

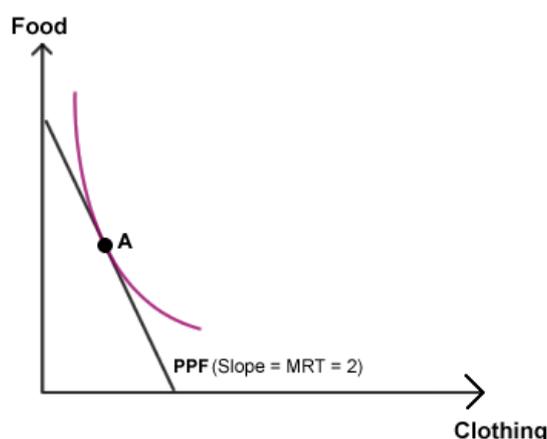
# Exercise Sheet 2: The Ricardian Model.

## Short Solutions.

### Exercise 1

a) The home country has an absolute advantage in the production of both goods. The home country has a comparative advantage in the production of food ( $\frac{a_{LF}}{a_{LC}} < \frac{a_{LF}^*}{a_{LC}^*}$ ), and the foreign country has a comparative advantage in the production of clothing.

b) Assuming that people in the home country want to consume both goods, relative prices in the home country under autarky are given by  $\frac{P_C}{P_F} = 2 = \text{MRT}$  (marginal rate of transformation).<sup>1</sup> We draw an arbitrary indifference curve (we don't know the exact preferences) such that production and consumption under autarky is at point A.



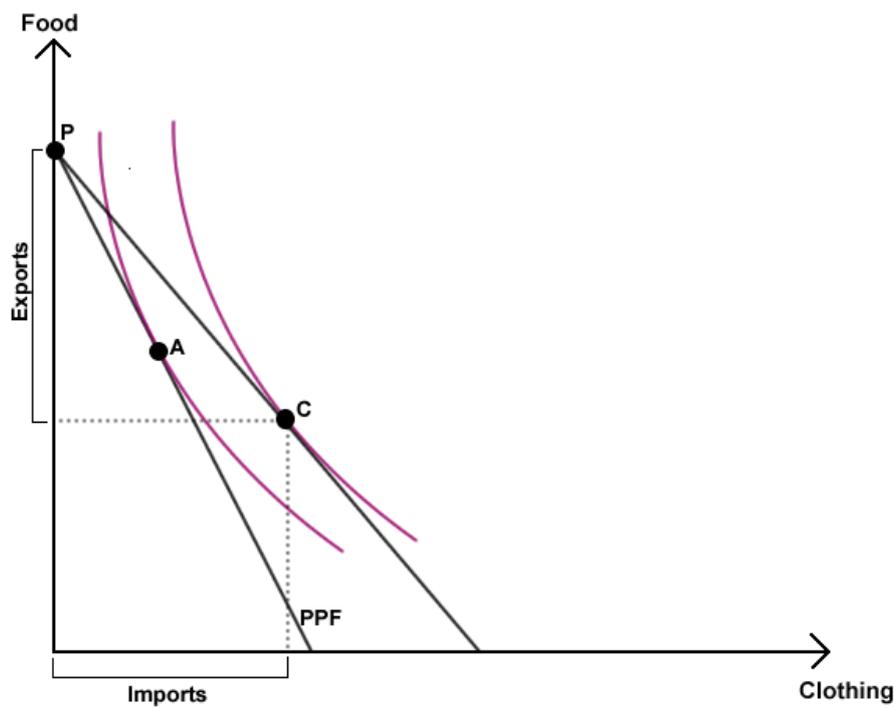
c) In the home country, autarky prices are given by  $\frac{P_C}{P_F} = 2$ . In the foreign country, autarky prices are given by  $\frac{P_C^*}{P_F^*} = \frac{a_{LC}^*}{a_{LF}^*} = \frac{5}{3}$ . The relative autarky price of clothing is lower in the foreign country than in the home country. Under free trade, the price at which trade occurs must lie between the two autarky prices. Relative prices under free trade are thus given by  $\frac{5}{3} \leq \frac{P_C^T}{P_F^T} \leq 2$ .

