

First Midterm Exam, Spring 2005

RICARDIAN MODEL

- 1-4. Cheese and wine are produced with labor. Suppose that the opportunity cost of cheese in terms of wine is higher in the United States than in Canada.
1. Under free trade, the United States produces
 - a. Only cheese
 - b. Only wine
 - c. Nothing
 - d. Cheese and sometimes wine
 - e. Wine and sometimes cheese

 2. 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

 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. Under free trade, the United States exports
 - a. Only cheese
 - b. Only wine
 - c. Nothing
 - d. Cheese and sometimes wine
 - e. Wine and sometimes cheese

- 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.
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. Cannot tell from the information provided

 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 lower in the cheese sector
 - e. Cannot tell from the information provided

SPECIFIC FACTORS MODEL

9-12 Manufacturing uses labor and capital, while food uses labor and land. Suppose the price of food increases.

9. The increase in the price of food causes some workers to
 - a. Leave food sector
 - b. Enter food sector
 - c. Leave manufacturing
 - d. Enter manufacturing
 - e. Leave manufacturing and enter food sector

10. The increase in the price of food causes the value of the marginal product of labor in food in equilibrium to
 - a. Rise
 - b. Fall
 - c. Remain the same
 - d. Rise or remain the same
 - e. Fall or remain the same

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

12. In equilibrium, the increase in the price of food 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 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 the United States, how are workers (who own labor) affected by the price change?
 - a. They gain for sure
 - b. They are hurt for sure
 - c. Their nominal wage goes up by more than the price of manufactures
 - d. Their nominal wage goes up by less than the price of manufactures
 - e. Their nominal wage goes down

16. In the United States, how will production respond to the price change?
 - a. Output of manufactures increases
 - b. Output of food increases
 - c. Output of manufactures decreases
 - d. Output of food decreases
 - e. Output of manufactures increases and output of food decreases

PROBLEMS (Ricardian Model)

In the United States (US), producing one pound of cheese requires one unit of labor, while producing one gallon of wine requires five units of labor. In the rest of the world (ROW), producing one pound of cheese requires three units of labor, while producing one gallon of wine requires six units of labor. The United States has 400 units of labor and the ROW has 600 units of labor. World relative demand for cheese to wine is

$$RD / \frac{D_C}{D_W} \cdot \frac{P_W}{P_C}.$$

1. Construct the US production possibilities frontier (all three forms). 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 ROW production possibilities frontier (all three forms). 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 US trade possibilities frontier (all three forms). 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 ROW trade possibilities frontier (all three forms). 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, Spring 2005

MULTIPLE CHOICE

- 1e The United States produces wine and sometimes cheese.
- 2b The United States has comparative advantage in only wine.
- 3e Would need information about unit labor requirements to know.
- 4b Under free trade, the United States exports only wine.

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

- 9e The increase in the price of food causes some workers to leave manufacturing and enter the food sector.
- 10a The increase in the price of food causes the value of the marginal product of labor in food to rise in equilibrium.
- 11a The increase in the price of food causes the value of the marginal product of labor in manufactures to rise in equilibrium.
- 12c In equilibrium, the increase in the price of food 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.
- 15d In the United States, workers (owners of labor) see their nominal wage go up by less in proportion than the price of manufactures.
- 16e In the United States, output of manufactures increases and output of food decreases.

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

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

1. Construct the production possibilities frontier for the United States

$$a_{LC} Q_C + a_{LW} Q_W = L, \quad Q_C \leq 400, \quad Q_W \leq 80 + \frac{1}{5} Q_C$$

Determine the maximum production of cheese and wine.

$$\bar{Q}_C = 400, \quad \bar{Q}_W = 80$$

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

$$\frac{a_{LC}}{a_{LW}} = \frac{1}{5}$$

Where does it appear in the equation describing production possibilities?

