

Concept of Comparative Advantage

MODEL -

Let's consider a simple model with

2 countries - Home & Foreign

2 Good - Cheese & Wine

1 Factor of Production - Labor

We start with discussing production in country without trade (only Home).

- Unit labor requirement is defined as number of hours of labour required to produce 1 unit (i.e. a pound) of cheese or 1 unit (i.e. a gallon) of wine. It is ~~def~~ expressed by a_{LC} and a_{LW} respectively.
- We define productivity as the quantity of cheese / wine a labor can produce in an hour. It is expressed as inverse of unit labor requirement i.e. $-\frac{1}{a_{LC}}$ or $\frac{1}{a_{LW}}$.
[Hint: using unitary method]

② \Rightarrow the higher the productivity, lower is the unit labor requirement.

- Let economy's total resources be defined as L , the total labor supply.
- With only one factor of production, the PPF of the economy is a straight line:

$$\boxed{a_{LC} \cdot Q_C + a_{LW} \cdot Q_W \leq L} \quad - (1)$$

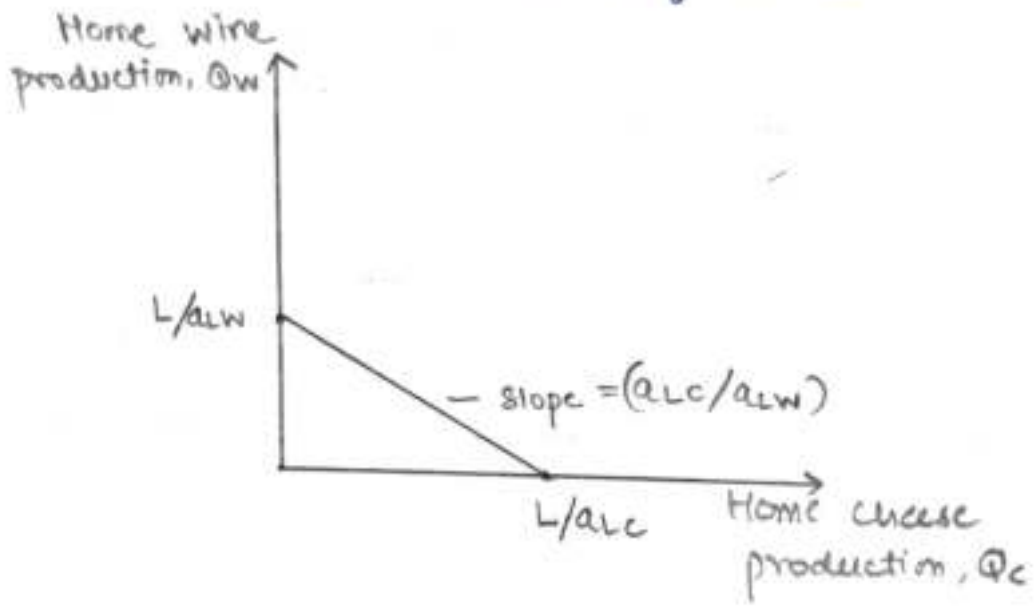
Here, Q_C is the quantity of cheese produced. So, $a_{LC} \cdot Q_C$ describes labor used in producing cheese.

Similarly, it takes a_{LW} labor hours to produce 1 gallon of wine and Q_W is the economy's production of wine. So, $a_{LW} \cdot Q_W$ expresses labor used in producing wine.

Equation (1) says that ^{total} labor used in producing both goods cannot

exceed country's total available labor.

As the equation suggests, PPF is a straight line with slope (a_{LC}/a_{LW}) . It also describes the opportunity cost of a pound of cheese in terms of wine.



Note - opportunity cost of producing 1 unit of cheese in terms of wine (also the slope of PPF) is $\Delta y/\Delta x$ i.e. how much units of wine has to be given up to produce an extra unit of cheese (which requires a_{LC} labor hours).

$\therefore \text{O.C.} = a_{LC} \times \frac{1}{a_{LW}} \text{ or } \frac{a_{LC}}{a_{LW}}$

(4)

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PPF talks about "possibilities" of what a country can produce with given resources.

What a country actually produces depends upon the relative prices (R.P.), which is price of cheese in terms of wine (P_c/P_w).

In a competitive economy, supply decisions are determined by attempts of individuals to maximise earnings.

In our example, since labor is the only factor of production, supply of cheese & wine will be determined by the movement of labor to whichever sector pays the higher wage.

