

d. Compare U.S. relative factor prices under free trade to autarky.

e. Who would oppose free trade in the United States?

REVIEW 4.1 SOLUTIONS (U.S. PRODUCTION)

In either country, producing one yard of cloth uses 2 units of labor and 1 acre of land, while producing one pound of food uses 2 units of labor and 3 acres of land. The United States has 900 units of labor and 600 acres of land.

- a. What is the United States labor constraint?

$$a_{LC}Q_C + a_{LF}Q_F = L$$

$$2Q_C + 2Q_F = 900$$

$$Q_F = 450 - Q_C$$

- b. What is the United States land constraint?

$$a_{TC}Q_C + a_{TF}Q_F = T$$

$$Q_C + 3Q_F = 600$$

$$Q_F = 200 - \frac{1}{3}Q_C$$

- c. What United States production bundle fully employs both factors?

$$450 - Q_C = 200 - \frac{1}{3}Q_C$$

$$\left(1 - \frac{1}{3}\right)Q_C = 450 - 200$$

$$\frac{2}{3}Q_C = 250 \rightarrow Q_C = 375$$

$$Q_F = 450 - Q_C = 450 - 375 = 75$$

REVIEW 4.2 SOLUTIONS (RUSSIAN PRODUCTION)

Russia has 900 units of labor and 900 acres of land.

- a. What is the Russian land constraint?

$$a_{TC} Q_C^* + a_{TF} Q_F^* = T^*$$

$$Q_C^* + 3 Q_F^* = 900$$

$$Q_F^* = 300 - \frac{1}{3} Q_C^*$$

- b. What Russian production bundle fully employs both factors?

$$450 - Q_C^* = 300 - \frac{1}{3} Q_C^*$$

$$\left(1 - \frac{1}{3}\right) Q_C^* = 450 - 300$$

$$\frac{2}{3} Q_C^* = 150 \rightarrow Q_C^* = 225$$

$$Q_F^* = 450 - Q_C^* = 450 - 225 = 225$$

- c. Compare the two countries' supplies of cloth relative to food.
The United States produces more cloth relative to food than Russia.

$$5 = \frac{375}{75} = \frac{Q_C}{Q_F} > \frac{Q_C^*}{Q_F^*} = \frac{225}{225} = 1$$

- d. Which country is relatively abundant in labor to land?
United States has a relative abundance in labor to land.

$$\frac{3}{2} = \frac{900}{600} = \frac{L}{T} > \frac{L^*}{T^*} = \frac{900}{900} = 1$$

- e. Which good makes relatively intensive use of labor to land?
Cloth production is relatively intensive in labor to land.

$$2 = \frac{2}{1} = \frac{a_{LC}}{a_{TC}} > \frac{a_{LF}}{a_{TF}} = \frac{2}{3}$$

- f. Determine the pattern of comparative advantage and the pattern of trade.

The United States has comparative advantage in cloth and Russia in food. The United States exports cloth and imports food, while Russia exports food and imports cloth.

REVIEW 4.3 SOLUTIONS (U.S. AUTARKY PRICING)

The price of food is always \$240/pound. In the United States, the price of cloth is \$120/yard in autarky.

- a. What is the pricing equation for food?

$$a_{LF}w + a_{TF}r = P_F$$

$$2w + 3r = 240$$

$$r = 80 - \frac{2}{3}w$$

- b. What is the U.S. pricing equation for cloth in autarky?

$$a_{LC}w^A + a_{TC}r^A = P_C^A$$

$$2w^A + r^A = 120$$

$$r^A = 120 - 2w^A$$

- c. What U.S. autarkic factor prices allow both goods to be priced at cost?

$$120 - 2w^A = 80 - \frac{2}{3}w^A$$

$$\left(2 - \frac{2}{3}\right)w^A = 120 - 80$$

$$\left(\frac{4}{3}\right)w^A = 40 \rightarrow w^A = 30$$

$$r^A = 120 - 2w^A = 120 - 2(30) = 120 - 60 = 60$$

REVIEW 4.4 SOLUTIONS (FREE TRADE PRICING)

In both countries, the price of cloth is \$144/yard under free trade.

