

PROBLEM SET 3 SOLUTIONS

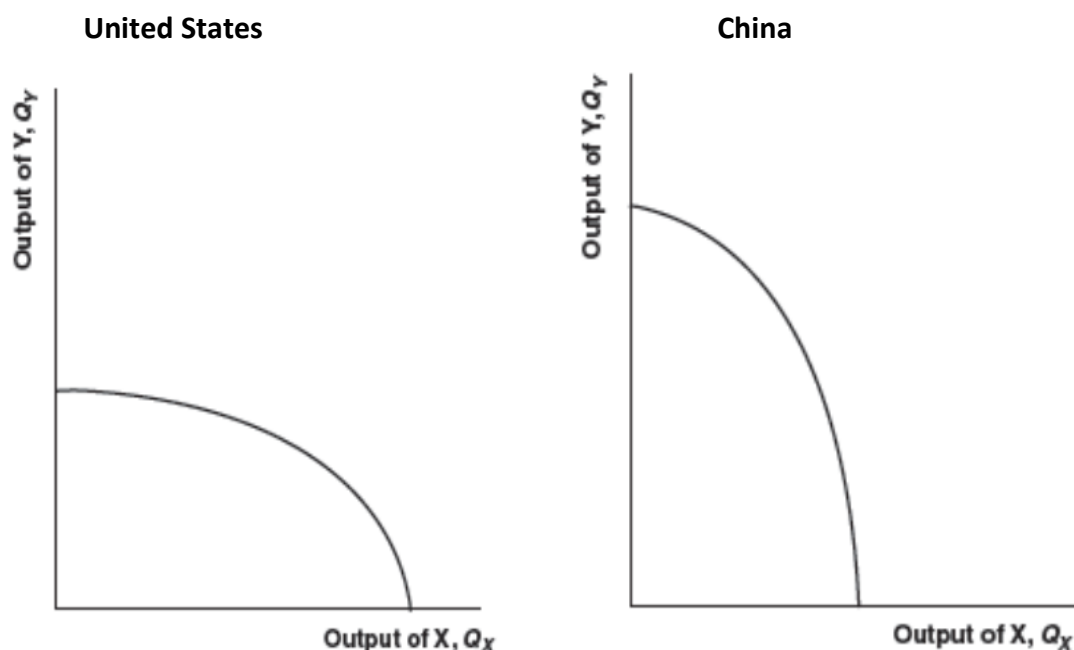
International Trade

Georgetown University School of Foreign Service in Qatar

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Problem 1

Suppose the United States and China produce two goods, Y and X. Assume that good Y is labor intensive and good X is capital intensive.



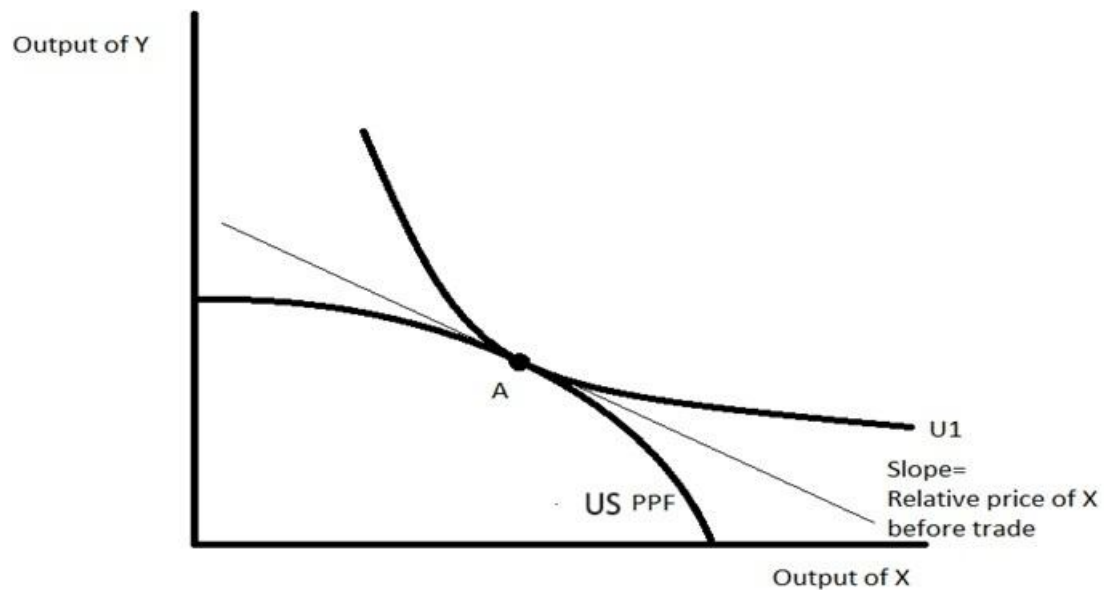
- a. Given the above PPFs, which country is relatively labor-abundant? Capital-abundant? Explain.

Answer: We know that good Y is labor intensive and good X is capital intensive. If the United States devoted all of its resources to the production of good X, it would produce more than China if it did the same. Thus, United States is capital abundant.

