

First Midterm Exam, Spring 2004

RICARDIAN MODEL

- 1-4. Cheese and wine are produced with labor. Suppose that the relative price of cheese in terms of wine is higher in the United States than in Canada under autarky.
1. The United States has comparative advantage in
 - a. Only cheese
 - b. Only wine
 - c. Both cheese and wine
 - d. Neither cheese nor wine
 - e. Would need information about unit labor requirements to know
 2. Canada has comparative advantage in
 - a. Only cheese
 - b. Only wine
 - c. Both cheese and wine
 - d. Neither cheese nor wine
 - e. Would need information about unit labor requirements to know
 3. The United States has absolute advantage in
 - a. Only cheese
 - b. Only wine
 - c. Both cheese and wine
 - d. Neither cheese nor wine
 - e. Would need information about unit labor requirements to know
 4. Canada has absolute advantage in
 - a. Only cheese
 - b. Only wine
 - c. Both cheese and wine
 - d. Neither cheese nor wine
 - e. Would need information about unit labor requirements to know

- 5-8 The United States and Mexico engage in free trade in cheese and wine, which are produced with labor. The relative price of cheese to wine under free trade equals the opportunity cost of cheese in terms of wine in the United States. The United States has comparative advantage in cheese relative to wine compared to Mexico.
5. Does the United States gain from trade?
 - a. Yes, definitely
 - b. No, definitely
 - c. Yes, but only if produce just cheese
 - d. Yes, but only if produce just wine
 - e. Yes, but only if produce both goods

 6. Does Mexico gain from trade?
 - a. Yes, definitely
 - b. No, definitely
 - c. Yes, but only if produce just cheese
 - d. Yes, but only if produce just wine
 - e. Yes, but only if produce both goods

 7. How does the wage paid in the cheese sector compare to the wage paid in the wine sector in the United States?
 - a. Wage is higher in the cheese sector
 - b. Wage is lower in the cheese sector
 - c. Wage is the same in the cheese sector
 - d. Wage is the same or higher in the cheese sector
 - e. Wage is the same or lower in the cheese sector

 8. How does the wage paid in the cheese sector compare to the wage paid in the wine sector in Mexico?
 - a. Wage is higher in the cheese sector
 - b. Wage is lower in the cheese sector
 - c. Wage is the same in the cheese sector
 - d. Wage is the same or higher in the cheese sector
 - e. Wage is the same or lower in the cheese sector

SPECIFIC FACTORS MODEL

9-12 Manufacturing uses labor and capital, while food uses labor and land.

9. If the value of the marginal product of labor in manufacturing exceeds the wage, what should a manufacturing firm do?
 - a. Hire more workers
 - b. Fire some workers
 - c. Use more capital
 - d. Use more land
 - e. Fire some workers and hire more capital

10. If the wage exceeds the value of the marginal product of labor in food, what should a firm producing food do?
 - a. Hire more workers
 - b. Fire some workers
 - c. Use less capital
 - d. Use less land
 - e. Hire more workers and use less land

11. An increase in the price of manufactures causes the value of the marginal product of labor in manufacturing to
 - a. Rise
 - b. Fall
 - c. Remain the same
 - d. Rise or remain the same
 - e. Fall or remain the same

12. In equilibrium, an increase in the price of manufactures causes the wage to
 - a. Rise in the manufacturing sector
 - b. Rise in the food sector
 - c. Rise in both the manufacturing and the food sectors
 - d. Fall in the food sector
 - e. Rise in the manufacturing sector and fall in the food sector

13-16 Food production uses labor and land, while manufacturing uses labor and capital. Suppose that under free trade, the relative price of manufacturing to food rises in both the United States and Japan.

13. In the United States, owners of which specific factor or factors are hurt by the price change?
 - a. Capital
 - b. Land
 - c. Labor
 - d. Both capital and land
 - e. Both labor and land

14. In the United States, owners of which specific factor or factors benefit from the price change?
 - a. Capital
 - b. Land
 - c. Labor
 - d. Both capital and land
 - e. Both labor and land

15. In Japan, owners of which specific factor or factors are hurt by the price change?
 - a. Capital
 - b. Land
 - c. Labor
 - d. Both capital and land
 - e. Both labor and land

16. In Japan, owners of which specific factor or factors benefit from the price change?
 - a. Capital
 - b. Land
 - c. Labor
 - d. Both capital and land
 - e. Both labor and land

PROBLEMS (Ricardian Model)

