

First Midterm Exam

RICARDIAN MODEL

- 1-4. Suppose that the relative price of chemicals to food under autarky is higher in Canada than in the United States and that the free trade relative price of chemicals to food in the United States is the same as in autarky.
1. Canada must have comparative advantage in
 - a. Only chemicals
 - b. Only food
 - c. Both chemicals and food
 - d. Neither chemicals nor food
 - e. Would need information about unit labor requirements to know
 2. The United States must have comparative advantage in
 - a. Only chemicals
 - b. Only food
 - c. Both chemicals and food
 - d. Neither chemicals nor food
 - e. Would need information about unit labor requirements to know
 3. Does Canada gain from trade?
 - a. Yes, definitely
 - b. No, definitely
 - c. Yes, but only if they produce only chemicals
 - d. Yes, but only if they produce only food
 - e. Yes, but only if they have an absolute advantage in food
 4. Does the United States gain from trade?
 - a. Yes, definitely
 - b. No, definitely
 - c. Yes, but only if we produce only chemicals
 - d. Yes, but only if we produce only food
 - e. Yes, but only if we have an absolute advantage in chemicals

- 5-8 The United States and Canada engage in free trade in airplanes and clothes, which are produced with labor. The relative price of clothes to airplanes under free trade is less than the opportunity cost of clothes in terms of airplanes in the United States.
5. The United States produces
- Only airplanes
 - Only clothes
 - Airplanes and maybe clothes
 - Clothes and maybe airplanes
 - Neither airplanes nor clothes
6. Canada produces
- Only airplanes
 - Only clothes
 - Airplanes and maybe clothes
 - Clothes and maybe airplanes
 - Neither airplanes nor clothes
7. The United States imports
- Only airplanes
 - Only clothes
 - Airplanes and maybe clothes
 - Clothes and maybe airplanes
 - Neither airplanes nor clothes
8. The United States exports
- Only airplanes
 - Only clothes
 - Airplanes and maybe clothes
 - Clothes and maybe airplanes
 - Neither airplanes nor clothes

SPECIFIC FACTORS MODEL

- 9-12 Lumber production uses labor and land, while food production uses labor and capital. Suppose that when opening up to free trade, the relative price of food to lumber rises in the United States and falls in Canada.
9. In the United States, owners of which specific factor or factors are hurt relative to autarky?
- Capital
 - Land
 - Labor
 - Both capital and land
 - Both labor and land
10. In the United States, owners of which specific factor or factors benefit relative to autarky?
- Capital
 - Land
 - Labor
 - Both capital and land
 - Both labor and land
11. In Canada, owners of which specific factor or factors are hurt relative to autarky?
- Capital
 - Land
 - Labor
 - Both capital and land
 - Both labor and land
12. In Canada, owners of which specific factor or factors benefit relative to autarky?
- Capital
 - Land
 - Labor
 - Both capital and land
 - Both labor and land

- 13-16. Medical equipment production uses labor and capital, while mineral production uses labor and land. Suppose the United States is abundant in capital relative to land compared to Canada.
13. An increase in the price of medical equipment causes workers to change jobs how?
- Seek jobs in the medical equipment sector
 - Quit jobs in the medical equipment sector
 - Seek jobs in the mineral sector
 - Quit jobs in the mineral sector
 - Both a and d
14. If workers move to the medical equipment sector from the mineral sector, what happens to the marginal product of labor?
- Rises in the medical equipment sector
 - Falls in the medical equipment sector
 - Rises in the mineral sector
 - Falls in the mineral sector
 - Both b and c
15. U.S. workers may benefit from or be hurt by an increase in the price of medical equipment because
- U.S. capital owners gain more than U.S. land owners lose
 - U.S. land owners lose more than U.S. capital owners gain
 - U.S. capital owners lose more than U.S. land owners gain
 - U.S. land owners gain more than U.S. capital owners lose
 - The real wage rises in terms of the price of minerals but falls in terms of the price of medical equipment
16. The curvature of the production possibilities frontier is best attributed to what feature of the specific factors model?
- Increasing opportunity costs
 - Decreasing opportunity costs
 - Constant opportunity costs
 - Both a and b
 - Both b and c

PROBLEMS (Ricardian Model)

