

**Questions to be handed in**

**True/ False:** For each question, answer True or False in the context of the Ricardian Model of trade. You don't need to explain on your answer (but it would help you to understand why the question is true or false.)

**1. Absolute advantage does not affect the level of wages in a country.**

False. Absolute advantage has a strong effect on wages. See the answer to Q10 below. Absolute advantage may not be important for the pattern of trade, but it does matter a great deal for wages.

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

True. Gains from trade come from (a) lowering prices by substituting less expensive (more efficient) foreign production for more expensive (less efficient) domestic production, and (b) using the resources freed up to expand exports.

**3. A country must have an absolute advantage in a good to be a successful exporter of that good.**

False. See the Honduran example below. Honduras has a comparative advantage in, and exports, bananas despite being absolutely less productive.

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

True. At least in the Ricardian model. This says that a country's CPF curve is no different under autarky and free trade.

Chile has a total supply of labor hours of 400 and Honduras has a total supply of labor hours of 200. The following table provides information on the unit-labor requirements in each country.

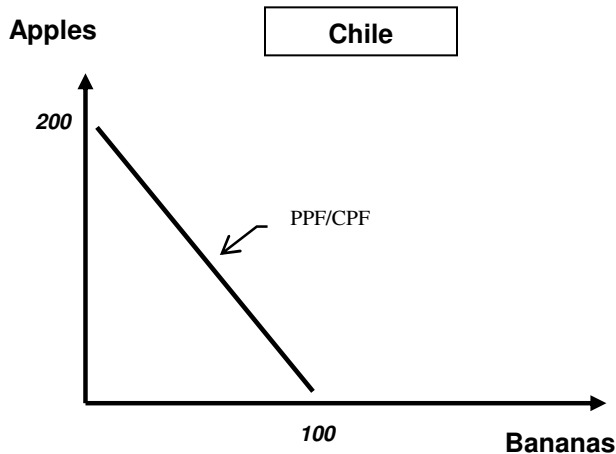
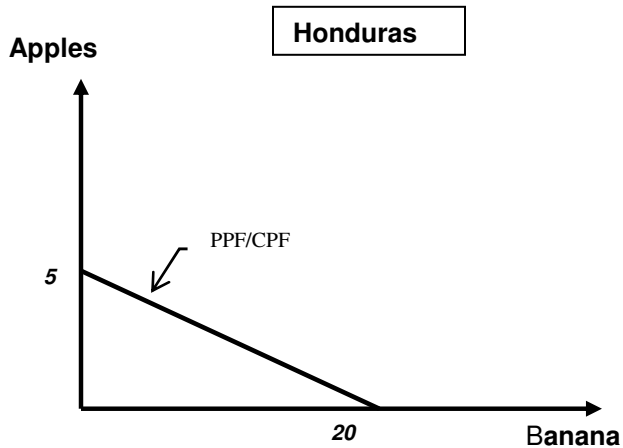
	Bananas	Apples
Honduras	10	40
Chile	4	2

In autarky...

**5. Graph the PPF and CPF for Honduras and Chile. For each country, determine the opportunity cost of bananas in terms of apples.**

Honduras: Producing 1 unit of bananas requires 10 workers. These workers could have produced 1/4 a unit of apples. The opportunity cost of one banana is 1/4 an apple.

Chile: 1 unit of bananas requires 4 workers, who could have been used to make 2 apples. The opportunity cost of one banana is 2 apples.



6. In autarky, determine the relative price apples/bananas in both countries. How is labor market arbitrage important for determining this relative price?

$$\text{Honduras: } \frac{P_a^H}{P_b^H} = \frac{w_a^H a_a^H}{w_b^H a_b^H} = \frac{w^H a_a^H}{w^H a_b^H} = \frac{a_a^H}{a_b^H} = 4$$

Two notes:

- a. Because apples require 4 times the workers as bananas, they are 4 times as expensive.

b. Labor market arbitrage says that workers will move to find the best paying job. This will tend to equalize the wage rate across the apple and banana sectors within Honduras. IN the equation above we dropped the “a” and “b” subscripts from the wage rates in the second substitution to reflect that there is a common wage rate in Honduras.

