

First Midterm Exam, Fall 2004

RICARDIAN MODEL

- 1-4. Cheese and wine are produced with labor. Suppose that the relative price of cheese in terms of wine is lower in the United States than in Canada under autarky.
1. The United States exports
 - a. Only cheese
 - b. Only wine
 - c. Nothing
 - d. Cheese and sometimes wine
 - e. Wine and sometimes cheese
 2. Canada exports
 - a. Only cheese
 - b. Only wine
 - c. Nothing
 - d. Cheese and sometimes wine
 - e. Wine and sometimes cheese
 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 Mexico. The United States has comparative advantage in cheese relative to wine compared to Mexico.
5. Does the United States gain from trade?
- Yes, definitely
 - No, definitely
 - Yes, but only if produce just cheese
 - Yes, but only if produce just wine
 - Yes, but only if produce both goods
6. Does Mexico gain from trade?
- Yes, definitely
 - No, definitely
 - Yes, but only if produce just cheese
 - Yes, but only if produce just wine
 - 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?
- Wage is higher in the cheese sector
 - Wage is lower in the cheese sector
 - Wage is the same in the cheese sector
 - Wage is the same or higher in the cheese sector
 - 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?
- Wage is higher in the cheese sector
 - Wage is lower in the cheese sector
 - Wage is the same in the cheese sector
 - Wage is the same or higher in the cheese sector
 - 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. An increase in the price of manufactures causes some workers to
 - a. Leave food sector
 - b. Enter food sector
 - c. Leave manufacturing
 - d. Enter manufacturing
 - e. Leave food sector and enter manufacturing

10. An increase in the price of manufactures causes 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

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 the relative price of manufacturing to food rises in Japan and falls in the United States due to opening up to free trade.

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 the United States (US), producing one pound of cheese requires ten units of labor, while producing one gallon of wine requires two units of labor. In the rest of the world (ROW), producing one pound of cheese requires one hundred units of labor, while producing one gallon of wine requires four units of labor. The United States has 1000 units of labor and the ROW has 4800 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 the United States. Determine the maximum production of cheese and wine. What is the US opportunity cost of cheese in terms of wine? Where does it appear in the equation describing production possibilities? Draw graph of US production possibilities frontier.
2. Construct the production possibilities frontier for the ROW. Determine the maximum production of cheese and wine. What is the ROW 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 ROW 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 each country under free trade. Determine whether each country gains from trade and explain the source of any gains from trade.
5. Construct the trade possibilities frontier for the United States. 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 US trade possibilities frontier on the PPF graph.

6. Construct the trade possibilities frontier for the ROW. Determine the maximum consumption of cheese and wine under free trade. Compare the slopes of the two trade possibilities frontiers and explain. Draw graph of ROW trade possibilities frontier on the PPF graph.

First Midterm Exam Solutions, Fall 2004

MULTIPLE CHOICE

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

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

- 9e An increase in the price of manufactures causes some workers to leave food sector and enter manufacturing.
- 10b An increase in the price of manufactures causes the marginal product of labor in manufactures to fall.
- 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.

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

PROBLEMS (Ricardian Model)

In the United States (US), producing one pound of cheese requires ten units of labor, while producing one gallon of wine requires two units of labor. In the rest of the world (ROW), producing one pound of cheese requires one hundred units of labor, while producing one gallon of wine requires four units of labor. The United States has 1000 units of labor and the ROW has 4800 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 the United States

$$a_{LC}Q_C + a_{LW}Q_W = L, \quad 10Q_C + 2Q_W = 1000, \quad Q_W = 500 - 5Q_C$$

Determine the maximum production of cheese and wine.

$$\bar{Q}_C = 100, \quad \bar{Q}_W = 500$$

What is the US opportunity cost of cheese in terms of wine?

$$\frac{a_{LC}}{a_{LW}} = \frac{10}{2} = 5$$

Where does it appear in the equation describing production possibilities?

