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International Trade Problem Set #2

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Exercise 1

Consider a Ricardian model with two goods (food and clothing) and two countries (home and foreign). Units of labor needed to produce one unit food and clothing respectively are given by $\alpha_{LC} = 4, \alpha_{LF} = 2$ for the home country and by $\alpha_{LC}^* = 5, \alpha_{LF}^* = 3$ for the foreign country.

a) Determine the absolute and comparative advantage.
- ▶ Absolute advantage:
  - ▶ Clothing: Home country
  - ▶ Food: Home country
- ▶ Comparative advantage:
  - ▶ Clothing: Foreign country
  - ▶ Food: Home country

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EXERCISE 1

b) Draw the country's PPF. Determine relative prices under autarky. Draw any reasonable indifference curve and show consumption and production under autarky.

- ► Relative Price Home: $\frac{P_C}{P_F} = 2$
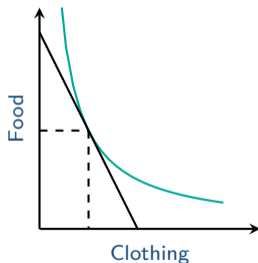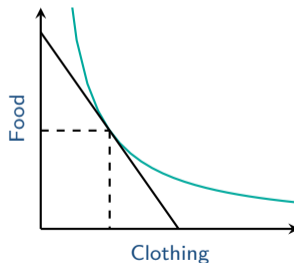- ► Relative Price Foreign: $\frac{P_C}{P_F} = \frac{5}{3}$

Figure: Home

Figure: Foreign

Clothing

Clothing

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EXERCISE 1

c) If the two countries open up to trade, in which range will the relative price be?

   ▶ Under autarky the price in the home country is given by $\frac{P_C}{P_F} = 2$, and the price in the foreign country is given by $\frac{P_C}{P_F} = \frac{5}{3}$.

   ▶ Therefore under free trade the price must lie in between: $\frac{5}{3} \leq \frac{P_C}{P_F} \leq 2$

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EXERCISE 1

d) Draw consumption and production of the home country under free trade. Show imports and exports of the home country.

  ▶ The relative price of food is higher under free trade (or equiv. the relative price of clothing is lower) and thus the home country will fully specialize its production on food.

Figure: Home

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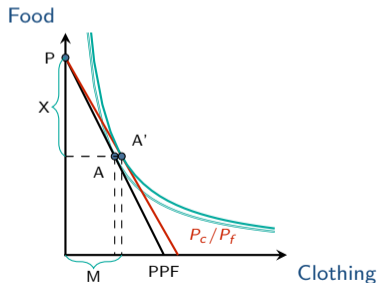
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Exercise 2

Consider the Ricardian model with two goods (food and clothing) and two countries (A and B). Labour units needed to produce one unit of food or clothing respectively are given by $\alpha_{LF}^A = 1, \alpha_{LC}^A = 2$ for country A and by $\alpha_{LF}^B = 3, \alpha_{LC}^B = 3$ for country B. Suppose trade between the two countries occurs at prices of $\frac{P_F}{P_C} = \frac{2}{3}$.

a) Which country produces which good(s)?
   ▶ Country A has a comparative advantage at producing food (equiv. country B has a comparative advantage at producing clothing) and will therefore produce only food (only clothing).

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EXERCISE 2

Country A: $\alpha_{LF}^A = 1, \alpha_{LC}^A = 2$
Country B: $\alpha_{LF}^B = 3, \alpha_{LC}^B = 3$

b) Coumpute the relative wage rate $\frac{w^A}{w^B}$. In which country is the wage higher?

- ▶ Perfect competition implies that marginal costs must be equal to marginal benefit.
  - ▶ Country A: $P_F = w^A \cdot \alpha_{LF}^A$
  - ▶ Country B: $P_C = w^B \cdot \alpha_{LC}^B$
- ▶ Rearranging terms we get: $\frac{w^A}{w^B} = \frac{P_F}{P_C} \frac{\alpha_{LC}}{\alpha_{LF}} = 2$
- ▶ In country A there will be a higher wage.

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Exercise 2

Country A: $\alpha_{LF}^A = 1, \alpha_{LC}^A = 2$
Country B: $\alpha_{LF}^B = 3, \alpha_{LC}^B = 3$

c) Suppose country B increases its productivity in the production of clothing such that α_{LC}^B drops to 1.

Determine the new relative wage $\frac{w^A}{w^B}$.

