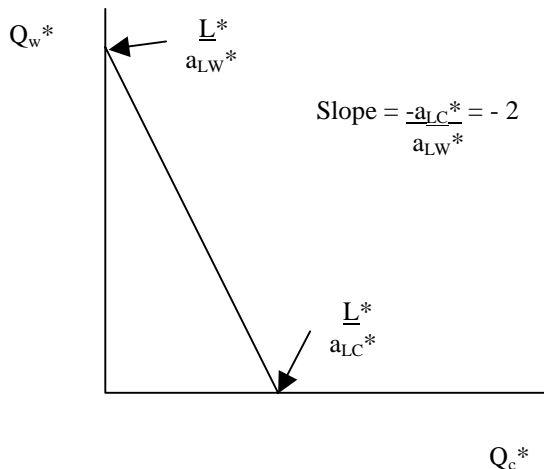
To reiterate: The absolute advantage is not relative. The ratio of the Unit Labor Requirements represents the opportunity cost of producing one good and is the key issue in trade.

Ricardian Model and the Production Possibility Frontier (PPF)

PPF for home country:

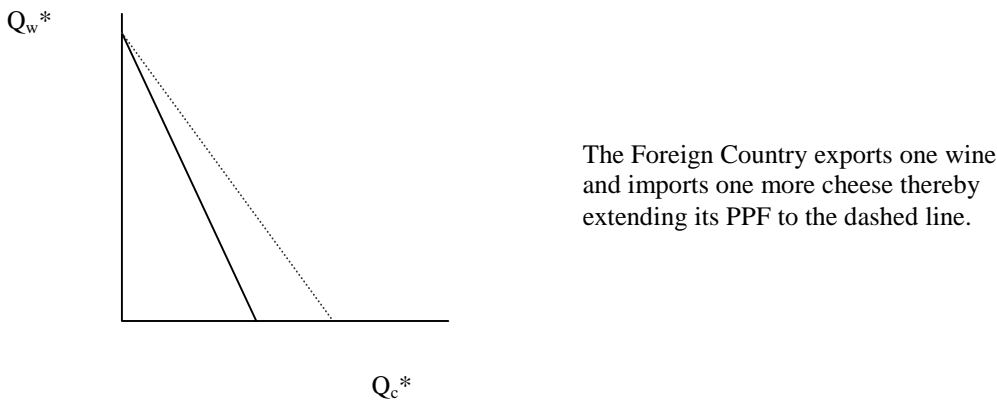
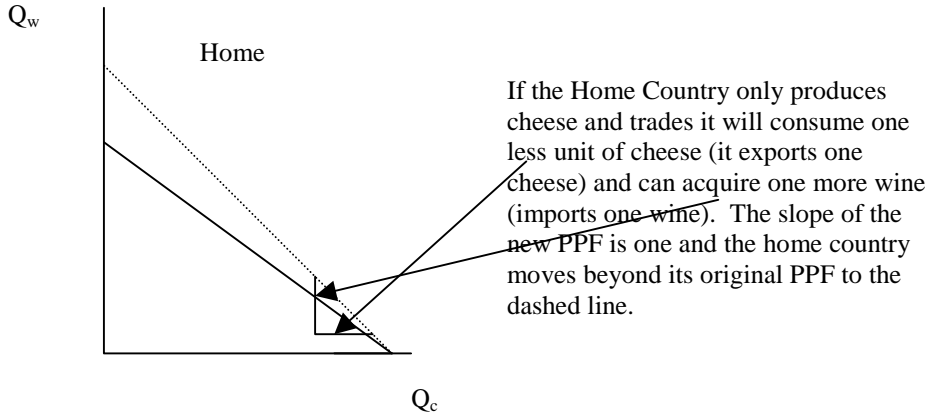


PPF for Foreign Country

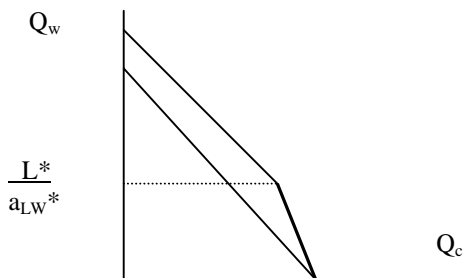


Because of the different slopes of the PPF's there are benefits to trade in this model. If the home country produces only cheese and gets wine from the foreign country the foreign country would be willing to give at most 2 units of wine. With trade the consumption possibilities increase. Trade leads to specialization in the good at which they are better at producing.