d) The relative price of clothing is lower with free trade than the autarky price in the home country (respectively the free trade price of food is higher, which amounts to the

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<sup>1</sup>Only with these prices does the country produce both goods. For any other relative prices the country would just produce one good - this is because of the linear PPF.

same thing). The slope of the isovalue line that shows relative prices is thus less steep than the PPF of the home country, as shown in the graph below. The home country completely specializes in food, producing at point P (see graph below) and consuming at point C.<sup>2</sup>



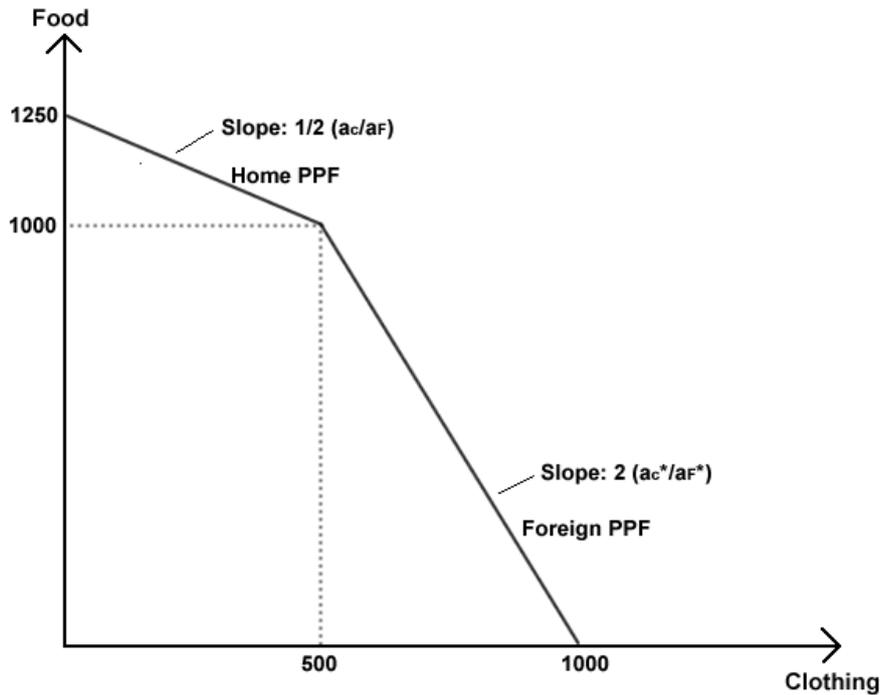
<sup>2</sup>Note that  $\frac{P_C^T}{P_F^T} \leq 2$  such that  $\frac{P_C^T}{P_F^T} = 2$  is theoretically possible. For instance, this special case is possible when one country is much bigger than the other or if demand for one good is very small. We will not further discuss this case here. In the exercise we just assumed that  $\frac{P_C^T}{P_F^T} < 2$ .

