

Econ 355 - International Trade

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Problem Set 1 Solutions

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1. True/False/Uncertain:

- (a) False. Decline in demand for durable goods, a decline in credit available to exporters and downward adjustment in inventory also contribute to decline in trade volume.
- (b) True. Comparative Advantage determines trade pattern. If we know the marginal product of labor in both goods for Home and Foreign, then for each good, we can determine which country has a comparative advantage in producing it.
- (c) True. Under perfect competition the wage in country j is equal to the value of the marginal product of labor in the industry producing good i :

$$w^j = p_i^j \times MPL_i^j$$

Under trade, good prices are equal across countries. The higher MPL_i^j is, the higher w^j . Absolute advantage does determine real wages and therefore consumption.

2. Home Autarky:

- (a) If employ all labor in Apples:

$$Q_A = 120 \times 1 = 120$$

- (b) If employ all labor in Bananas:

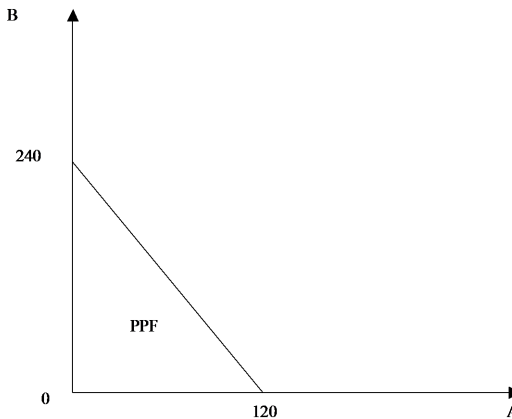
$$Q_B = 120 \times 2 = 240$$

- (c) Let OC_A and OC_B denote the opportunity cost of apple and banana, respectively. Let a_{LA} and a_{LB} denote the unit labour requirement in apple and banana production for the Home country. Then the opportunity costs are:

$$OC_A = \frac{MPL_B}{MPL_A} = 2$$

$$OC_B = \frac{MPL_A}{MPL_B} = \frac{1}{2}$$

- (d) PPF for Home:



- (e) Because the producers of apples and bananas are perfectly competitive the wages are equal to marginal product:

$$MPL_A p_A = w \Rightarrow w = p_A$$

$$MPL_B p_B = w \Rightarrow w = 2p_B$$

- (f) The autarky relative price of apples is:

$$\left(\frac{p_A}{p_B}\right)_A = 2$$

Yes, apple producers can sell apples for a certain number of Bananas. With 3 Apples, they can exchange for $3 \times 2 = 6$ Bananas.

3. Foreign Autarky:

- (a) Foreign country has an absolute advantage in producing both goods as their MPLs are higher for the two goods.
- (b) The opportunity cost of an Apple is only 1.5 unit of Bananas for the Foreign country, which is lower than that of the Home country. The Foreign country has a comparative

advantage in the production of Apples. Similarly, the opportunity cost of a unit of Bananas is $\frac{2}{3}$ unit of Apple for the Foreign country, which is higher than that for the Foreign country. The Home country must have a comparative advantage in the production of Bananas.

(c) Let Q^* denote the quantity Q in the Foreign country

i. If employ all labor in Apples:

$$Q_A^* = 80 \times 2 = 160$$

ii. If employ all labor in Bananas:

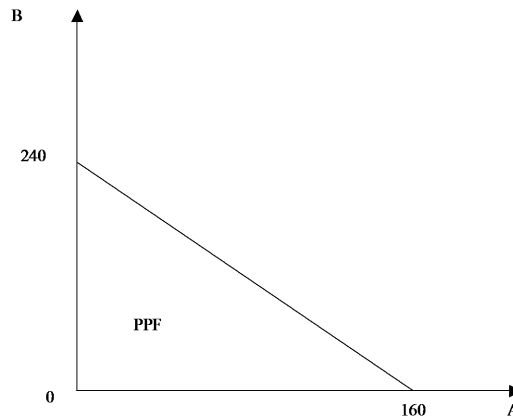
$$Q_B^* = 80 \times 3 = 240$$

iii.

$$OC_A^* = 1.5$$

$$OC_B^* = \frac{2}{3}$$

iv. PPF for Foreign:



v.

$$w^* = 2p_A^* = 3p_B^*$$

vi. The autarky relative price of apples in the Foreign country is:

$$\left(\frac{p_A^*}{p_B^*} \right)_A = \frac{3}{2}$$

With 3 Apples, one can exchange for $3 \times \frac{3}{2} = \frac{9}{2}$ unit of Bananas in the Foreign country.

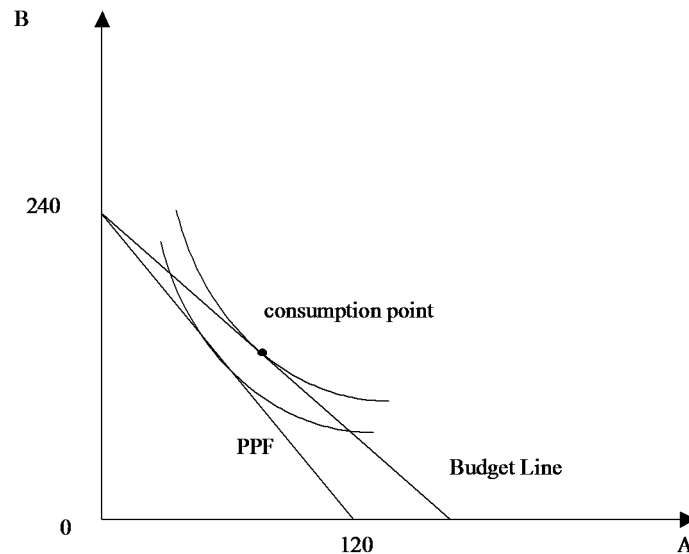
4. International Trade:

(a) To answer this question, I first work out the pattern of specialization under various prices.

