

International Economics: BSc Year Three

Trade Flows

Basic neo-classical foundations can be applied to lead us to the **Heckscher-Ohlin-Samuelson model**. We look first at welfare gains solely associated with trade.

Looking at welfare available to an autarkic (that is, a closed) economy, we assume the country is efficient and look at the Pareto model and optimum. The economy is efficient if nobody can be made better off without someone else being worse off; this relies on perfectly competitive markets, perfect factor mobility, and a constant supply of factors of production (labour and capital).

Both factors of production can be used to produce goods X and Y :

$$\bar{L} = L_x + L_y$$

$$\bar{K} = K_x + K_y$$

$$X = X(K_x, L_x)$$

$$Y = Y(K_y, L_y)$$

We must set the following conditions:

Productive efficiency

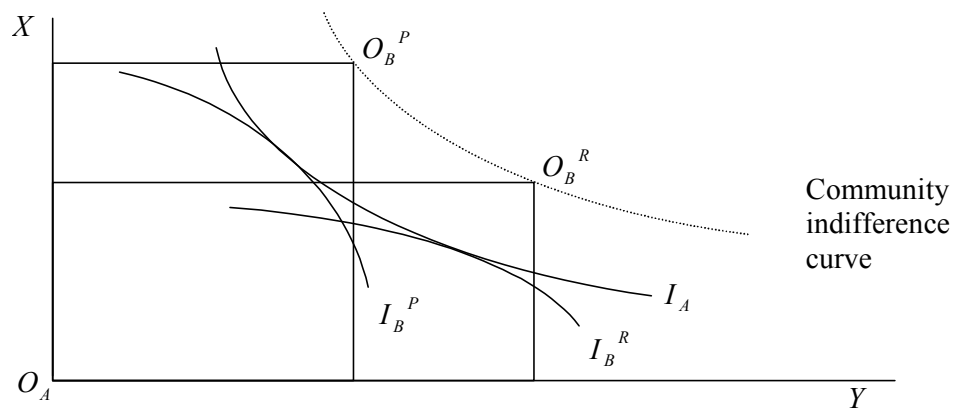
$$\begin{aligned} \max Z &= X(K_x, L_x) + (\bar{Y} - Y(K - K_x, L - L_x)) \\ \Rightarrow MRTS_{K,L}^Y &= \frac{\frac{\partial Y}{\partial L_y}}{\frac{\partial Y}{\partial K_y}} = \frac{\frac{\partial X}{\partial L_x}}{\frac{\partial X}{\partial K_x}} = MRTS_{K,L}^X \end{aligned}$$

so we must lie on a contract curve; MRTS is the marginal rate of technical substitution.

Consumption efficiency

$$\begin{aligned} \max L &= U^A(X, Y) - \lambda(\bar{U}^B - U^B(X, Y)) \\ \Rightarrow MRS_{Y,X}^A &= MRS_{Y,X}^B \end{aligned}$$

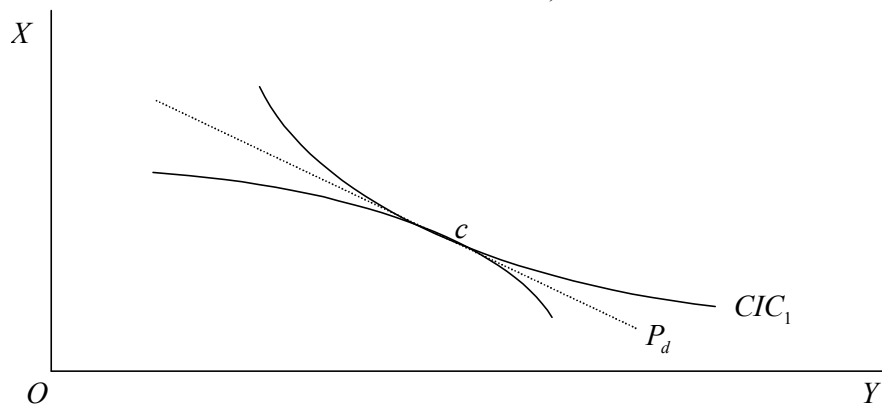
This leads to a community indifference curve, if the marginal rate of substitution is held constant. We may shift the Edgeworth box to get a new intersection:



From the conditions above, we may find a third condition:

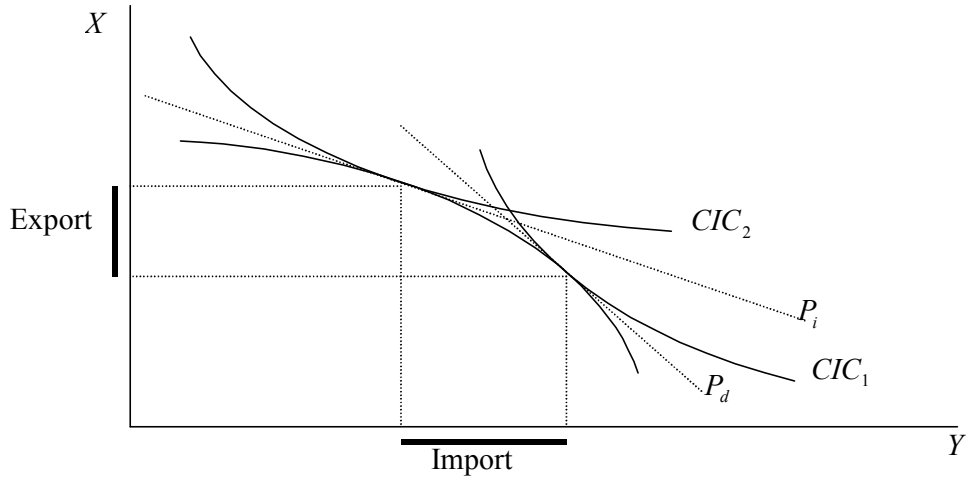
$$MRS = MRT$$

(see Layard and Walters for a mathematical derivation).



which is the best possible welfare solution for the economy.

In trade situations, however, the price schedules of other countries may be different (P_i rather than the domestic level P_d). Suppliers will seek to produce more of Y , as they can get a much higher price. At the same time, the consumptive possibilities of the economy are expanded.



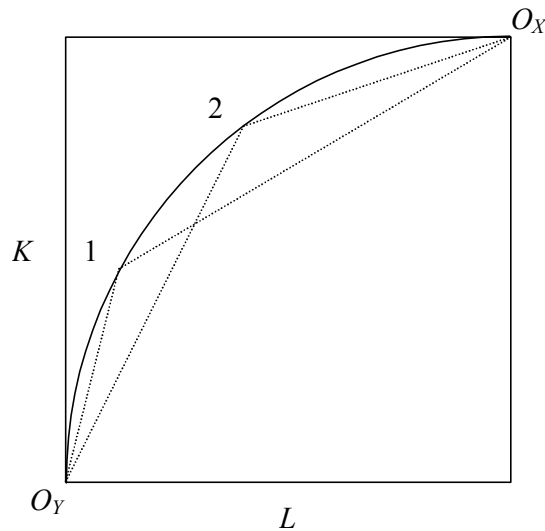
However, free trade does not exist; we need to insert a fourth condition:

$$MRT_f = MRT_d$$

So the marginal rate of technical substitution is the same in both countries.

The Stolper-Samuelson Theorem

The World Bank encourages countries to lower tariffs, but they often resist this. Not every country will benefit from free trade; we may see this by looking at the Edgeworth box:

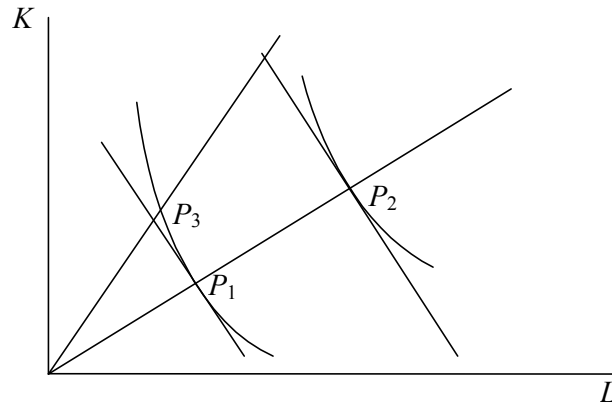


We assume perfect competition, and perfect factor mobility between industries. Note here X is a labour intensive good (an increase in X means proportionately more labour is employed); producing more Y rather than X means unemployment rises. Then the price of labour (the real wage) falls, and the price of capital rises. As we move from 1 to 2, lots of labour is released (or made unemployed).