Chile:

$$\frac{P_a^C}{P_b^C} = \frac{a_a^C}{a_b^C} = 1/2$$

**7. Which country has comparative advantage in producing apples? Which country has absolute advantage in producing bananas?**

Chile can produce apples at the lowest relative price so it has a comparative advantage. Chile also has an absolute advantage at producing bananas since it takes fewer workers to make apples than Honduras does. However, these workers are more efficiently used making apples in Chile, so Honduras has a comparative advantage in Bananas.

Allow these countries to trade...

**8. Describe the pattern of trade. What happens to the composition of output in each country?**

Countries specialize in, and export, their comparative advantage good. Chile exports apples. Honduras exports bananas.

Because Chile is now serving apple consumers at home and in Honduras, its apple output must rise. This uses workers who could otherwise have produced bananas, so banana output falls in Chile.

The reverse happens in Honduras.

**9. Provide a range for the relative price apples/bananas worldwide.**

With free trade, world prices equalize across markets. The price will settle somewhere between the autarky prices for Chile and Honduras, between  $\frac{1}{2}$  and 4.

**10. Suppose the relative price of apples/bananas under free trade is 1. What is the wage for Chile relative to the wage for Honduras?**

To get the wage rates, go back to our expression for the price of goods.

$$P_b^H = w_b^H a_b^H$$

Rearranging this, I can write an expression for the wage in terms of the price of goods and the input requirement.

$$w_b^H = \frac{P_b}{a_b^H} \quad w_a^C = \frac{P_a}{a_a^C}$$

Two notes:

1. I've dropped the country superscript "H" and "C" on the price of the goods. Why? Because arbitrage (trade) equalizes the prices of goods across countries.
2. This equation only holds for the sectors in which the country is producing.

To see who has higher wages, divide the Chilean wage by the Honduran wage.

$$\frac{w^C}{w^H} = \frac{P_a a_b^H}{P_b a_a^C}$$

Plugging in for relative prices = 1, and the "a" terms from the technology matrix, we get

$$\frac{w^C}{w^H} = 5$$

**11. At world prices apples/bananas = 1, could a firm paying Chilean wages to Honduran workers successfully export bananas to Chile?**

No.

To export, a country must have lower relative prices in autarky. But when exporting a particular good, it must also have a lower absolute price than the importing country. (I still have to ask: can an arbitrageur make money selling the good internationally?)

To export bananas  $P_b^H < P_b^C \Leftrightarrow w^H a_b^H < w^C a_b^C$

We can write that in terms of relative wages

$$\frac{w^H}{w^C} < \frac{a_b^C}{a_b^H} = \frac{4}{10}$$

In other words, Honduras must have wages equal to 40% of Chile's wages (or lower) or it won't be able to export bananas. As we saw above, under free trade Honduran wages always range from 40% of Chile's wages (at best) to 20% of Chile's wages. So this condition is always met.

But, suppose we force Honduras to pay higher wages so that  $\frac{w^H}{w^C} = 1$ . This would raise Honduran banana prices above what the Chilean's would be willing to pay. The result would be to force these countries back into autarky.

### 12. Describe how the gains from trade depend on the terms of trade.

The terms of trade for a country are the price of its export good (what it sells on world markets) divided by the price of its import good (what it buys). The higher is the terms of trade, the greater are the gains from trade.

Chile wants  $\frac{P_a}{P_b}$  to be as large as possible since it exports apples and imports bananas.