▶ Still there is perfect competition which implies that marginal costs must be equal to marginal benefit.

▶ Production patterns stay the same and both countries continue to produce the same goods. Assuming that the price will also remain the same we find the following:

  ▶ Country A: $P_F = w^A \cdot \alpha_{LF}^A$
  ▶ Country B: $P_C = w^B \cdot \alpha_{LC}^B$

▶ Rearranging terms we get: $\frac{w^A}{w^B} = \frac{P_F}{P_C} \frac{\alpha_{LC}^B}{\alpha_{LF}^A} = \frac{2}{3}$

▶ Now there will be a higher wage in country B.

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EXERCISE 2

Country A: $\alpha_{LF}^A = 1, \alpha_{LC}^A = 2$
Country B: $\alpha_{LF}^B = 3, \alpha_{LC}^B = 3$

d) Suppose a third country which is a large agricultural producer enters the world market. The world market price of food drops to $\frac{P_F}{P_C} = \frac{1}{4}$. What is the production pattern of country A and country B now?

Determine relative wages $\frac{w^A}{w^B}$.

▶ At such a low price of food, both countries will start producing only clothing (Realize that the autarky price of food at which the countries are indifferent between producing one or the other good is higher in both countries).

▶ Perfect competition will imply that marginal costs are equal to marginal profit
  ▶ Country A: $P_C = w^A \cdot \alpha_{LC}^A$
  ▶ Country B: $P_C = w^B \cdot \alpha_{LC}^B$

▶ Rearranging terms we get: $\frac{w^A}{w^B} = \frac{\alpha_{LC}^B}{\alpha_{LC}^A} = \frac{3}{2}$

▶ Wage in country A is higher because labour productivity in country A is higher in the sector of clothing than in B.

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EXERCISE 3

Consider the Ricardian model with two goods (food and clothing) and two countries (A and B). Labour units needed to produce one unit of food or clothing respectively are given by $\alpha_{LF}^A = 2, \alpha_{LC}^A = 1$ for country A and by $\alpha_{LF}^B = 1, \alpha_{LC}^B = 2$ for country B. Total labour units are given by $L^A = 500$ in country A and $L^B = 1000$ in country B. The world consists only of the two countries.
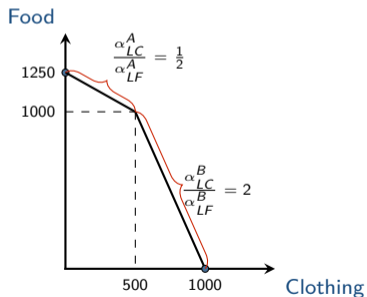
a) Draw the PPF of the World (draw clothing on the X-axis an food on the Y-axis.).

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EXERCISE 3

Country A: $\alpha_{LF}^A = 2, \alpha_{LC}^A = 1$; $L^A = 500$
Country B: $\alpha_{LF}^B = 1, \alpha_{LC}^B = 2$; $L^B = 1000$

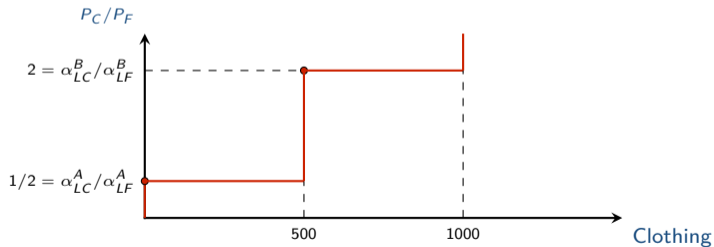a) Draw the PPF of the World (draw clothing on the X-axis an food on the Y-axis).

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EXERCISE 3

Country A: $\alpha_{LF}^A = 2, \alpha_{LC}^A = 1$; $L^A = 500$
Country B: $\alpha_{LF}^B = 1, \alpha_{LC}^B = 2$; $L^B = 1000$

b) Draw the world supply curve for clothing with the amount for clothing on the X-axis and the relative price
   of clothing ($\frac{P_C}{P_F}$) on the Y-axis.

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EXERCISE 3

Country A: $\alpha_{LF}^A = 2, \alpha_{LC}^A = 1$; $L^A = 500$
Country B: $\alpha_{LF}^B = 1, \alpha_{LC}^B = 2$; $L^B = 1000$

c) Draw the relative wages in country A and B in dependence of the relative price of clothing. Draw the diagram with $\frac{P_C}{P_F}$ on the X-axis and $\frac{w^A}{w^B}$ on the Y-axis.