

Homework 1 – The Ricardian Model

True/False/Uncertain: For each question, answer T/F/U and briefly explain the answer. (No points for an unsupported answer).

Questions 1-6 refer to a simple Ricardian model of trade like that we used in class: two countries and two goods (1,2) produced using only labor according to the simple production function $\text{Output} = \text{Labor used} / \text{unit labor input requirement}$.

1. Wages in the US are \$25/ hour while wages in China are \$1/hour. Goods manufactured using only labor will be 25 times cheaper in China.

Uncertain. Goods prices depend on wages and productivity, not just wage rates, so you can't really say for certain with the problem set up. In the real world, China has much lower productivity levels, so goods prices will almost certainly not be 25 times cheaper.

2. Closing relatively inefficient plants is necessary for a country to gain from trade.

True. When relatively inefficient plants close it frees up resources to be used in expanding more efficient parts of the economy.

3. Trade is beneficial because countries export goods with high opportunity costs in exchange for goods with low opportunity costs.

False. Countries export goods with low opportunity costs in exchange for goods with high opportunity costs. This yields consumption gains.

4. Trade is beneficial because it reduces unemployment.

False. There is no relationship between the amount of trade and employment or unemployment. Trade is not beneficial because it changes unemployment, it's beneficial because it allows countries to more effectively utilize their resources.

5. A useful measure of the gains from trade is how far the production possibilities frontier shifts out due to trade.

False. The PPF does not shift out with trade. The CPF may shift out, and how far it shifts out is a good measure of the gains from trade.

6. A country will not gain from trade if goods' prices after trade are equal to goods' prices in autarky.

True. This is equivalent to saying that the country can exchange goods at the same rate before and after trade, which means the CPF does not shift out and the country is no better off.

7. A country will specialize according to comparative advantage only if its government makes wise decisions about how to allocate resources across industries.

False. Private sector arbitrage is very effective at allocating resources, without government intervention.

8. Labor market arbitrage equalizes the wage rate across industries within a country.

True. Workers move between industries in search of the highest wage rates. This causes wage rates to equalize across industries within a country.

9. Labor market arbitrage equalizes the wage rate across countries within the same industry.

False. This would require international migration, of which there is very little. Trade may equalize goods prices across markets, but it will not equalize wage rates.

Questions 10-13 The consumption possibilities frontier (CPF) is equivalent to the production possibilities frontier (PPF) under which circumstances

10. The CPF is always equivalent to the PPF

False. If free trade prices differ from autarky prices, the CPF will lie outside the PPF.

11. The CPF is equivalent to the PPF in autarky.

True. If a country cannot trade (definition of autarky), it can only consume (CPF) what it produces (PPF).

12. The CPF is equivalent to the PPF in free trade if world prices after trade equal the country's autarky prices

True. If world prices equal the autarky prices, then the CPF has not shifted out as a result of trade. This means that the country has the same CPF as in autarky, which means it is the same as the PPF.

13. The CPF is equivalent to the PPF in free trade if relative productivity is equal in the two countries.

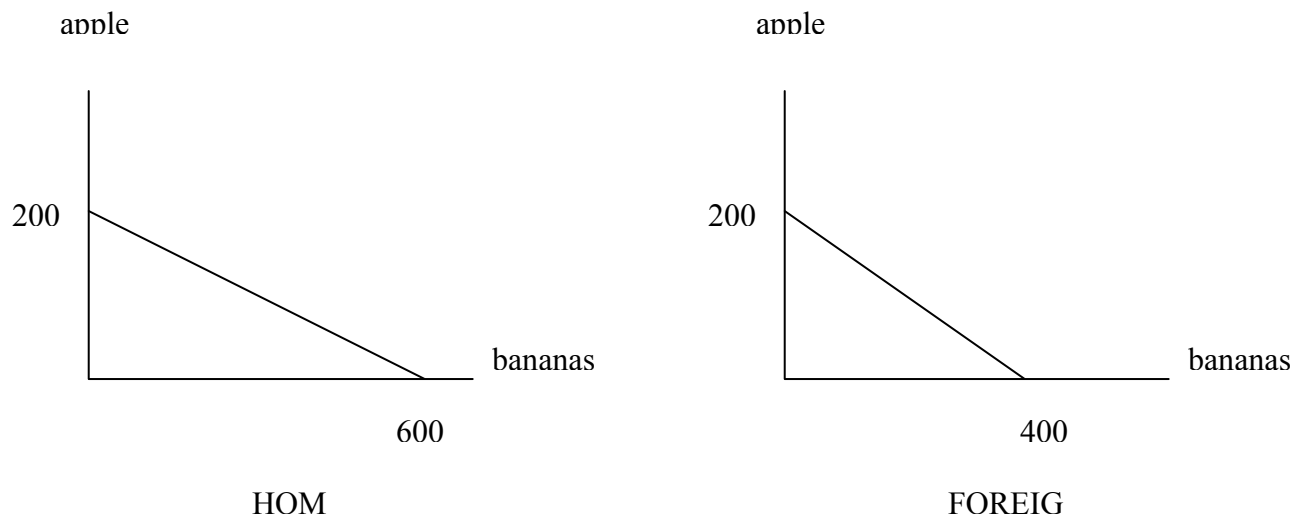
True. If relative productivity is the same in the two countries, then there is no reason to trade, which means the CPF under free trade is the equivalent of the CPF under autarky which equals the PPF.