- a. What is the pricing equation for cloth under free trade?

$$a_{LC}w + a_{TC}r = P_C$$

$$2w + r = 144$$

$$r = 144 - 2w$$

- b. What factor prices under free trade allow both goods to be produced at cost?

$$144 - 2w = 80 - \frac{2}{3}w$$

$$\left(2 - \frac{2}{3}\right)w = 144 - 80$$

$$\frac{4}{3}w = 64 \rightarrow w = 48$$

$$r = 144 - 2w = 144 - 2(48) = 144 - 96 = 48$$

- c. How should factor prices in the United States and Russia compare under free trade.

The factor prices are the same across countries due to the same technology and the same prices of goods.

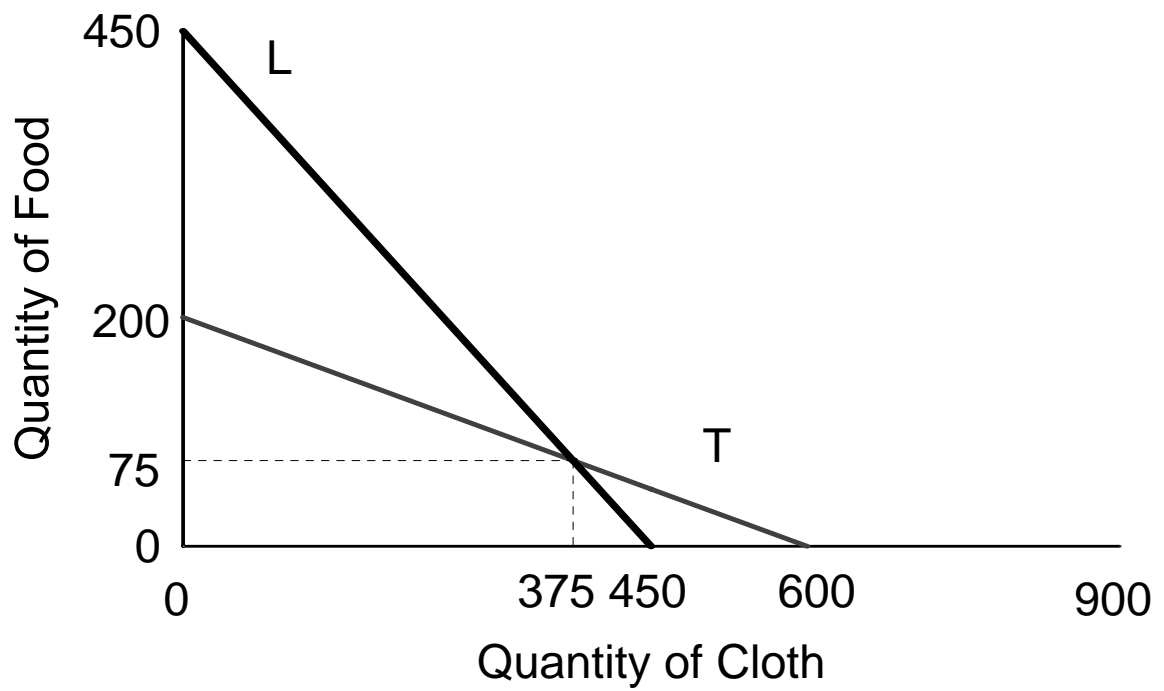
- d. Compare U.S. factor prices under free trade to autarky.
The wage to rent ratio rises in the United States in the move from autarky to free trade because labor is relatively abundant in the United States.

$$\frac{w}{r} = 1 = \frac{48}{48} > \frac{30}{60} = \frac{1}{2} = \frac{w^A}{r^A}$$

- e. Who would oppose free trade in the United States?
United States landlords would oppose a free trade agreement because the purchasing power of their income would fall.

$$\hat{r} < \hat{P}_F < \hat{P}_C < \hat{w} \rightarrow -20\% < 0 < 20\% < 60\%$$

Review 4.1 U.S. Production



Review 4.2 Russian Production



Review 4.3 & 4.4 U.S. Pricing

