

Key to a Fifth Exercise Concerning Comparative Advantage

	Home	Foreign*	Possible production		Relative Productivity O_{LS}/O^*_{LS}
			Home	Foreign	
Labor (hours / year)	L=1000	L*=800	$L O_{LS}$	$L^* O^*_{LS}$	
Soybeans (kilograms S / hour)	$O_{LS}=4$	$O^*_{LS}=1$	4000 kg./yr	800 kg./yr	4
			$L O_{LT}$	$L^* O^*_{LT}$	O_{LT}/O^*_{LT}
Textiles (meters T / hour)	$O_{LT}=2$	$O^*_{LT}=1.5$	2000 m./yr	1200 m./yr	1.33
Opportunity costs					
Textiles O_{LS}/O_{LT} (kg. S / m. T)	2	2/3	Foreign has a lower opp. cost of T.		
Soybeans O_{LT}/O_{LS} (m. T / kg. S)	1/2	3/2	Home has a lower opp. cost of S.		

1. Use the Ricardian model of international trade to answer the following questions. The table above shows the labor productivity of each country in each industry as its output per hour of labor.

- a. Which country has absolute advantage in which good and why?

Home has an absolute advantage in Soybeans because they can produce them more efficiently (more units per hour). Home produces 4 kilograms per hour while Foreign produces only one kilogram per hour. Home also has an absolute advantage in Textiles because they can produce it with fewer resources. Home requires 1/2 of a labor hour to produce one meter; Foreign requires a 2/3 hour. Of course, you could also say that Home's labor productivity is higher; they produce meters of T at 1.33 times Foreign's rate of output and kilograms of S at four times Foreign's rate.

- b. If Home produces both goods in autarkic equilibrium (no international trade), then what relative price of S must prevail?

Home's workers will not produce a good unless they can earn their opportunity cost. Thus $P_S/P_T \geq O_{LT}/O_{LS} = 1/2$ (m./kg.) and $P_T/P_S \geq O_{LS}/O_{LT} = 2$ (kg./m.). The only relative price that makes both of these statements true is $P_S/P_T = 1/2$ (m./kg.).

- c. Which country has comparative advantage in which good and why?

Home has a comparative advantage in S because their opportunity cost (and autarky relative price, P_S/P_T) is lower than that of the other country.
Foreign has a comparative advantage in T because their opportunity cost (and autarky relative price, P_T/P_S) is lower than that of the other country.

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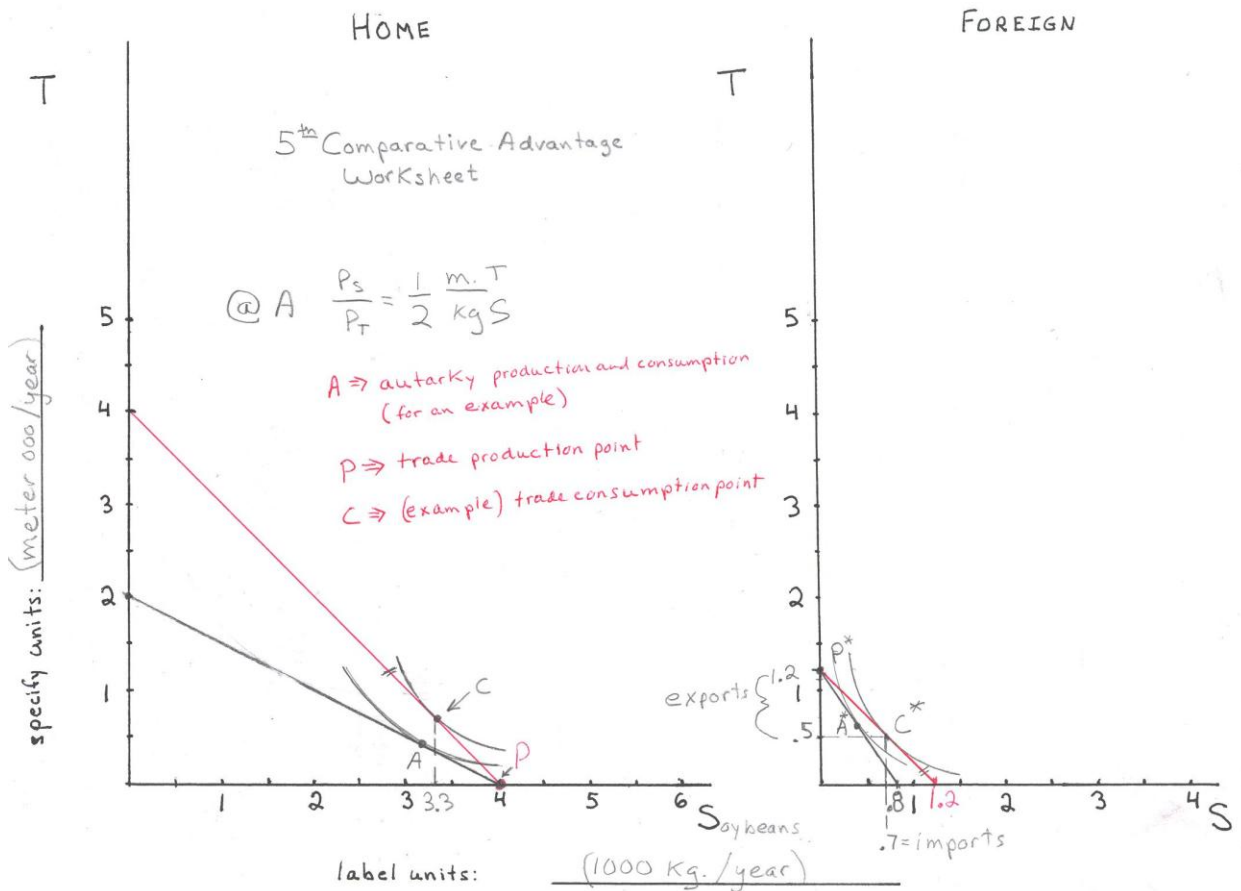
- d. Turn your paper over and graph a possible international trade equilibrium. Assume that the countries agree to trade at a relative price of S, P_s/P_t equal to the average of their opportunity costs for S.