In the United States, producing one pair of cowboy boots requires two units of labor, while producing one wool hat requires one unit of labor. In Canada, producing one pair of cowboy boots requires ten units of labor, while producing one wool hat requires one unit of labor. The United States has 110 units of labor and Canada has 220 units of labor. World relative demand for cowboy boots to wool hats 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 cowboy boots and wool hats. What is the U.S.'s opportunity cost of cowboy boots in terms of wool hats and where does it appear in the equation describing production possibilities? *Draw graph of U.S. production possibilities frontier.*
2. Construct the production possibilities frontier for Canada. Determine the maximum production of cowboy boots and wool hats. What is Canada's opportunity cost of cowboy boots in terms of wool hats? Compare the slopes of the two production possibilities frontiers – which is flatter and why? *Draw graph of Canada's production possibilities frontier.*
3. What is the world relative supply of cowboy boots to wool hats 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 cowboy boots in terms of wool hats under free trade. *Draw graph of world relative supply and world relative demand.*
4. Determine the optimal production bundle for the United States and the optimal production bundle for Canada under free trade. Determine whether the United States and/or Canada 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 cowboy boots and wool hats for the United States under free trade. Where does the free trade relative price of cowboy boots in terms of wool hats appear in the equation describing trade possibilities? *Draw graph of U.S. trade possibilities frontier.*

6. Construct the trade possibilities frontier for Canada. Determine the maximum consumption of cowboy boots and wool hats for Canada under free trade. Compare the slopes of the two trade possibilities frontiers. *Draw graph of Canada's trade possibilities frontier.*

First Midterm Exam Solutions

MULTIPLE CHOICE

- 1b Canada must have comparative advantage in only food.
- 2a The United States must have comparative advantage in only chemicals.
- 3a Yes, Canada does definitely gain from trade.
- 4b No, the United States does not gain from trade.

- 5a The United States produces only airplanes.
- 6d Canada produces clothes and maybe airplanes.
- 7b The United States imports only clothes.
- 8a The United States exports only airplanes.

- 9b In the United States, owners of land suffer relative to autarky.
- 10a In the United States, owners of capital benefit relative to autarky.
- 11a In Canada, owners of capital suffer relative to autarky.
- 12b In Canada, owners of land benefit relative to autarky.

- 13e Workers quit jobs in the mineral sector and seek jobs in the medical equipment sector.
- 14e The marginal product of labor rises in the mineral sector and falls in the medical equipment sector.
- 15e U.S. workers may benefit or suffer because the real wage rises in terms of the price of minerals but falls in terms of the price of medical equipment.
- 16a The curvature of the production possibilities frontier is best attributed to increasing opportunity costs.

PROBLEMS (Ricardian Model)

1. Construct the production possibilities frontier for the United States

$$a_{LC}Q_C + a_{LW}Q_W = L \Rightarrow 2Q_C + Q_W = 110 \Rightarrow Q_W = 110 - 2Q_C$$

Determine the maximum production of cowboy boots and wool hats.

$$\bar{Q}_C = \frac{L}{a_{LC}} = \frac{110}{2} = 55, \quad \bar{Q}_W = 110$$

What is the U.S.'s opportunity cost of cowboy boots in terms of wool hats and where does it appear in the equation describing production possibilities?

$$\frac{a_{LC}}{a_{LW}} = \frac{2}{1} = 2$$

Absolute value of slope of production possibilities frontier

2. Construct the production possibilities frontier for Canada.

$$a_{LC}^*Q_C^* + a_{LW}^*Q_W^* = L^* \Rightarrow 10Q_C^* + Q_W^* = 220 \Rightarrow Q_W^* = 220 - 10Q_C^*$$

Determine the maximum production of cowboy boots and wool hats.

$$\bar{Q}_C^* = \frac{L^*}{a_{LC}^*} = \frac{220}{10} = 22, \quad \bar{Q}_W^* = 220$$

What is Canada's opportunity cost of cowboy boots in terms of wool hats? Compare the slopes of the two production possibilities frontiers – which is flatter and why?

$$\frac{a_{LC}^*}{a_{LW}^*} = \frac{10}{1} = 10, \quad 2 = \frac{a_{LC}}{a_{LW}} < \frac{a_{LC}^*}{a_{LW}^*} = 10$$

U.S. production possibilities frontier flatter due to lower opportunity cost of cowboy boots in terms of wool hats.