- Hourly wage in cheese sector will equal the value of what a worker can produce in an hour

i.e. $\frac{1}{\text{hr}} \times P_c$. [Hourly wage for wine = $\frac{P_w}{\text{hr}}$]

say for eg. - a labor produces 5 pens in an hour, which is sold for Rs 10 each (value or price). So, his hourly wage will be Rs $5 \times 10 =$ Rs 50.

- If $\frac{P_C}{P_W} > \frac{a_{LC}}{a_{LW}} \Rightarrow$ wages in cheese sector will be higher \Rightarrow specialise in cheese production

- If $\frac{P_C}{P_W} < \frac{a_{LC}}{a_{LW}} \Rightarrow$ wages in wine sector will be higher \Rightarrow specialise in wine production because workers want to work in sector paying higher wages.

- In absence of trade, Home will specialise in production of both goods iff

$$\frac{P_C}{P_W} = \frac{a_{LC}}{a_{LW}}$$

\therefore In the absence of international trade, the relative prices of goods are equal to their unit labor requirement.

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Model with International Trade:

Now we have 2 countries - Home and Foreign (a_{lc}^* , a_{lw}^* , L^*).

We assume that Home is less productive than ~~for~~ Foreign in wine but more productive in cheese i.e. ratio of labor required to produce a pound of cheese $\frac{a_{lc}}{a_{lw}}$ to that required of produce a gallon of wine $\frac{a_{lw}}{a_{lw}^*}$ is lower in Home than it is in Foreign.

$$a_{lc}/a_{lw} < a_{lc}^*/a_{lw}^*$$

(by cross ^{or} multiplication) $a_{lc}/a_{lc}^* < a_{lw}/a_{lw}^*$

∴ We are assuming that Home's relative productivity in cheese is higher than it is in wine. and that Home has a comparative advantage in cheese. And it is the comparative advantage as per Ricardo's model which determined pattern of trade.

• Relative prices after trade is determined by interaction of relative demand and relative supply (in general equilibrium setup) with relative prices across two countries (P_c/P_w). $\left[\text{Relative Qty} = \frac{Q_c + Q_c^*}{Q_w + Q_w^*} \right]$.
Relative Demand (RD) is downward sloping against relative prices (RP) due to substitution effect.

Relative supply (RS) curve is a step-function:

(a) When $\boxed{P_c/P_w < a_{cc}/a_{cw}}$ (which is less than a_{cc}^*/a_{cw}^* as per our assumption) \Rightarrow relative prices are below ~~relative~~ opportunity cost \Rightarrow labor finds it unprofitable to produce cheese in both the countries.
 $\therefore RS = 0$ since no cheese is produced.

(b) If $\boxed{P_c/P_w = a_{cc}/a_{cw}}$ \Rightarrow workers in Home will be indifferent in production of cheese and wine. Home will be willing to supply any relative amount of two goods (flat part of RS).

(c) If $\boxed{P_c/P_w > a_{lc}/a_{lw}}$ (but is less than a_{lc}^*/a_{lw}^*)

Now workers can earn a higher wage by working in cheese sector.
 \Rightarrow Home will specialise in production of cheese. (cont.)

Note - In all the 3 cases above, ~~and case (a)~~, Foreign will specialise in production of wine, and also Home in case (a).

(cont.) In this case, Home specialises in production of cheese \Rightarrow produce L/a_{lc} quantity of cheese. Foreign produces L^*/a_{lw}^* units of wine.

$$\therefore R_s = \frac{(L/a_{lc})}{(L^*/a_{lw}^*)}$$

represented by vertical portion of R_s curve.