Absolute value of slope of production possibilities frontier

GRAPH OF PRODUCTION POSSIBILITIES FRONTIER: horizontal axis labeled cheese, vertical axis labeled wine; cheese endpoint 100; wine endpoint 500; PPF label

2. Construct the production possibilities frontier for the ROW.

$$a_{LC}^* Q_C^* + a_{LW}^* Q_W^* = L^*, \quad 100 Q_C^* + 4 Q_W^* = 4800, \quad Q_W^* = 1200 - 25 Q_C^*$$

Determine the maximum production of cheese and wine.

$$\bar{Q}_C^* = 48, \quad \bar{Q}_W^* = 1200$$

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

$$\frac{a_{LC}^*}{a_{LW}^*} = \frac{100}{4} = 25$$

US production possibilities frontier flatter due to lower opportunity cost of cheese in terms of wine.

$$5 = \frac{a_{LC}}{a_{LW}} < \frac{a_{LC}^*}{a_{LW}^*} = 25$$

GRAPH OF PRODUCTION POSSIBILITIES FRONTIER*: horizontal axis labeled cheese, vertical axis labeled wine; cheese endpoint 48; wine endpoint 1200; PPF* label

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

$$\tilde{RS} = \frac{\bar{Q}_C}{\bar{Q}_W^*} = \frac{100}{1200} = \frac{1}{12}$$

Construct the world relative supply and world relative demand functions.

P_C/P_W	$RD = P_W/P_C$	RS
5	1/5	0 .. 1/12
12	1/12	1/12
25	1/25	1/12 .. ∞

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

$$\frac{P_C}{P_W} = 12$$

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 5, second step at 25; jump at 1/12 and free trade relative price 12; other two points on RD; RD label, RS label

4. Determine the optimal production bundle for each country under free trade.

$$Q_C = \bar{Q}_C = 100, Q_W = 0$$

$$Q_C^* = 0, Q_W^* = \bar{Q}_W^* = 1200$$

Determine whether each country 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 the US.

$$\frac{P_C}{P_W} D_C + D_W = \frac{P_C}{P_W} \bar{Q}_C, \quad 12D_C + D_W = 12(100) = 1200, \quad D_W = 1200 - 12D_C$$

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

$$\bar{D}_C = 100, \quad \bar{D}_W = 1200$$

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 100; wine endpoint 1200; TPF label; position of TPF outside PPF

6. Construct the trade possibilities frontier for the ROW.

$$\frac{P_C}{P_W} D_C^* + D_W^* = \bar{Q}_W^*, \quad 12D_C^* + D_W^* = 1200, \quad D_W^* = 1200 - 12D_C^*$$

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

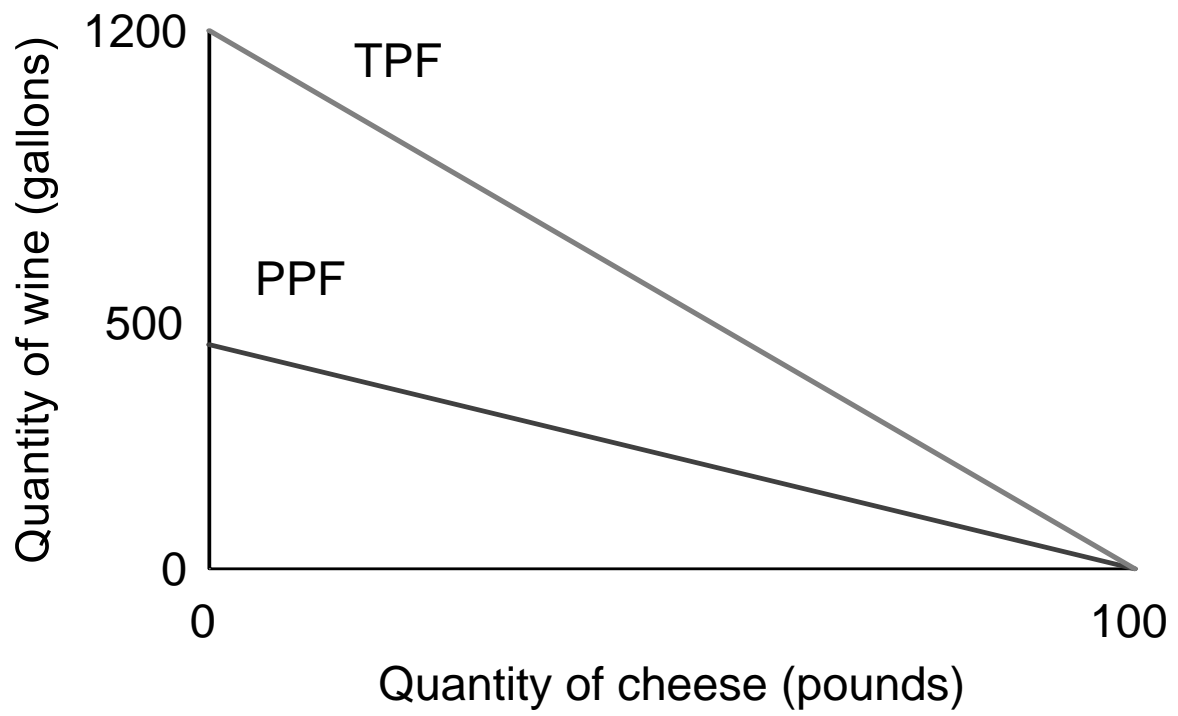
$$\bar{D}_C^* = 100, \quad \bar{D}_W^* = 1200$$