In China, producing one pound of cheese requires one unit of labor, while producing one gallon of wine requires three units of labor. In the United States, producing one pound of cheese requires one unit of labor, while producing one gallon of wine requires one unit of labor. China has 300 units of labor and the United States has 200 units of labor. World relative demand for cheese to wine is

$$RD \equiv \frac{D_C}{D_W} = \frac{P_W}{P_C}.$$

1. Construct the production possibilities frontier for China. Determine the maximum production of cheese and wine. What is China's opportunity cost of cheese in terms of wine and where does it appear in the equation describing production possibilities? *Draw graph of Chinese production possibilities frontier.*
2. Construct the production possibilities frontier for the United States. Determine the maximum production of cheese and wine. What is the U.S. opportunity cost of cheese in terms of wine? Compare the slopes of the two production possibilities frontiers – which is flatter and why? *Draw graph of the U.S. production possibilities frontier.*
3. What is the world relative supply of cheese to wine if each country produces only its comparative advantage good? Construct the world relative supply and world relative demand functions. Find the world equilibrium relative price of cheese in terms of wine under free trade. *Draw graph of world relative supply and world relative demand.*
4. Determine the optimal production bundle for China and the optimal production bundle for the United States under free trade. Determine whether China and/or the United States gains from trade and explain the source of any gains from trade.
5. Construct the trade possibilities frontier for China. Determine the maximum consumption of cheese and wine under free trade. Where does the free trade relative price of cheese in terms of wine appear in the equation describing trade possibilities? *Draw graph of China's trade possibilities frontier on the PPF graph.*

6. Construct the trade possibilities frontier for the United States. Determine the maximum consumption of cheese and wine under free trade. Compare the slopes of the two trade possibilities frontiers. *Draw graph of U.S. trade possibilities frontier on the PPF graph.*

First Midterm Exam Solutions, Spring 2004

MULTIPLE CHOICE

- 1b The United States must have comparative advantage in only wine.
- 2a Canada must have comparative advantage in only cheese.
- 3e Would need information about unit labor requirements to know.
- 4e Would need information about unit labor requirements to know.

- 5b No, the United States definitely does not gains from trade.
- 6a Yes, Mexico definitely gains from trade.
- 7c In the United States, the wage in the cheese sector is the same.
- 8b In Mexico, the wage in the cheese sector is lower.

- 9a A firm should hire more workers.
- 10b A firm should fire some workers.
- 11a An increase in the price of manufactures causes the value of the marginal product of labor in manufactures to rise.
- 12c In equilibrium, an increase in the price of manufactures causes the wage to rise in both the manufacturing and the food sectors.

- 13b In the United States, owners of land suffer.
- 14a In the United States, owners of capital benefit.
- 15b In Japan, owners of land suffer.
- 16a In Japan, owners of capital benefit.

PROBLEMS (Ricardian Model)

In China, producing one pound of cheese requires one unit of labor, while producing one gallon of wine requires three units of labor. In the United States, producing one pound of cheese requires one unit of labor, while producing one gallon of wine requires one unit of labor. China has 300 units of labor and the United States has 200 units of labor. World relative demand for cheese to wine is

$$RD \equiv \frac{D_C}{D_W} = \frac{P_W}{P_C}.$$

1. Construct the production possibilities frontier for China

$$a_{LC} Q_C + a_{LW} Q_W = L, \quad Q_C + 3Q_W = 300, \quad Q_W = 100 - \frac{1}{3} Q_C$$

Determine the maximum production of cheese and wine.

$$\bar{Q}_C = 300, \quad \bar{Q}_W = 100$$

What is China's opportunity cost of cheese in terms of wine and where does it appear in the equation describing production possibilities?

$$\frac{a_{LC}}{a_{LW}} = \frac{1}{3}$$

Absolute value of slope of production possibilities frontier

GRAPH OF PRODUCTION POSSIBILITIES FRONTIER: horizontal axis labeled cheese, vertical axis labeled wine; cheese endpoint 300; wine endpoint 100; PPF label

2. Construct the production possibilities frontier for the United States.

$$a_{LC}^* Q_C^* + a_{LW}^* Q_W^* = L^*, \quad Q_C^* + Q_W^* = 200, \quad Q_W^* = 200 - Q_C^*$$

Determine the maximum production of cheese and wine.

$$\bar{Q}_C^* = 200, \quad \bar{Q}_W^* = 200$$

What is the U.S. opportunity cost of cheese in terms of wine?
Compare the slopes of the two production possibilities frontiers – which is flatter and why?