We can apply similar reasoning to get that Ireland is labor abundant.

- b. Suppose the countries have identical preferences. Show the no-trade equilibrium and the free-trade equilibrium. Be sure to label the production and consumption points for both economies.

Answer: No trade equilibrium for the United States

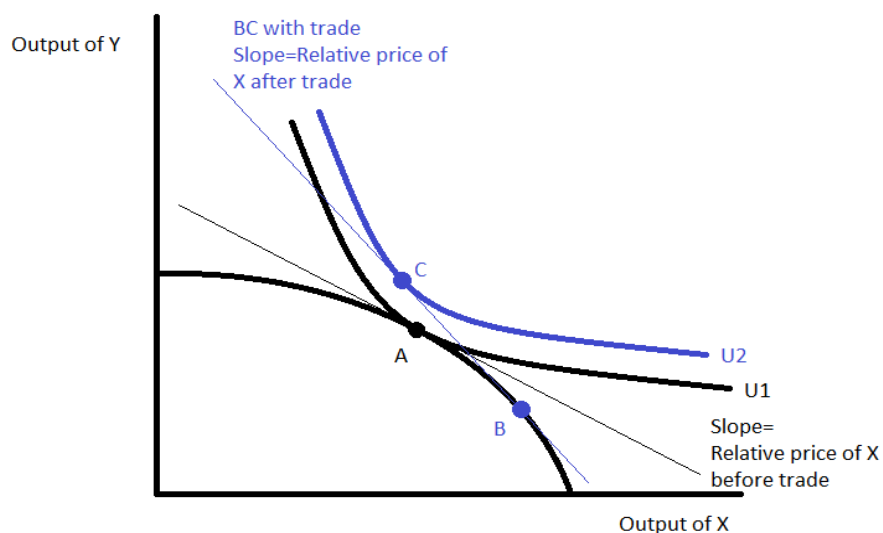


A is the production and consumption bundle.

Repeat the same process for China. Because of the shape of the PPFs of both countries and the fact that they have the same preferences, the relative price of good X is lower in the United States than in China before trade.

Thus, if these two countries begin to trade then the relative price of good X in the United States must go up.

Trade equilibrium in the United States



B is the trade production bundle and C is the trade consumption bundle. Notice that given production bundle B, the BC characterizes all the bundles that are affordable to United States under trade.

Repeat the same process for China. In that case, the relative price of X will go down after the countries open up to trade.

c. Which good will China export? What about the United States? Explain.

Answer: On the graph above, you can see that the United States exports good X and imports good Y.

China will import good X and export good Y.

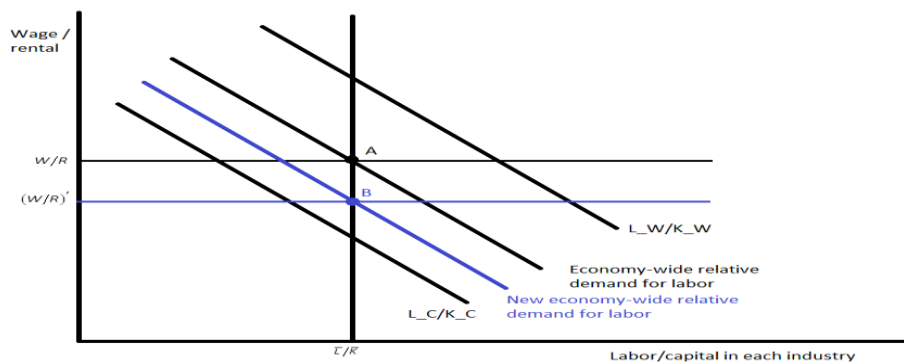
d. Compare the relative factor prices (wages/rental) in the two countries before and after trade.

Answer: We first characterize the relative supply and relative demand for labor in the United States:

$$\frac{\bar{L}}{\bar{K}} = \frac{L_X}{K_X} \left(\frac{K_X}{\bar{K}} \right) + \frac{L_Y}{K_Y} \left(\frac{K_Y}{\bar{K}} \right)$$

no change

Since the production of good X will increase in the United States, we get that $\frac{K_X}{\bar{K}}$ rises and $\frac{K_Y}{\bar{K}}$ falls. This causes the following change in the economy-wide relative demand for labor.



[We see that wage/rental declines.

Something else to note is that the lower relative wage induces both industries to hire more workers per unit of capital (a move down along their relative demand curves). We get that

$$\frac{\bar{L}}{\bar{K}} = \frac{L_X}{K_X} \left(\frac{K_X}{\bar{K}} \right) + \frac{L_Y}{K_Y} \left(\frac{K_Y}{\bar{K}} \right)$$

$\uparrow \quad \uparrow \quad \uparrow \quad \downarrow$

no change

e. Comment on the overall welfare in both countries.

Answer: In the case of the United States, we see that welfare increases since C is on a higher indifference curve than A. If we draw the same graph for China, we will also have the same result.

In China, the exact opposite will happen.