SHORT ANSWER

1. The following table describes the technology of production of apples and bananas in countries home and foreign.

Country	Home	Foreign
Labor endowment	1200	4000
Labor needed to produce 1 unit of:		
Apples	6	20
Bananas	2	10

a. Draw the Production Possibilities Frontier (PPF) for each country.



b. What determines the slope of the PPF?

The opportunity cost of producing bananas in terms of apples production foregone.

c. What is the opportunity cost of apples in terms of bananas?

Home: Making an additional apple costs me 3 bananas (I could have made 3 bananas with the labor I used to make 1 more apple)

Foreign: making an additional apple costs me 2 bananas.

d. In the absence of trade, what is the relative price of apples and bananas?

$$\text{Home: } \frac{P_{apples}}{P_{bananas}} = 3$$

$$\text{; Foreign: } \frac{P_{apples}}{P_{bananas}} = 2$$

- e. Describe how the concept of labor market arbitrage is important when solving for the relative prices of apples and bananas.

To get the relative prices of goods, write

Price of apples = wage rate paid for producing apples * input requirements for apple, and similarly for bananas.

$$p_a = w_a \cdot a_a$$

$$p_b = w_b \cdot a_b$$

Now express the two prices as a ratio

$$\frac{p_a}{p_b} = \frac{w_a}{w_b} \cdot \frac{a_a}{a_b}$$

Labor market arbitrage implies wages are equal in the two sectors so the ratio of wages equals one. This gives the price ratio as a function of the input ratios

$$\frac{p_a}{p_b} = 1 \cdot \frac{a_a}{a_b} = \frac{a_a}{a_b}$$

With trade

- f. Which country has an absolute advantage in producing apples? Bananas?

Home has an absolute advantage at producing both apples and bananas.

- g. Which country should specialize in producing apples? Bananas?

Foreign should produce apples because they can be made at a lower opportunity cost (they give up fewer bananas). Home should make bananas.

h. In which country are wage rates higher? Why?

Wage rates are higher in the home country, because labor is many times more productive. To get specific values, note that home makes bananas and foreign makes bananas. Using our formula from class

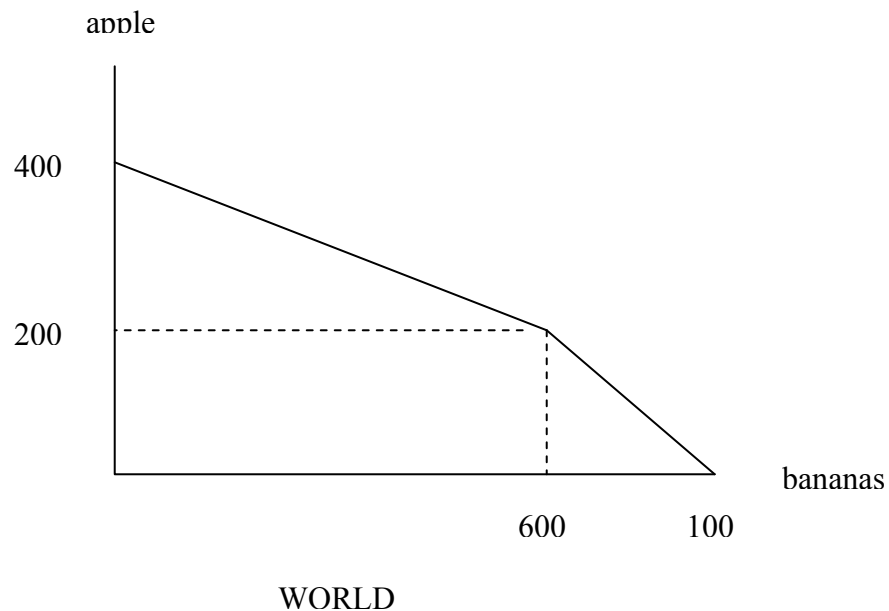
$$p = wa \Rightarrow w = p / a$$

Now express the wage at home over the wage at foreign, noting that the wage formula applies only in the sector that the country produces in.

$$\frac{w^{Home}}{w^{Foreign}} = \frac{p_{bananas}^{world} a_{apples}^{Foreign}}{p_{apples}^{world} a_{bananas}^{Home}} = \frac{p_{bananas}^{world} 20}{p_{apples}^{world} 2}$$

We know that the world price of bananas relative to apples has to fall between Home and Foreign's relative prices, between 1/3 and 1/2, so the range of wage rates falls between 10/3 and 5.

i. Draw the world PPF



2. Redraw foreign's PPF for each of the following and explain why the PPF changes

PPF is initially a straight line with intercepts at 200 apples 400 bananas

a. Productivity doubles in the Foreign apple industry

PPF twists outward, straight line at intercepts 400 apples 400 bananas. The productivity increase has lowered the cost of producing apples, but not changed the cost of producing bananas.

b. Productivity doubles in both the Foreign apple and banana industries

PPF shifts out in parallel to 400 apples, 800 bananas. Productivity increase gives twice the output in both sectors but the opportunity costs have not changed.

c. Foreign's labor endowment is cut in half.

PPF shifts in parallel to 100 apples, 200 bananas. With fewer resources and the same technology, less output can be produced.

d. Both b and c at the same time.

The PPF is unchanged – the change in technology exactly offsets the change in resources.