$$\frac{a_{LC}^*}{a_{LW}^*} = \frac{1}{1} = 1$$

China's production possibilities frontier flatter due to lower opportunity cost of cheese in terms of wine.

$$\frac{1}{3} = \frac{a_{LC}}{a_{LW}} < \frac{a_{LC}^*}{a_{LW}^*} = 1$$

GRAPH OF PRODUCTION POSSIBILITIES FRONTIER*: horizontal axis labeled cheese, vertical axis labeled wine; cheese endpoint 200; wine endpoint 200; PPF* label

3. What is the world relative supply of cheese to wine if each country produces only its comparative advantage good?

$$\tilde{RS} = \frac{\bar{Q}_C}{\bar{Q}_W^*} = \frac{300}{200} = \frac{3}{2} = 1.5$$

Construct the world relative supply and world relative demand functions.

P_C/P_W	$RD = P_W/P_C$	RS
1/3	3	0 .. 3/2
2/3	3/2	3/2
1	1	3/2 .. ∞

Find the world equilibrium relative price of cheese in terms of wine under free trade.

$$\frac{P_C}{P_W} = \frac{2}{3}$$

GRAPH OF RELATIVE DEMAND AND RELATIVE SUPPLY:
horizontal axis labeled relative quantity of cheese (to wine), vertical axis labeled relative price of cheese (to wine); first step at 1/2, second step at 1; jump at 3/2 and free trade relative price 2/3; other two points on RD; RD label, RS label

4. Determine the optimal production bundle for China and the optimal production bundle for the United States under free trade.

$$Q_C = \bar{Q}_C = 300, Q_W = 0$$

$$Q_C^* = 0, Q_W^* = \bar{Q}_W^* = 200$$

Determine whether China and/or the United States gains from trade and explain the source of any gains from trade.

Both countries gain from trade as the free trade relative price differs from both opportunity costs.

5. Construct the trade possibilities frontier for China.

$$\frac{P_C}{P_W} D_C + D_W = \frac{P_C}{P_W} \bar{Q}_C, \quad \frac{2}{3} D_C + D_W = \frac{2}{3} (300) = 200, \quad D_W = 200 - \frac{2}{3} D_C$$

Determine the maximum consumption of cheese and wine under free trade.

$$\bar{D}_C = 300, \quad \bar{D}_W = 200$$

Where does the free trade relative price of cheese in terms of wine appear in the equation describing trade possibilities?

Absolute value of slope of trade possibilities frontier

GRAPH OF TRADE POSSIBILITIES FRONTIER: cheese endpoint 300; wine endpoint 200; TPF label; position of TPF outside PPF

6. Construct the trade possibilities frontier for the United States.

$$\frac{P_C}{P_W} D_C^* + D_W^* = \bar{Q}_W^*, \quad \frac{2}{3} D_C^* + D_W^* = 200, \quad D_W^* = 200 - \frac{2}{3} D_C^*$$

Determine the maximum consumption of cheese and wine under free trade.

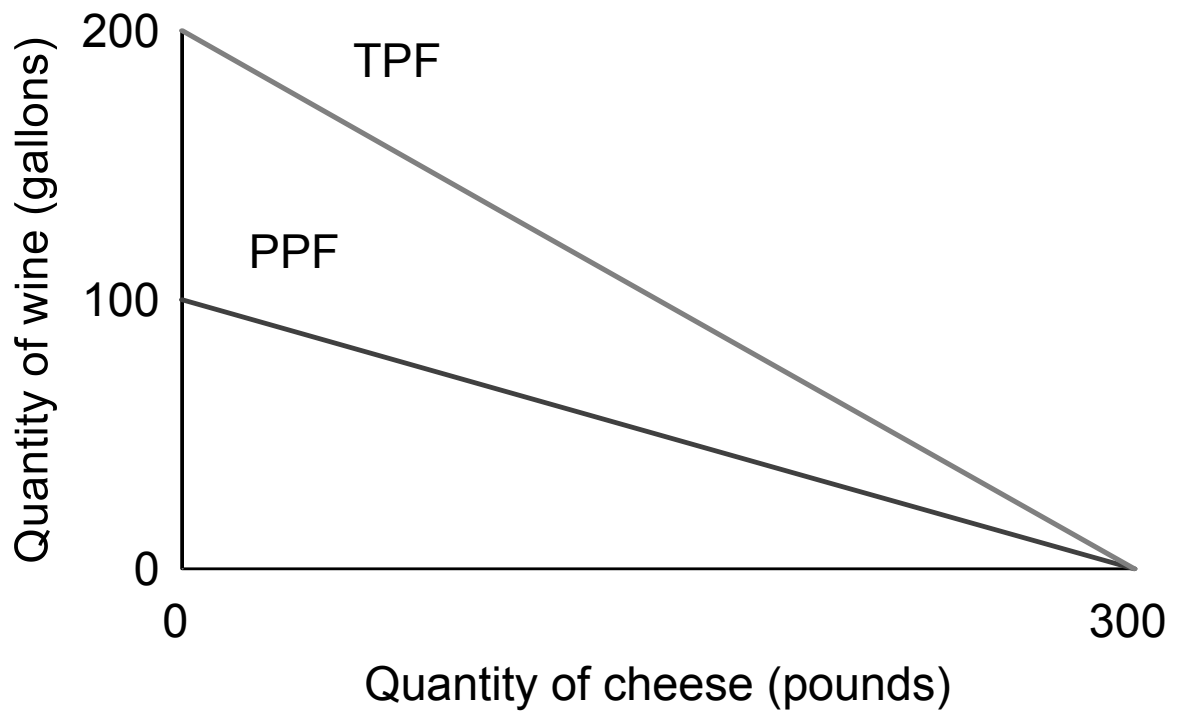
$$\bar{D}_C^* = 300, \quad \bar{D}_W^* = 200$$