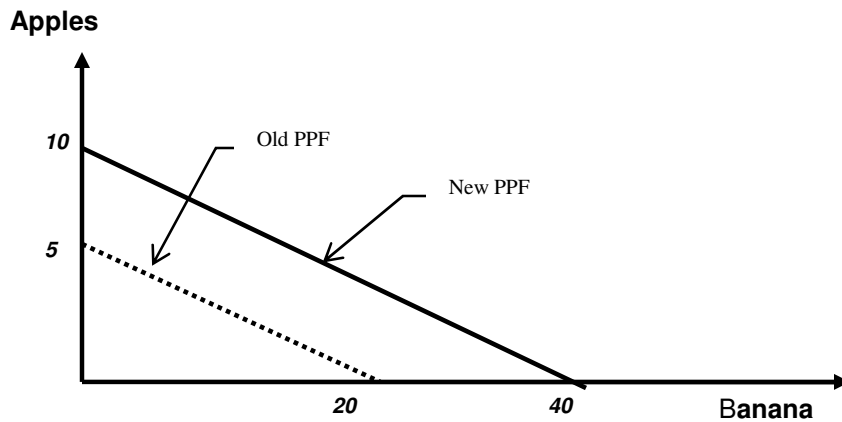
Honduras wants  $\frac{P_b}{P_a}$  to be large since it exports bananas and imports apples.

**Start from the data in the exercise above.**

**Redraw Honduras' PPF for each of the following changes in productivity or resources.**

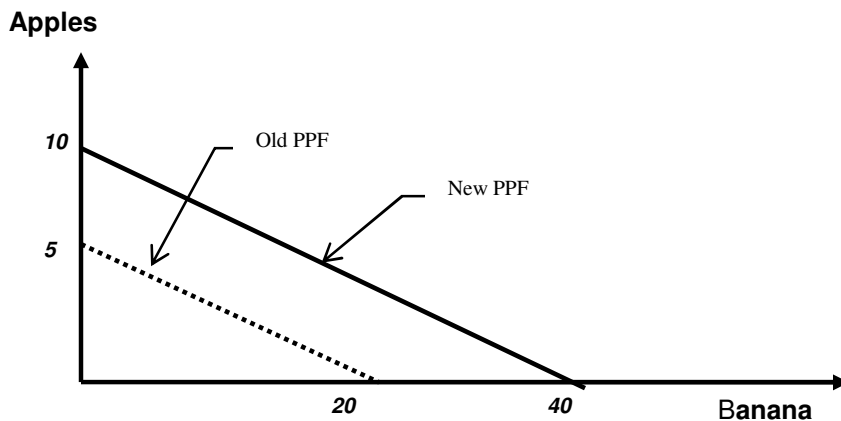
### 13. Honduras' labor endowment doubles.

Honduras has now a total supply of labor hours of 400. This means that it can produce now at most 40 bananas (400/4) or it can produce at most 10 apples (400/10).



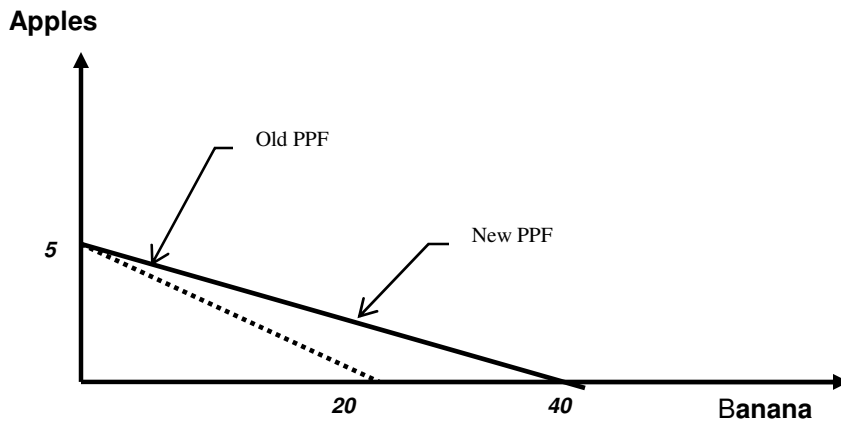
**14. Labor becomes twice as productive in both apples and bananas.**

Labor unit requirement for apples becomes 20, and for bananas becomes 5. This means that Honduras can produce now at most 40 bananas ( $200/5$ ) or it can produce at most 10 apples ( $200/20$ ).