Each country produces only its comparative advantage good, and trades to get the other good.

One possible trade: Foreign exports 800 (meter T/year) and imports 800 (kilogram S/year). Home imports 800 (meter T/year) and exports 800 (kilogram S/year). Graph that.

Average their opportunity costs. Foreign's autarky relative price, (P_s/P_t) is 1.5 meters of T per kilogram of S, while Home's opportunity cost (P_s/P_t) is 0.5 meters of T per kilogram of S. If trade is to benefit both countries, then $0.5 < P_s/P_t < 1.5$

The middle of this range suggests $P_s/P_t = 1$ (meter T/kilogram S), a convenient price. Here's the graph:



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- e. How will Home's wage rate compare to the wage rate in Foreign?

Home's workers are more productive. Therefore, they will earn a higher wage than Foreign's workers. The limits on the relative wage are $1.33W^* < W < 4W^*$, where W is the wage in Home and W^* is the wage in Foreign. That is, Home's wage must be between $4/3$ and 4 times the wage in Foreign, because Home is 4 times as productive in S and $4/3$ as productive in T .

These limits may be determined by comparing the costs of each good across countries. We know that Home has a comparative advantage in S . In the long run, goods will be produced where they are less expensive to produce. This implies that $W/O_{LS} < W^*/O_{LS}^*$. Rearrange this to show $W/W^* < O_{LS}/O_{LS}^* = 4/1 = 4$

Foreign's comparative advantage in T implies that $W/O_{LT} > W^*/O_{LT}^*$. Rearrange this to show $W/W^* > O_{LT}/O_{LT}^* = 2/1.5 = 4/3 = 1.33$

It is also acceptable to answer this question with a numerical example. Given $P_S/P_T = 1$ (meter/kilogram), then it follows that $W/W^* = 2.67$

Why? Home's workers produce S , and earn what they produce: $O_{LS} = 4$ (kg./hr.). Foreign's workers produce T , and earn what they produce: $O_{LT}^* = 1.5$ (m./hr.). Home's workers can trade their S for T at the $P_S/P_T = 1$ (m./kg.). Thus, in terms of T , Home's wage is 4 (m./hr.) – found as 4 (kg./hr.) times 1 (m./kg.)
Next compute the relative wage, say $w/w^* = 4/1.5 = 8/3 = 2 \frac{2}{3} = 2.67$

Note that 2.67 is within the limits on the relative wage found in the first paragraph of this answer.