## Exercise 2

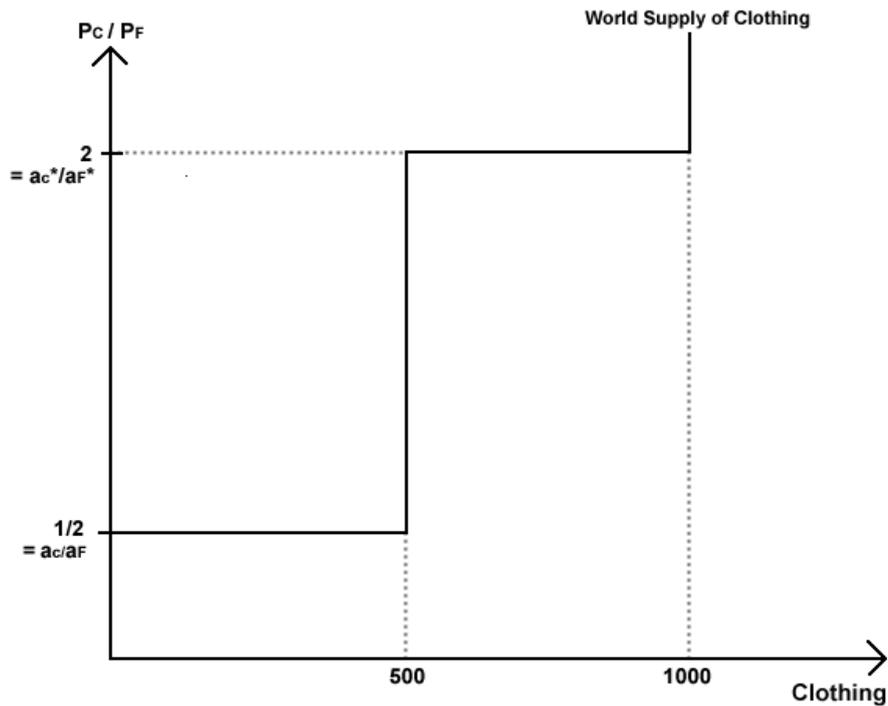
- a) In country A, the autarky relative price of food is lower than the free trade price of food. Country A therefore exports food and imports clothing. The opposite is true for country B. Country A specializes completely in food (i.e. it produces only food) and country B specializes completely in clothing. The reason is that the PPFs of the two countries are linear, as always in the ricardian model.
- b) Perfect competition implies that firms do not make profits and the price of a good equals the production cost of the good. Country A produces only food under free trade. The cost of producing one unit of food is given by the wage times the units of labor needed to produce one unit of food:  $a_{LF}^A * W^A = P_F$ . Country B produces only clothing. The condition *production costs = price* writes:  $a_{LC}^B * W^B = P_C$ . Dividing the two equations then yields an expression for the relative wage:  $\frac{W^A}{W^B} = \frac{a_{LC}^B P_F}{a_{LF}^A P_C} = 2$ . We see that the relative wages depend both on the terms of trade and the labor productivities. Wages are higher in country A.
- c) Production patterns are not changed. Country A still produces only food and country B only clothing. Relative wages are now given by  $\frac{W^A}{W^B} = \frac{a_{LC}^B P_F}{a_{LF}^A P_C} = \frac{2}{3}$ . Compared to b), wages in country B are now higher, as a result of the increased labor productivity.
- d) With such a low price of food, both countries produce only clothing (the world price of clothing is above the autarky price in both countries). The condition *production cost = price* for clothing writes  $a_{LC}^A * W^A = P_C$  for country A, and  $a_{LC}^B * W^B = P_C$  for country B. Dividing the two equations yields the relative wages:  $\frac{W^A}{W^B} = \frac{a_{LC}^B}{a_{LC}^A} = \frac{3}{2}$ . Since both countries produce only clothing, relative wages depend only on the relative labor productivities in the clothing sector. The wage in country A is higher because labor productivity in the clothing sector is higher in country A.

Exercise 3

a) To draw the world PPF, simply draw the home and foreign PPF together:



b) At a relative price of clothing below  $\frac{1}{2}$ , both countries will produce only food. Note that, since it is assumed that the world consists only of these two countries, this is only possible if there is zero demand for clothing. At a price of  $\frac{P_C}{P_F} = \frac{1}{2}$ , the foreign country will produce only food, while the home country will produce both food and clothing (incomplete specialization). If the relative price of clothing is between  $\frac{1}{2}$  and 2, there is complete specialization, i.e. the home country produces only clothing and the foreign country produces only food. At a relative price of clothing of  $\frac{P_C}{P_F} = 2$ , the home country produces only clothing, while the foreign country produces both clothing and food (incomplete specialization). If the relative price of clothing is above two, both countries produce only clothing. Again, this is only possible if demand for food is zero. The graph below shows the world supply curve for clothing.



c) The computation of the relative wages is analogous to the ones done in exercise 2. If the relative price of clothing is below  $\frac{1}{2}$ , both countries produce only food. The relative wages are then given by the relative labor productivities in food production. If the relative price of clothing is between  $\frac{1}{2}$  and 2, the home country produces only clothing and the foreign country only food. The relative wages then depend both on labor productivities and the terms of trade. With increasing relative price of clothing, the terms of trade for the home country improve (its exports become more expensive, its imports cheaper). This increases the relative wage of the home country. At a relative price of clothing above 2, both countries produce only clothing, and relative wages are determined by relative labor productivities in clothing production. (Graph on next page).