We assume the production functions are linearly homogenous (with constant returns to scale);

$$q_A = f(L, K)$$

$$f(\lambda L, \lambda K) = \lambda n \cdot f(L, K)$$



The marginal product of the factors depends only on the rate they are used. At P_3 the marginal product of labour has increased.

This is the Stolper-Samuelson Theorem. In this example, if the price of Y increases then the return to capital will increase. In general, if the price of a good increases, the return to the factor used intensively in production of that good will increase.

$$\left. \begin{aligned} a_{KY}r + a_{LY}w &= P_Y \\ a_{KX}r + a_{LX}w &= P_X \end{aligned} \right\} \text{ (in perfect competition)}$$

$$r \frac{a_{KY}}{P_Y} \frac{dr}{r} + w \frac{a_{LY}}{P_Y} \frac{dw}{w} = \frac{dP_Y}{P_Y}$$

$$r \frac{a_{KX}}{P_X} \frac{dr}{r} + w \frac{a_{LX}}{P_X} \frac{dw}{w} = \frac{dP_X}{P_X}$$

where $r \frac{a_{KY}}{P_Y} = \theta_{KY}$ (the distributive share), and $\frac{dr}{r} = \hat{r}$ (the proportional change).

Furthermore:

$$|\theta| = \theta_{KY}\theta_{LX} - \theta_{KX}\theta_{LY}$$

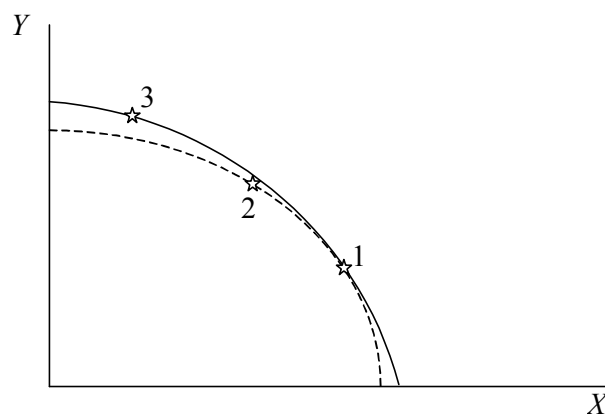
$$|\theta|(\hat{r} - \hat{w}) = \hat{P}_Y - \hat{P}_X$$

which is the magnification effect.

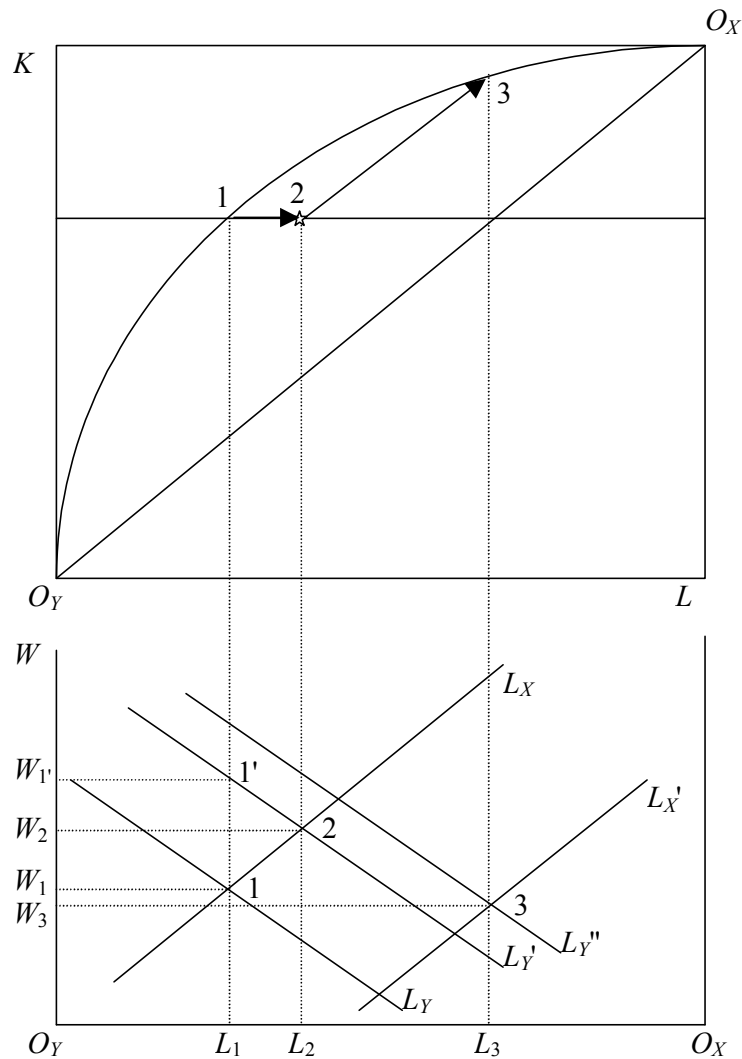
This is another problem for trade liberation. We may change the model - relax the assumptions over perfect factor mobility. Labour has certain skills, and machinery is specific; we actually have factor immobility in the short run.