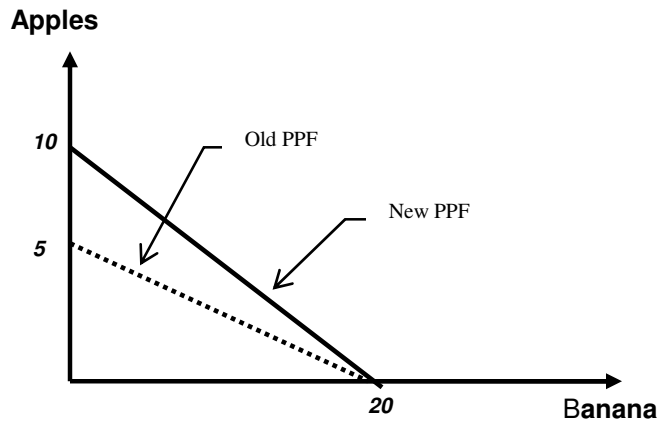
**15. Honduras becomes twice as productive at producing bananas.**

Labor unit requirement for bananas becomes 5, but for apples stays constant at 40. This means that Honduras can produce now at most 40 bananas ( $200/5$ ) or it can produce at most 5 apples ( $200/40$ ).



**16. Honduras becomes twice as productive at producing apples.**

Labor unit requirement for apples becomes 20, and for bananas stays constant at 10. This means that Honduras can produce now at most 20 bananas ( $200/10$ ) or it can produce at most 10 apples ( $200/20$ ).



**17. Of these four changes, which cause a change in Honduras' autarky prices?**

Honduras' autarky prices depend on the relative technologies of the two goods.

In the first two cases (Q13 & 14), relative productivities do not change, so neither do prices.

It is only changes described in Q15 and Q16 that cause a change in relative productivities, and so in Honduras' autarky prices.

**18. Of these four changes, which cause a change in Honduras' export good?**

None.

In the last two cases (Q15&16), relative prices change but not enough to change the comparative advantage of countries, so Honduras remains the low cost producer of bananas.

Wages in the US are \$25/ hour while wages in Mexico are \$5/hour.

Good	US unit labor requirement	Price in US	Export price inclusive of tax	Mexico unit labor requirement	Price in Mexico	Export price inclusive of tax
Apples	1	25	31	2	10	16
Bananas	1	25	31	4	20	26
Cherries	1	25	31	5	25	31
Dates	1	25	31	6	30	36
Eggplant	1	25	31	10	50	56

**19. Which goods will the US export? Which will Mexico export?**

Comparing the prices of goods across the two countries, the US will export dates (since  $P_{US} = 25 < 30 = P_{Mex}$ ) and eggplant (since  $P_{US} = 25 < 56 = P_{Mex}$ ).

Mexico will export apples (since  $P_{Mex} = 10 < 25 = P_{US}$ ) and bananas (since  $P_{Mex} = 20 < 25 = P_{US}$ ).

Both countries will produce cherries, but neither will export them since the prices are equal (there is no incentive for arbitrage.)

**20. Suppose there is a tariff (tax) of \$6 on any good crossing the border in any direction. How does that change your answer to 19?**

Because of the tax, the US will export only dates since it is the only good whose export price inclusive of tax is still lower than the Mexican domestic price ( $P_{US} + \text{tax} = \$31 < \$56 = P_{Mex}$ ). For the same reason, Mexico will export only apples ( $P_{Mex} + \text{tax} = \$16 < \$25 = P_{US}$ ).