

Problem Set 2

Due Friday, April 10th at 3:30pm

Problem 1: True, false, or uncertain

Please *evaluate* whether each statement is true, false, or uncertain. Use economic reasoning, graphical analysis, or evidence discussed in class.

1. If a country has no absolute advantage, it will always produce the good it is more productive in compared to the other good it can produce.
2. In a Ricardian framework, each country fully specializes regardless of the consumer preferences.
3. A large productivity increase in a single sector in Foreign can have no effect on production at Home.
4. If autarky and world prices are the same, then there are no gains to trade.

Problem 2: Classical Ricardian theory

Consider a two country (Home and Foreign), two good (x, y) , and one factor (labor, L) model where the production technology is linear in labor:

$$x = b_x L_x; \quad y = b_y L_y; \quad x^* = b_x^* L_x^*; \quad y^* = b_y^* L_y^*,$$

where b_i represents the unit productivity in production of i , and $*$ denotes Foreign. In class, we worked with unit labor requirements. Unit labor requirements are the reciprocal of labor productivity: $1/b_i$.

Consider the same utility function for Home and Foreign, $U(x, y)$ and $U(x^*, y^*)$, which gives rise to the same set of indifference curves that have the usual properties (increasing, bowed towards the origin). Suppose that labor endowments for Home and Foreign are $\bar{L}$ and $\bar{L}^*$, respectively.

1. Suppose that $\frac{b_x}{b_y} > \frac{b_x^*}{b_y^*}$ but $\bar{L} = \bar{L}^*$. Show the production possibilities frontier, and make sure to label the intercepts.
2. Show the autarky equilibrium for both economies in two diagrams.
3. Suppose that Home and Foreign open up for trade. Show where the trade equilibrium occurs in both diagrams. Characterize the equilibrium. In particular, discuss how the world relative price is determined.
4. Suppose that the population of Foreign increased, so that $\bar{L}^* > \bar{L}$, but comparative advantage remained the same. Does this affect Home's welfare? Explain. (Hint: consider what happens in the market that determines the world price).
5. Go back to the assumption of $\frac{b_x}{b_y} > \frac{b_x^*}{b_y^*}$ and $\bar{L} = \bar{L}^*$. Suppose that the productivity in good x doubled in Home. Does this benefit both economies? Explain.

6. Go back to the assumption of $\frac{b_x}{b_y} > \frac{b_x^*}{b_y^*}$ and $\bar{L} = \bar{L}^*$. Suppose that the productivity in good y doubled in Home. Does this benefit both economies? Explain.

Problem 3: Semiconductors and textiles

South Korea has 180 workers and Vietnam has 600 workers. Each economy produces two goods – semiconductors (s) and textiles (t) – using linear technologies. The unit labor requirements are:

	Semiconductors	Textiles
South Korea	$a_{Ls} = 3$	$a_{Lt} = 2$
Vietnam	$a_{Ls}^* = 12$	$a_{Lt}^* = 4$

Both countries share Cobb-Douglas preferences $U = s^{1/2}t^{1/2}$. Let $p = p_s/p_t$ denote the relative price of semiconductors. With these preferences, each country spends half its income on each good, so the world relative demand for semiconductors is

$$RD(p) = \frac{1}{p}.$$

1. Which country has the comparative advantage in semiconductors? Which has the absolute advantage in both goods?
2. Draw the PPF for each country and label the intercepts. Find each country's autarky production, consumption, and utility.
3. Derive the world relative supply curve for semiconductors. On the same diagram, plot relative demand. Find the free-trade equilibrium price p^* .
4. Find each country's production, consumption, and trade pattern under free trade. Verify that world markets clear.
5. Compute the gains from trade for each country. Which country gains more (in percentage terms)? Provide intuition.
6. Suppose Vietnam imports a semiconductor manufacturing technology that halves its unit labor requirement in semiconductors (from 12 to 6). What happens to the free-trade equilibrium? Does South Korea benefit or suffer?