The Specific Factor Model

There is therefore no smooth move to a new point on the production possibility frontier; we must move inside as adjusting costs reduce productivity, and increase unemployment and unused capital. Instead of moving around the PPF, adjustment costs mean we move off of it, onto the dashed frontier shown below (moving from point 1 to point 2). This makes the Stolper-Samuelson theorem fail.



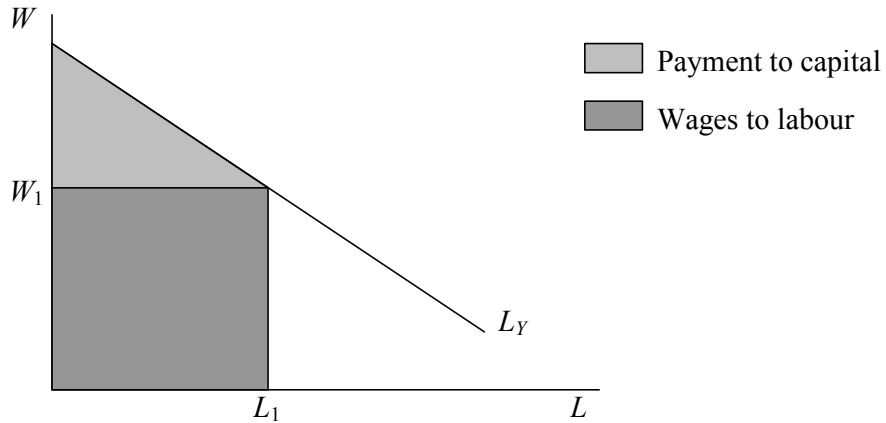
Now, this will only apply in the short run, as over time the economy will move to position 3 above. We can deduce that $L_Y = P_Y \cdot MPP_Y^L$ (where MPP is the marginal propensity to produce) but looking at standard economic theory. In short, this means that if the price of Y increases (P_Y) then demand for labour also increases, so in the very short term wages (W) increase (see the move from 1 to 1' in the lower diagram below):



However, in the longer term more labour moves into the market, so the wage may fall a little (to W_2). This leads to the position previously discussed, where factors are not being employed efficiently, and the country is not situated on its PPF.

Eventually, in the very long term, capital moves into the market, and we move to position 3 (see the diagrams above).

We may look at how output is related to the interest to capital and wages to labour:



The total shaded area gives the output – that is, the sum of payment to capital and wages.

In a 1980 study, 21 US industries were classified according to their protectionist or free trade position on the president’s trade bill. The study returned results thus:

		Position of labour	
		Protectionist	Free trade
Position of capital	Protectionist	Distilling Textiles Apparel Chemicals Plastics Rubber shoes Leather Shoes Stone, etc Iron/steel Cutlery Hardware Bearings Watches	Tobacco
	Free trade	Petroleum	Paper Machinery Tractors Trucks Aviation

Trade Flows

We can see from this that both capital and labour in a specific industry tend to agree on whether free trade is beneficial or wanted. In the examples above, those in favour of protection will be those in the industry for good X. Once we allow for adjustment costs, the opposition or support for protection tends to be the same for both labour and capital.

The US offers a trade adjustment assistance programme – any industry losing from trade can get compensation. There are several things to consider here:

- Why should we treat trade-based unemployment differently from normal unemployment? Workers may not then hurry into looking for a new job.
- Trying to hurry workers into a new job may be less efficient; we may face moral hazard (where firms take the support instead of trying to be competitive), or rent seeking.
- Political expediency.

Market economists say government intervention should be purely to get rid of distortions, such as trade unions, and so on.

Thus Ricardo, and the Stolper-Samuelson Theorem, is correct in the long run, but we must allow for adjustment costs in the short term, which may affect decisions due to the myopic nature of politics and consumers.