Absolute value of slope

GRAPH OF PRODUCTION POSSIBILITIES FRONTIER: horizontal axis labeled cheese, vertical axis labeled wine; cheese endpoint 400; wine endpoint 80; PPF label

2. Construct the production possibilities frontier for the ROW.

$$a_{LC}^{(C)} Q_C^{(C)} + a_{LW}^{(C)} Q_W^{(C)} = L^{(C)}, \quad 3Q_C^{(C)} + 6Q_W^{(C)} = 600, \quad Q_W^{(C)} = 100 + \frac{1}{2}Q_C^{(C)}$$

Determine the maximum production of cheese and wine.

$$\bar{Q}_C^{(C)} = 200, \quad \bar{Q}_W^{(C)} = 100$$

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?

$$\frac{a_{LC}^{(C)}}{a_{LW}^{(C)}} = \frac{3}{6} = \frac{1}{2}$$

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

$$\frac{1}{5} = \frac{a_{LC}^{(U)}}{a_{LW}^{(U)}} < \frac{a_{LC}^{(C)}}{a_{LW}^{(C)}} = \frac{1}{2}$$

GRAPH OF PRODUCTION POSSIBILITIES FRONTIER*: horizontal axis labeled cheese, vertical axis labeled wine; cheese endpoint 100; 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?

$$\tilde{RS} = \frac{\bar{Q}_C}{\bar{Q}_W} = \frac{400}{100} = 4$$

Construct the world relative supply and world relative demand functions.

P_C/P_W	$RD = P_W/P_C$	RS
1/5	5	0 .. 4
1/4	4	4
1/2	2	4 .. 4

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

$$\frac{P_C}{P_W} = \frac{1}{4}$$

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 15, second step at 1/2; jump at 4 and free trade relative price 1/4; other two points on RD; RD label, RS label

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

$$Q_C' \bar{Q}_C' 400, Q_W' 0$$

$$Q_C^{(C)}' 0, Q_W^{(C)}' \bar{Q}_W^{(C)}' 100$$

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.

$$\frac{P_C}{P_W} D_C \% D_W' = \frac{P_C}{P_W} \bar{Q}_C, \frac{1}{4} D_C \% D_W' = \frac{1}{4} (400)' 100, D_W' = 100 \& \frac{1}{4} D_C$$

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

$$\bar{D}_C' = 400, \bar{D}_W' = 100$$

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

Absolute value of slope

GRAPH OF TRADE POSSIBILITIES FRONTIER: cheese endpoint 400; wine endpoint 100; TPF label; position of TPF outside PPF

6. Construct the trade possibilities frontier for the ROW.

$$\frac{P_C}{P_W} D_C^{(} \% D_W^{(} = \bar{Q}_W^{(}, \frac{1}{4} D_C^{(} \% D_W^{(} = 100, D_W^{(} = 100 \& \frac{1}{4} D_C^{(}$$

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

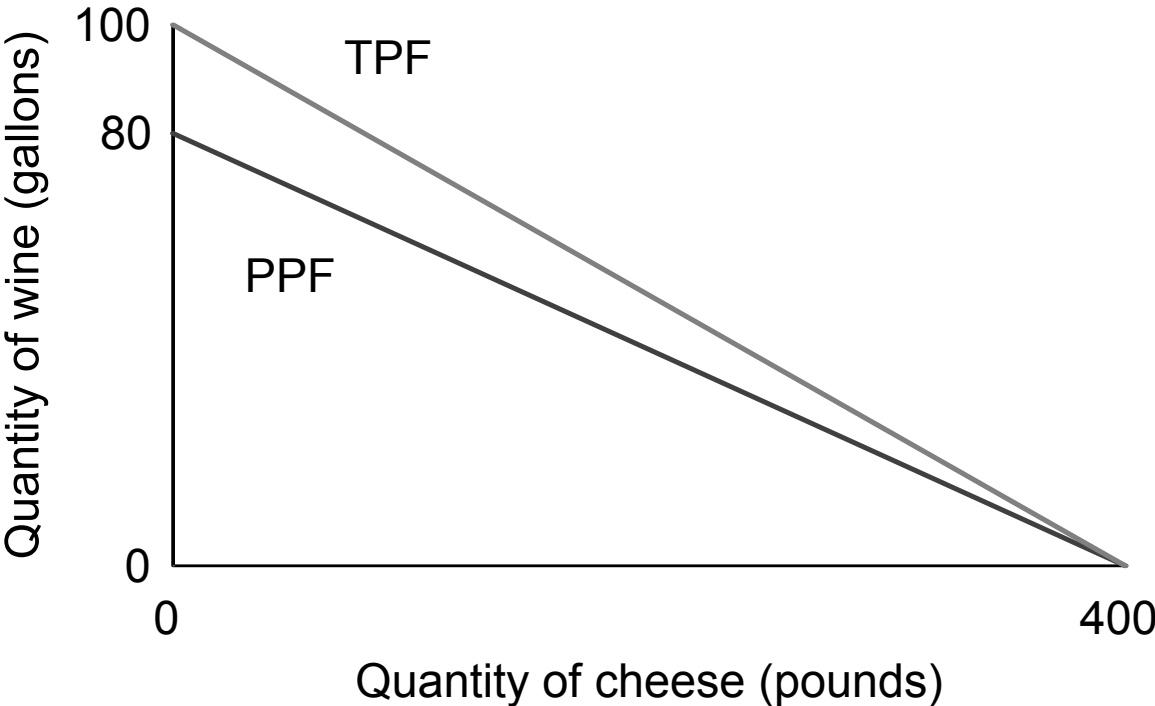
$$\bar{D}_C^{(} = 400, \bar{D}_W^{(} = 100$$