There exists a price between 1/2 and 2 at which the two countries can trade and be better off. If the price is equal to 2 then there is no benefit to the home country trading BUT the home country could still increase consumption possibilities and will want to trade.



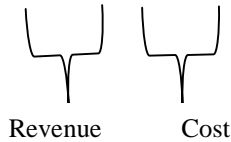
The consumption possibilities are different from production possibilities. Production sets depend on the size of the economy. The home country can only import up to the maximum produced in the foreign economy.



Implications of the Ricardian Model - Wage Rates

Assumption: No Profit - Competitive Economy

$$\text{Profit}_c = Q_c * P_c - w * a_{LC} * Q_c = 0$$



$$P_c = w_c * a_{LC}$$

$$W_c = \frac{P_c}{a_{LC}} \quad \left. \vphantom{\frac{P_c}{a_{LC}}} \right\} \begin{array}{l} \text{Must hold} \\ \text{with zero} \\ \text{profit} \end{array}$$

$$P_w = w_w * a_{wC}$$

$$W_w = \frac{P_w}{a_{LW}}$$

Now... Assume a Closed Economy (Antarky - no trade)

The wage rate must be the same in the two industries:

$$W_c = \frac{P_c}{a_{LC}} = \frac{P_w}{a_{LW}} = W_w$$

$$\frac{P_c}{P_w} = \frac{a_{LC}}{a_{LW}} \quad \leftarrow \text{Relative Prices Adjust so that we get the same wage in the two industries (for a Antarky - no trade).}$$

Now... With Trade:

P_c and P_w are fixed by trade. In other words, $\frac{P_c}{P_w}$ is given by the world market.

Now, the home country will not necessarily produce both the goods:

$$\text{If } W_c > W_w \text{ or } W_c = \frac{P_c}{a_{LC}} > \frac{P_w}{a_{LW}} = W_w$$

$$\text{or } \frac{P_c}{P_w} > \frac{a_{LC}}{a_{LW}} \quad (\text{the relative price of cheese} > \text{relative cost of cheese production})$$

Then the home country will specialize in producing cheese.

If $\frac{a_{LC}}{a_{LW}} < \frac{P_c}{P_w} < \frac{a_{LC}^*}{a_{LW}^*}$, meaning the price ratio is between the two costs then the home country will produce cheese and the foreign country will produce wine. This is perfect specialization. You will produce the good in which you have the comparative advantage.

Relative wages in the home and foreign country:

The wage rates in the two countries are not necessarily the same.

Home specializes in cheese

Foreign specializes in wine

$$W = \frac{P_c}{a_{LC}}$$

$$W^* = \frac{P_w}{a_{LW}^*}$$

$$\frac{W}{W^*} = \frac{P_c}{P_w} * \frac{a_{LW}}{a_{LC}}$$

If $\frac{a_{LC}}{a_{LW}} = \frac{1}{2}$ and $\frac{a_{LC}^*}{a_{LW}^*} = 2$ and $\frac{P_c}{P_w} = 1$

then $\frac{W}{W^*} = \frac{a_{LW}}{a_{LC}} = 3$

← This means the home wage is three times as high as the foreign wage. Even though the price of goods is the same this doesn't mean the wage has to be the same. The wage rate depends on whose labor is more productive. Here, the home country is more productive, therefore the wage is higher. Trading can benefit both weak and strong countries.

The limitations to this model are that the interests are assumed to be homogeneous (everyone has the same interests) and there is only one wage rate.

Heckscher-Ohlin Model of International Trade

Two goods (food and cloth) and two inputs (land and labor). Fixed proportions technology.

