Key to a Third Exercise Concerning Comparative Advantage

The 4th comparative advantage worksheet that I gave you was the same as the 3rd.

	Home	Foreign*	Possible production		Relative Productivity
			Home	Foreign	
Labor (hours / year)	L=2000	L*=1000	LO_{LS}	$L^*O^*_{LS}$	O_{LS}/O^*_{LS}
Shoes (pair S / hour)	O_{LS}=1	O^*_{LS}=6	2000 pr/yr	6000 pr/yr	**1/6**
			LO_{LT}	$L^*O^*_{LT}$	O_{LT}/O^*_{LT}
Tea (bushel T / hour)	O_{LT}=5	O^*_{LT}=6	10000 bu/yr	6000 bu/yr	**5/6**
Opportunity costs Tea O_{LS}/O_{LT} (pair S / bu. T)	**0.2**	1	Home has a lower opp. cost of T.		
Shoes O_{LT}/O_{LS} (bushel T / pair S)	5	**1**	Foreign 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?

   Foreign has an absolute advantage in Shoes because they can produce them more efficiently (more units per hour). Foreign produces six pairs per hour while Home produces only one pair per hour. Foreign also has an absolute advantage in Tea because they can produce it with fewer resources. Foreign requires 1/6 of a labor hour to produce one bushel; Home requires 1/5 of a labor hour. Of course, you could also say that Foreign's labor productivity is higher; they produce bushels of T at 1.2 times Home's rate of output.

   b. If Home produces both goods in autarkic equilibrium (no 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 $Ps/Pt \geq O_{LT}/O_{LS} = 5$ (bu./pr.) and $Pt/Ps \geq O_{LS}/O_{LT} = 1/5$ (pr./bu.) . The only relative price that makes both of these statements true is Ps/Pt = 5 (bu./pr.).

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

   Foreign has a comparative advantage in S because their opportunity cost (and autarky relative price, Ps/Pt) is lower than Home's opportunity cost.
   Home has a comparative advantage in T because their opportunity cost (and autarky relative price, Pt/Ps) is lower than Foreign's opportunity cost.

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

Foreign's workers are more productive. Therefore, they will earn a higher wage than Home's workers. The limits on the relative wage are $W^*/6 < W < 5W^*/6$, where W is the wage in Home and W* is the wage in Foreign. That is, Home's wage must be between 1/6 and 5/6 times the wage in Foreign, because Home is 1/6 as productive in S and 5/6 as productive in T. Using rounded decimal values, $0.167\ W^* < W < 0.833\ W^*$.

These limits may be determined by comparing the costs of each good across countries. We know that Home has a comparative advantage in T. In the long run, goods will be produced where they are less expensive to produce. This implies that $w/O_{LT} < w^*/O^*_{LT}$. Rearrange this to show $w/w^* < O_{LT}/O^*_{LT} = 5/6 = 0.833$

Foreign's comparative advantage in S implies that $w/O_{LS} > w^*/O^*_{LS}$. Rearrange this to show $w/w^* > O_{LS}/O^*_{LS} = 1/6 = 0.167$

It is also acceptable to answer this question with a numerical example. Given Ps/Pt = 3 (bushel/pair), then it follows that $w/w^* = 0.278$

Why? Foreign's workers produce S, and earn what they produce: $O^*_{LS} = 6$ (pr./hr.). Home's workers produce T, and earn what they produce: $O_{LT} = 5$ (bu./hr.). Foreign's workers can trade their T for S at the Ps/Pt = 3 (bu./pr.). Thus, in terms of T, Foreign's wage is 18 (bu./hr.) – found as 6 (pr./hr.) times 3 (bu./pr.)
Next compute the relative wage, say $w/w^* = 5/18 = 0.278$
Note that 0.278 is within the limits on the relative wage found in the first paragraph of this answer.

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e. Turn your paper over and graph a possible international trade equilibrium. Assume that the countries agree to trade at a relative price of S in the middle of the range of their opportunity costs.

Foreign's autarky relative price, (Ps/Pt) is 1 bushel of T per pair of S, while Home's opportunity cost (Ps/Pt) is 5 bushels of T per pair of S. If trade is to benefit both countries, then
$1 < Ps/Pt < 5$.

The middle of this range suggests Ps/Pt = 3 (bushel/pair).

Each country produces only its comparative advantage good, and trades to get the other good.
One possible trade: Home exports 3000 (bushel T/year) and imports 1000 (pair S/year). Foreign imports 3000 (bushel T/year) and exports 1000 (pair S/year). The graph below (although labeled 4th CA worksheet) illustrates this trade.