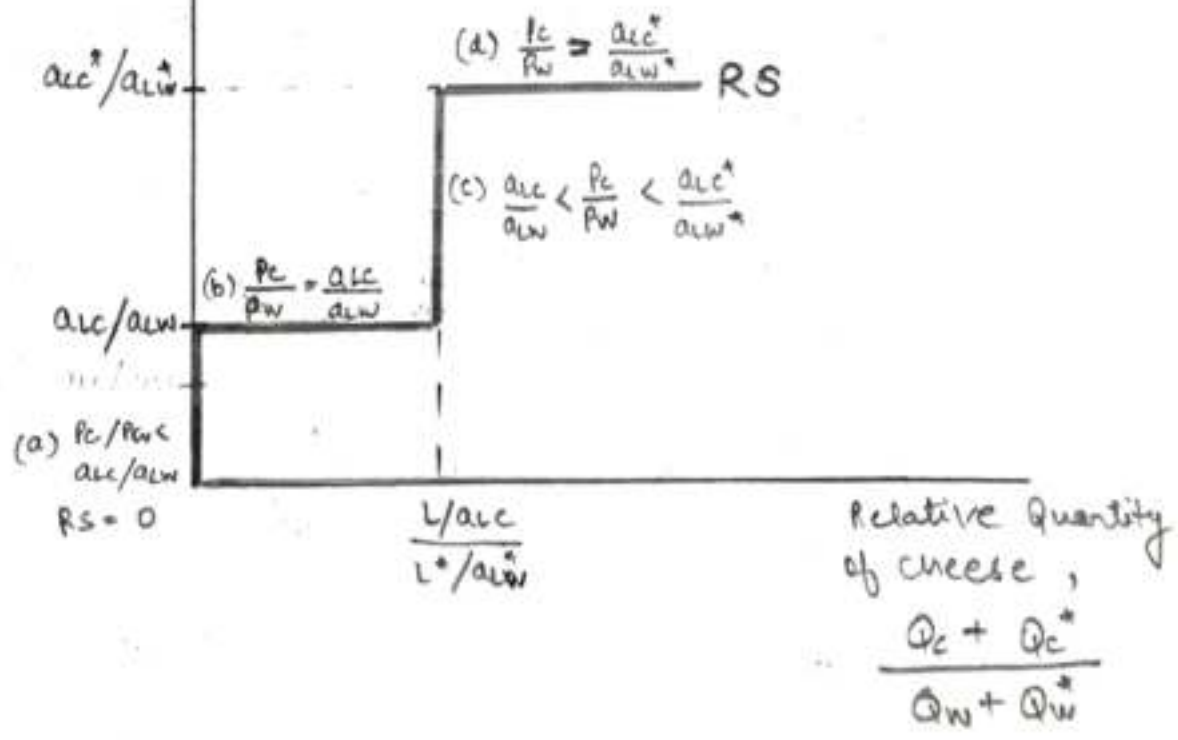
(d) If $\boxed{P_c/P_w = a_{lc}^*/a_{lw}^*}$, workers in Foreign are now indifferent in production of two goods. Again, flat R_s curve.

$$(e) \left| \frac{P_c}{P_w} > \frac{a_{lc}^*}{a_{lw}^*} \right.$$

Now it is beneficial for workers in foreign too to specialise in production of cheese. Both countries produce only cheese and no wine is produced.

$$\Rightarrow \frac{Q_c + Q_c^*}{Q_w + Q_w^*} = \infty$$

Relative Price of cheese, P_c/P_w



Numerical Eg - :

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

Opportunity cost of Cheese in terms of wine

Home: $\frac{a_{LC}}{a_{LW}} = \frac{1}{2}$

Foreign $\frac{a_{LC}^*}{a_{LW}^*} = 2$

∴ $\frac{P_C}{P_W}$ lies between $\frac{1}{2}$ and 2.

Note: After trade, relative prices across two countries converge.

It rises in Home & thus specialises in production of cheese.

It falls in Foreign, thus Foreign specialises in production of wine.

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A note on Relative Wages

- Without trade (Hourly wage)

$$\text{Home - Cheese} = P_c / a_{lc}$$

$$\text{Wine} = P_w / a_{lw}$$

$$\text{Foreign - Cheese} = P_c / a_{lc}^*$$

$$\text{Wine} = P_w / a_{lw}^*$$

Relative wage is the amount a country's worker paid per hour compared with that in other country.

Suppose P of both cheese & wine is $\$12$.

then Hourly wage in Home is $\$12$
(as workers produce only cheese \Rightarrow

$$\text{wage} = P_c \times 1/a_{lc} = 12 \times 1)$$

$$\text{Hourly wage in foreign} = P_w \times \frac{1}{a_{lw}^*}$$

$$= 12 \times \frac{1}{3} = \$4.$$

$$\therefore \text{Relative wage of Home} = \frac{12}{4} = 3.$$

Note - This wage rate lies between the ratio of 2 countries' productivities in two sectors:

$$\text{Rel. productivity of Cheese} = \frac{a_{lc}^*}{a_{lc}} = \frac{6}{1} = 6$$

$$\text{Wine} = \frac{a_{lw}^*}{a_{lw}} = \frac{2}{1} = 1.5$$

- (i) Relative productivity is inverse of relative unit labor requirement.
- (ii) R.W (= 3 in our example) lies b/w 6 & 1.5.
- (iii) This means that each country ends up with a cost advantage. Home has higher productivity in cheese. Foreign has cost advantage due to lower wage rate even if it has lower productivity.
- (iv) Wages in both countries will be higher after trade than before trade. as both countries specialise.