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

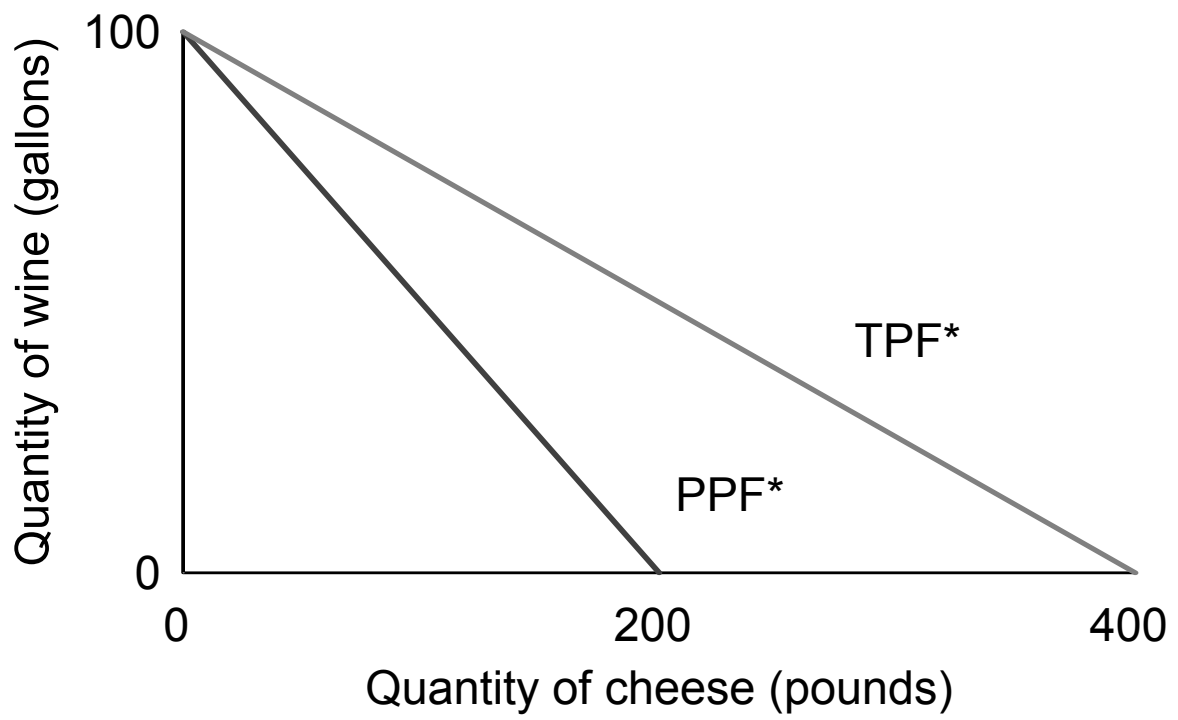
Same as the two countries face same relative price under free trade

GRAPH OF TRADE POSSIBILITIES FRONTIER*: cheese endpoint 400; wine endpoint 100; TPF* label; position of TPF* outside PPF*

1&5 US PPF and TPF



2&6 ROW PPF and TPF



3 World RS & RD