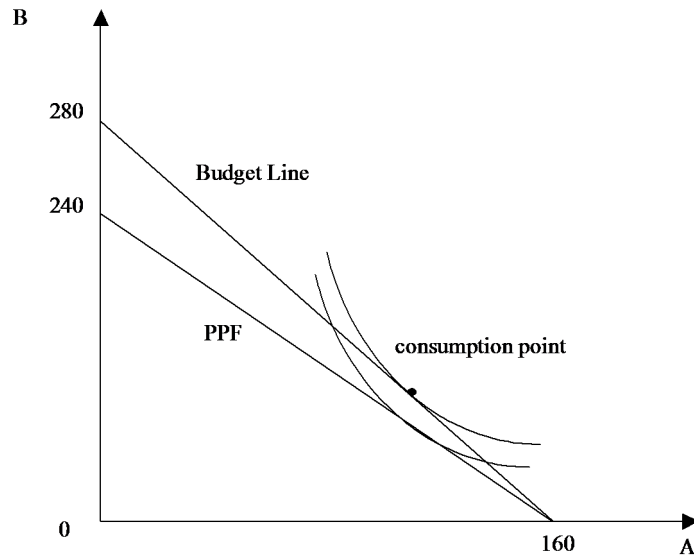
- i. If $\left(\frac{p_A}{p_B}\right)_T < \frac{3}{2}$, both Home and Foreign countries specialize in producing and export Bananas.
- ii. If $\left(\frac{p_A}{p_B}\right)_T = \frac{3}{2}$, The Foreign country produces both Apples and Bananas. The Home country specializes in producing and exports Bananas.
- iii. If $\frac{3}{2} < \left(\frac{p_A}{p_B}\right)_T < 2$, Foreign country specializes in producing and export Apples. Home country specializes in producing and exports Bananas.
- iv. If $\left(\frac{p_A}{p_B}\right)_T = 2$, Foreign country specializes in producing and exports Apples. Home country produces both Apples and Bananas.
- v. If $\left(\frac{p_A}{p_B}\right)_T > 2$, both Home and Foreign countries specialize in producing and export Apples.

The market clearing requires that $\frac{3}{2} \leq \left(\frac{p_A}{p_B}\right)_T \leq 2$.

(b) If $\left(\frac{p_A}{p_B}\right)_T = 1.75$, Foreign country specializes in the production of Apples while Home country specializes in the production of Bananas. Foreign country produces 160 unit of Apples but no Bananas. Home country specializes in produces 240 unit of Bananas but no Apples. For Home:

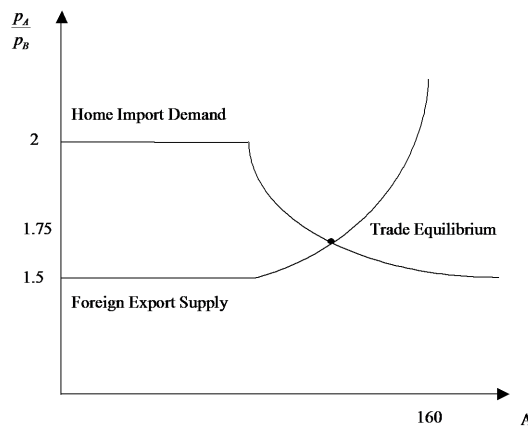


For Foreign:



Yes, both countries have their consumption points on higher indifference curves.

(c) Trade Equilibrium:



5. Wages and Productivity

(a) The real wage in Home in term of Apples under Autarky:

$$\left(\frac{w}{p_A}\right)_A = 1$$

The real wage in Home in term of Bananas under Autarky:

$$\left(\frac{w}{p_B}\right)_A = 2$$

(b) Under trade and $\left(\frac{p_A}{p_B}\right)_T = 1.75$, Home country produces Bananas only and imports Apples. In the Bananas industry wages are equal to the value of the marginal product

of labor:

$$w = 2p_B$$

The real wage in Home in term of Apples under Trade:

$$\left(\frac{w}{p_A}\right)_T = \frac{\left(\frac{w}{p_B}\right)}{\left(\frac{p_A}{p_B}\right)_T} = \frac{2}{1.75} = \frac{8}{7}$$

The real wage in Home in term of Bananas under Trade:

$$\left(\frac{w}{p_B}\right)_T = 2$$

(c)

$$\begin{aligned}\left(\frac{w}{p_A}\right)_A &= 1 < \frac{8}{7} = \left(\frac{w}{p_A}\right)_T \\ \left(\frac{w}{p_B}\right)_A &= \left(\frac{w}{p_B}\right)_T = 2\end{aligned}$$

The real wage in term of Apples increases under trade while the real wage in term of Bananas stays unchanged. As the real wage does not fall under free trade, the Home country is not worse off when it opens to trade.

(d) Under trade and $\left(\frac{p_A}{p_B}\right)_T = 1.75$, Foreign country produces Apples only and imports Bananas. The wage in the Apple industry in the the Foreign country is:

$$w^* = 2p_A$$

The real wage in Foreign country in term of Apples under Trade:

$$\left(\frac{w^*}{p_A}\right)_T = 2$$

The real wage in Foreign country in term of Bananas under Trade:

$$\left(\frac{w^*}{p_B}\right)_T = \frac{w^*}{p_A} \times \left(\frac{p_A}{p_B}\right)_T = \frac{7}{2}$$

The real wages in Home country in term of both goods are lower than those in the Foreign Country. This suggests that the level of real wage increases with the productivity of the country.