Problem 2

Consider two countries, Vietnam and China, producing two goods, textiles and televisions. Suppose that textiles are relatively labor-intensive. Vietnam has 20 units of capital and 16 units of labor, and China has 300 units of capital and 150 units of labor.

a. Which country is relatively labor-abundant? Explain.

Answer: Vietnam is labor-abundant because the labor–capital ratio in Vietnam exceeds that in China. Namely, $\bar{L}_V/\bar{K}_V > \bar{L}_C/\bar{K}_C$.

b. Which country will export textiles? Explain.

Answer: Vietnam will export textiles because it is labor-abundant.

c. In Vietnam, the production of which good decreases under trade? In China?

Answer: In Vietnam, the production of televisions will decrease, whereas the production of textiles will increase in China.

d. In China, is the relative price of televisions higher under free trade or no trade? Explain.

Answer: The relative price of televisions is higher under free trade than no trade because China is capital-abundant relative to Vietnam and the production of televisions is capital-intensive.

e. Which group benefits from trade in China? In Vietnam?

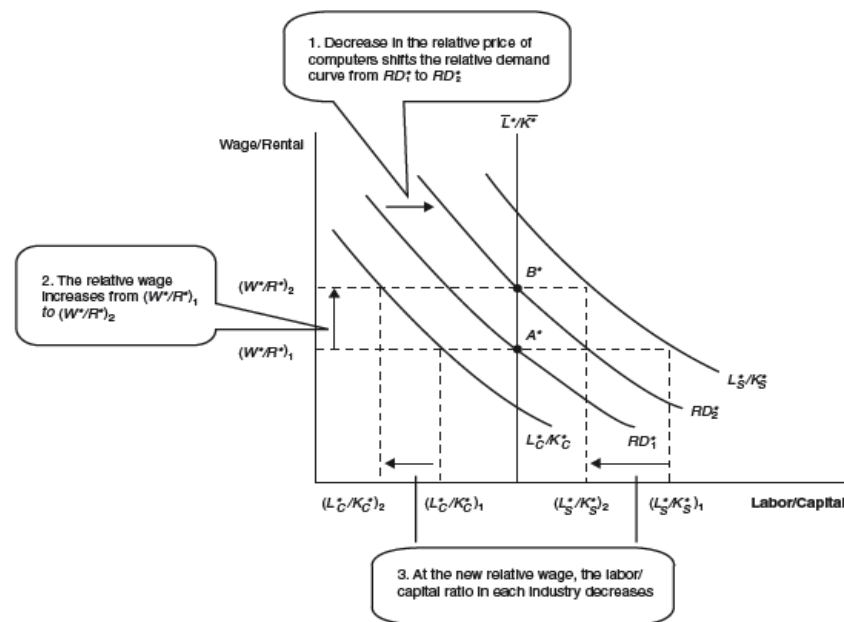
Answer: From the Stolper–Samuelson theorem, the real rental on capital will increase, so capital owners in China and labor in Vietnam will benefit.

Solutions to Exercises at the end of Chapter 4

7. Using a diagram similar to Figure 4-13, show the effect of a decrease in the relative price of computers in Foreign. What happens to the wage relative to the rental? Is there an increase in the labor–capital ratio in each industry? Explain.

Answer: With free trade the labor-abundant Foreign country will increase production of the labor-intensive good (shoes), leading to a rightward shift of the relative demand curve from RD_1^* to RD_2^* . At the new equilibrium point B^* , computers are weighted less, a fall in (K_C^*/K^*) , whereas the shoe industry is weighted more, a rise in (K_S^*/K^*) . As a result of the rise in the relative demand for labor in the shoe industry, the relative wage increases,

which in turn lowers the labor/capital ratio in both industries.



8. Suppose that when Japan opens to trade, it imports rice, a labor-intensive good.

- a. According to the Heckscher–Ohlin theorem, is Japan capital-abundant or labor-abundant? Briefly explain.

Answer: Japan is capital-abundant because it imports the labor-intensive good.

- b. What is the impact of opening trade on the real wage in Japan?

Answer: Japan will specialize in the capital-intensive product, which will lead to an increase in the relative demand for capital in the capital-intensive industry. This causes an increase in the relative rent. The higher relative rent cuts the number of capital hired per unit of labor in the capital-intensive industry, thereby decreasing the capital/labor ratio. By the law of diminishing returns, the decrease in the capital/labor ratio leads to an increase in the marginal product of capital in both industries. Thus, the real rent will increase in Japan following trade.

- c. What is the impact of opening trade on the real rental on capital?

Answer: The real rental on capital will increase because the world relative price of rice is lower than Japan's no-trade relative price. More specifically, the marginal product of capital increases, so the real rental on capital rises. Based on the Stolper–Samuelson theorem, the abundant factor gains from trade, whereas the scarce factor loses from trade. Japan is labor-scarce and imports labor-intensive goods, so the real rental on capital increases as a result of trade.

- d. Which group (capital owner or labor) would support policies to limit free trade? Briefly explain.

Answer: The labor group will support policies to limit free trade because they suffer a loss due to the decrease in the relative price of rice when Japan engages in trade.