Compare the slopes of the two trade possibilities frontiers.

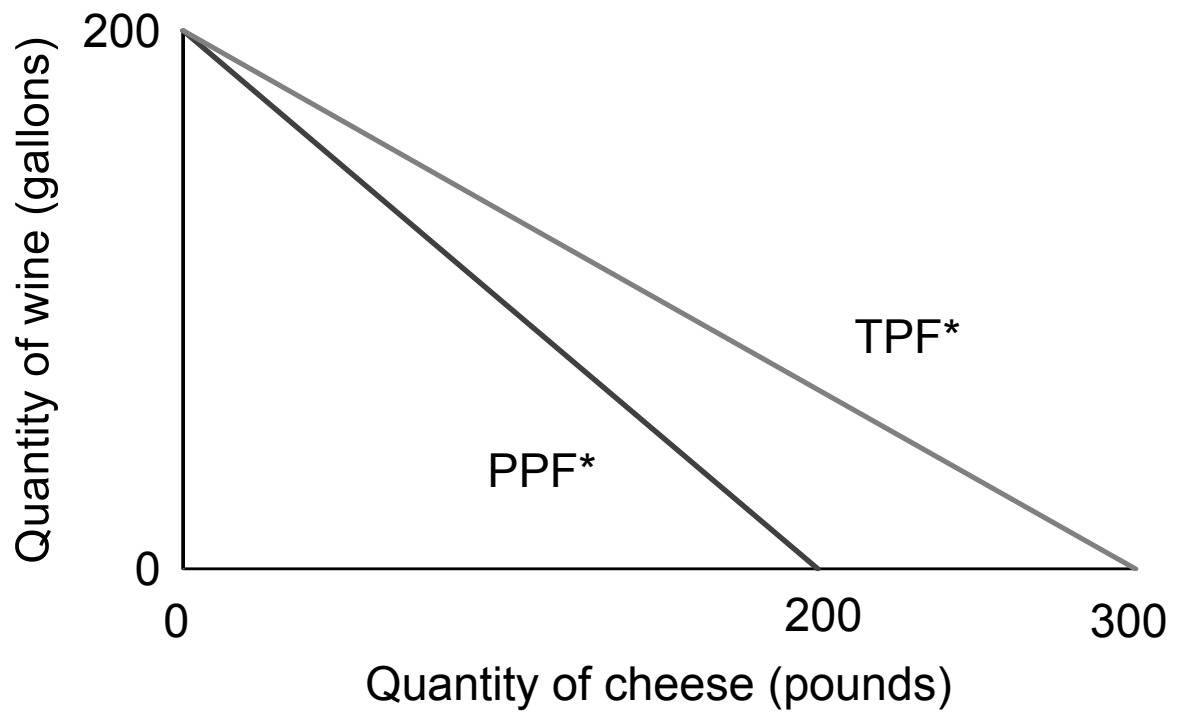
Same as the two countries face same relative price under free trade

GRAPH OF TRADE POSSIBILITIES FRONTIER*: cheese endpoint 300; wine endpoint 200; TPF* label; position of TPF* outside PPF*

1&5 Chinese PPF and TPF



2&6 U.S. PPF and TPF



3 World RS & RD