- a_{TC} a_{LC} Unit land and labor requirements in cloth production
- a_{TF} a_{LF} Unit land and labor requirements in food production

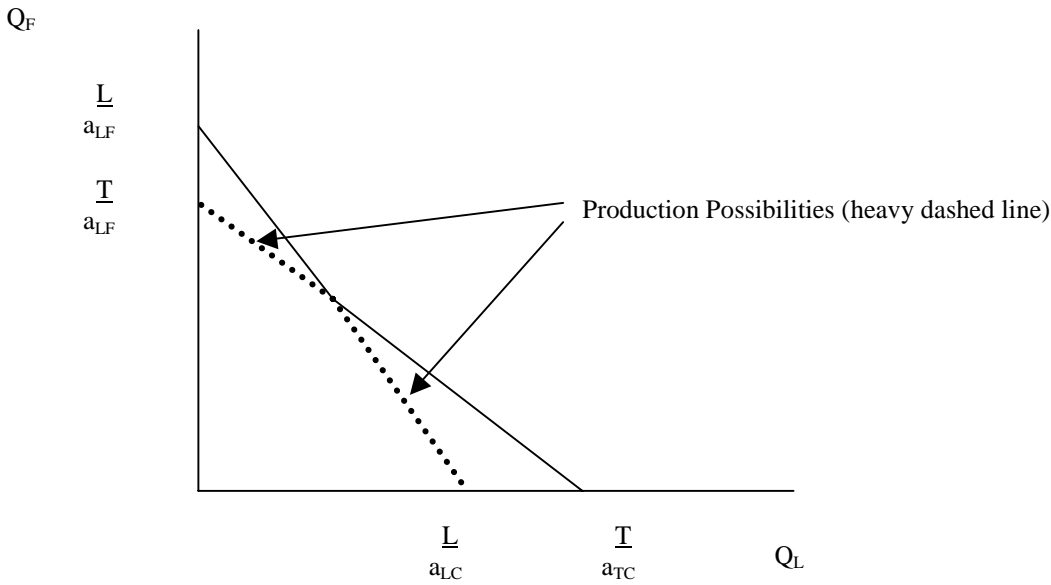
$\frac{a_{LC}}{a_{TC}} > \frac{a_{LF}}{a_{TF}}$ Cloth is labor intensive. It takes more labor to produce a unit of cloth

$$a_{LC} * Q_c + a_{LF} * Q_F < \text{or} = L$$
 Labor use:

 Labor in Cheese Labor in Food Total Labor in Economy

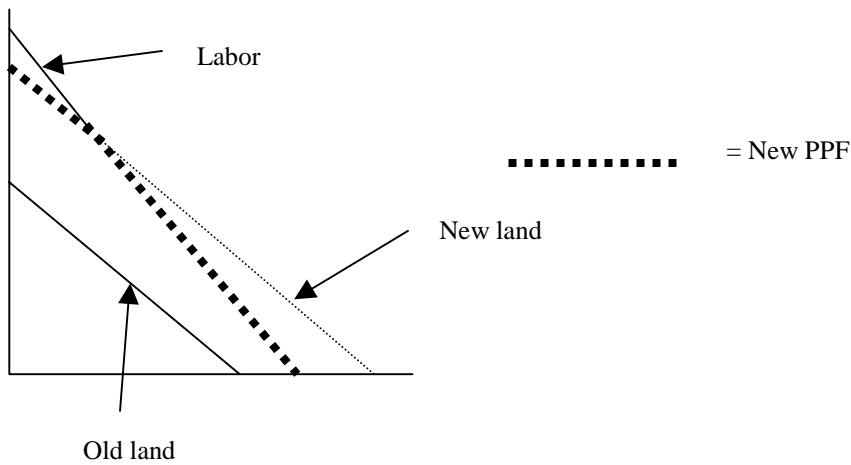
$$a_{TC} * Q_c + a_{TF} * Q_F < \text{or} = L$$
 Land use:

 Land in Cheese Land in Food Total Land available



Implications:

What happens to the economy when the supply of one of the inputs increases? If we increase the amount of land available the land frontier shifts out shifting the PPF proportionately greater in food because food is a labor intensive good.



What happens when there is a change in the price of goods? What happens when the price of clothing increases?