Compare the slopes of the two trade possibilities frontiers and explain.

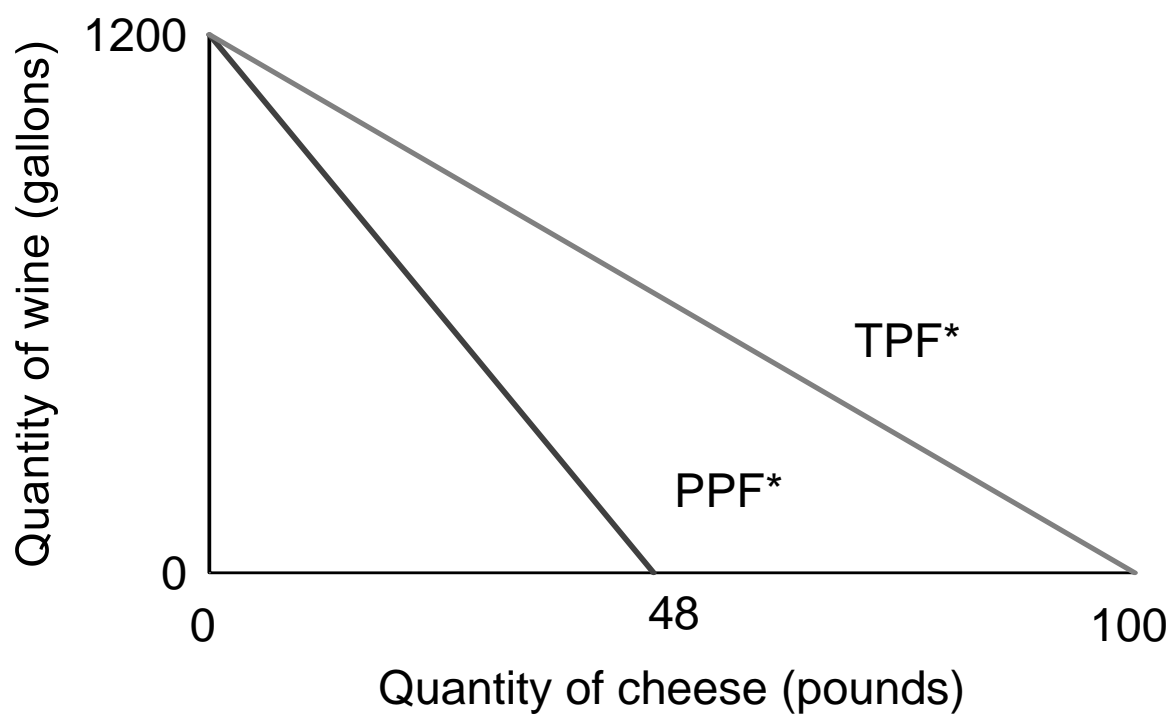
Same as the two countries face same relative price under free trade

GRAPH OF TRADE POSSIBILITIES FRONTIER*: cheese endpoint 100; wine endpoint 1200; TPF* label; position of TPF* outside PPF*

1&5 US PPF and TPF



2&6 ROW PPF and TPF



3 World RS & RD