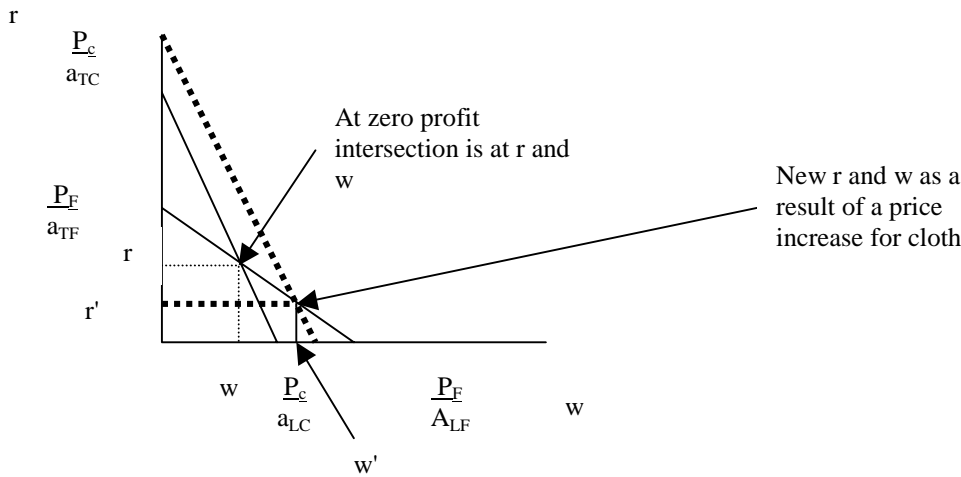
With the zero profit condition and the prices and technology given:

$$\text{Profit} = P_c * O_c - a_{LC} * w * Q_c - a_{TC} * r * O_c = 0$$

r is the rental rate of capital/value of land
 w is the wage rate of labor

Price of clothing $P_c = a_{LC} * w + a_{TC} * r$

Price of food $P_F = a_{LF} * w + a_{TF} * r$



Factor Price Equalization Theorem: If there is trade between goods then the price of goods will equalize.

Implications of graph above:

Producing more clothing increases the demand for labor and therefore increases the wage rate. Are the workers better off? Their wage rate increases, but so does the price of clothing. So, the workers are only better off if their wages will cover the increase in the price of clothing. The **Stolper Samuelson Theorem** states that the increase in the price of an output has a magnified (greater) impact on the price of inputs. In other words, the increase in wages (output) is greater than the increase of the price of clothing (input)

Adding trade to this model:

- 1) The price of cloth and food will be equalized across countries
- 2) If the home country is labor rich then when both countries face the same prices the home country will produce relatively more cloth.
- 3) Both countries have the same tastes but because one is rich in labor and the home country produces more cloth and exports to the foreign country. This is because the factor endowments of the two countries are different.

What does this imply about income distribution?

The price of cloth will increase under trade (because the demand in the world market increases). Therefore, the rental rate of capital decreases while the wage rate increases. Owners of land will be made worse off with international trade. Workers will be better off because even though the price of cloth increased their wage increased by a greater amount.

What happens to the wage in the foreign country? Because prices are equal across countries the free trade of goods implies **factor price equalization** so the price of inputs across countries will be the same.

With international trade some people are made better off while some are made worse off. If the gains to those who benefit are greater than compensation and redistribution is possible towards those who are worse off.

Bhagwati Article

There are arguments for and against free trade. Some people link free trade and other moral issues such as child labor, the environment, etc.

What are the arguments for free trade?

The benefits of free trade is that increased consumption possibilities for countries that engage in trade.

What are the arguments against free trade?

1. The Infant Industry Market

The argument against free trade is that if a country has an industry that is in its infancy, then maybe trade should be protected. The country may not have the comparative advantage in that good, but we can assume that the industry may learn by doing and become more efficient. Therefore, the comparative advantage would not be static. So, protectionism would help the infant industry to thrive and eventually gain the comparative advantage.

2. The Macro-economic argument

The argument against free trade is that deterring free trade may help stimulate the local economy.

3. The Efficiency in production argument

Market efficiency depends on perfect competition. If the assumptions for perfect competition are not valid, then we can't say if markets should be as competitive as possible. The **Generalized Theory of Second Best** is that if there are distortions free trade may not be optimal.

How can these arguments be dealt with?

Protectionism:

Protectionism may not give enough incentive for the industry to improve. One alternative to unlimited protectionism may be to give only a limited amount of time of protectionism to ensure that the industry will prepare for competition.

Market Imperfections:

Unemployment is an example of imperfection in the market. If a market failure arises in domestic markets, then use domestic policy to directly target the market failure while maintaining free trade externally. **The targeting principle** states that there should be as many policy instruments as policy objectives.

When people make links of free trade to other issues such as labor or environmental standards, then they must consider the following points.

Any deviation from free trade is costly. The assumption is that we may be poorer, but hopefully the objective we achieve is worthwhile. Use the targeting principle rather than link issue to free trade.