3. What is the world relative supply of cowboy boots to wool hats if each country produces only its comparative advantage good?

$$\tilde{RS} = \frac{\bar{Q}_C}{\bar{Q}_W^*} = \frac{55}{220} = \frac{1}{4}$$

Construct the world relative supply and world relative demand functions.

$$RS = \begin{cases} 0 \dots 1/4 & P_C/P_W = 2 \\ 1/4 \dots \infty & P_C/P_W = 10 \end{cases}$$

P_C/P_W	$RD = P_W/P_C$	RS
2	1/2	0 .. 1/4
4	1/4	1/4
10	1/10	1/4 .. ∞

Find the world equilibrium relative price of cowboy boots in terms of wool hats under free trade.

$$RD = \tilde{RS} = \frac{1}{4} \rightarrow \frac{P_C}{P_W} = 4$$

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

$$Q_C = \bar{Q}_C = 55, Q_W = 0$$

$$Q_C^* = 0, Q_W^* = \bar{Q}_W^* = 220$$

Determine whether the United States and/or Canada 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 United States.

$$\frac{P_C}{P_W} D_C + D_W = \frac{P_C}{P_W} \bar{Q}_C \Rightarrow 4 D_C + D_W = 4(55) = 220 \leftrightarrow D_W = 220 - 4 D_C$$

Determine the maximum consumption of cowboy boots and wool hats for the United States under free trade.

$$\bar{D}_C = 55, \bar{D}_W = 220$$

Where does the free trade relative price of cowboy boots in terms of wool hats appear in the equation describing trade possibilities?

Absolute value of slope of trade possibilities frontier

6. Construct the trade possibilities frontier for Canada.

$$\frac{P_C}{P_W} D_C^* + D_W^* = \bar{Q}_W^* \Rightarrow 4 D_C^* + D_W^* = 220 \Rightarrow D_W^* = 220 - 4 D_C^*$$

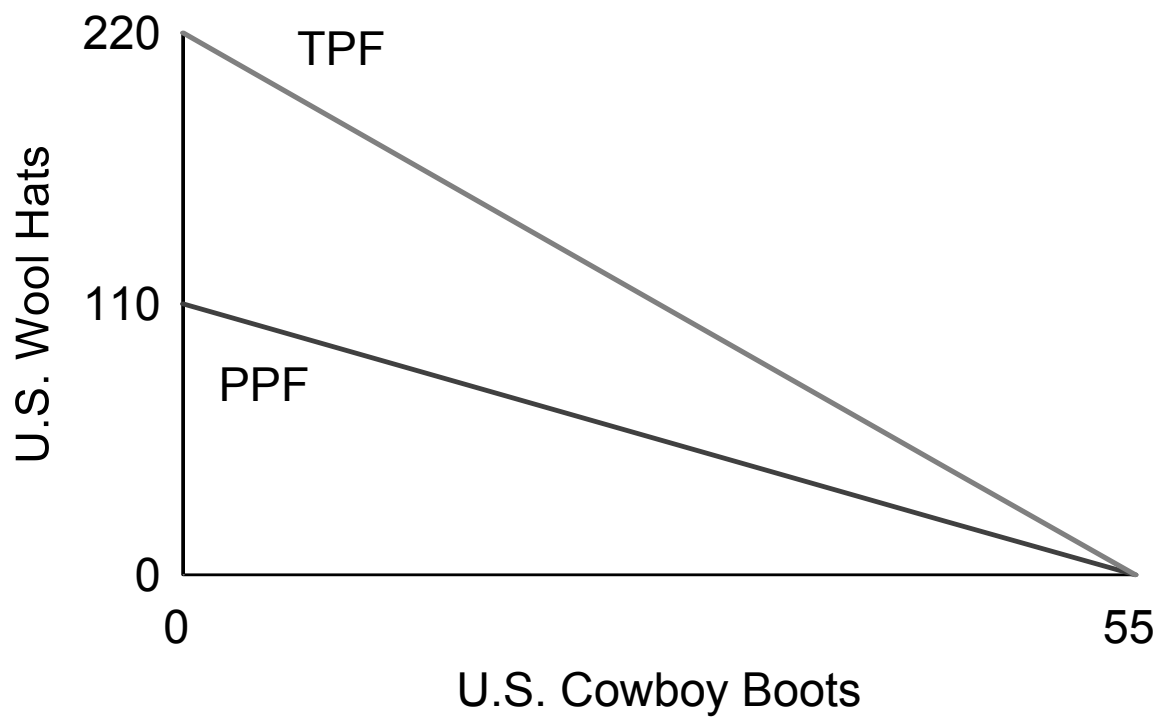
Determine the maximum consumption of cowboy boots and wool hats for Canada under free trade.

$$\bar{D}_C^* = 55, \bar{D}_W^* = 220$$

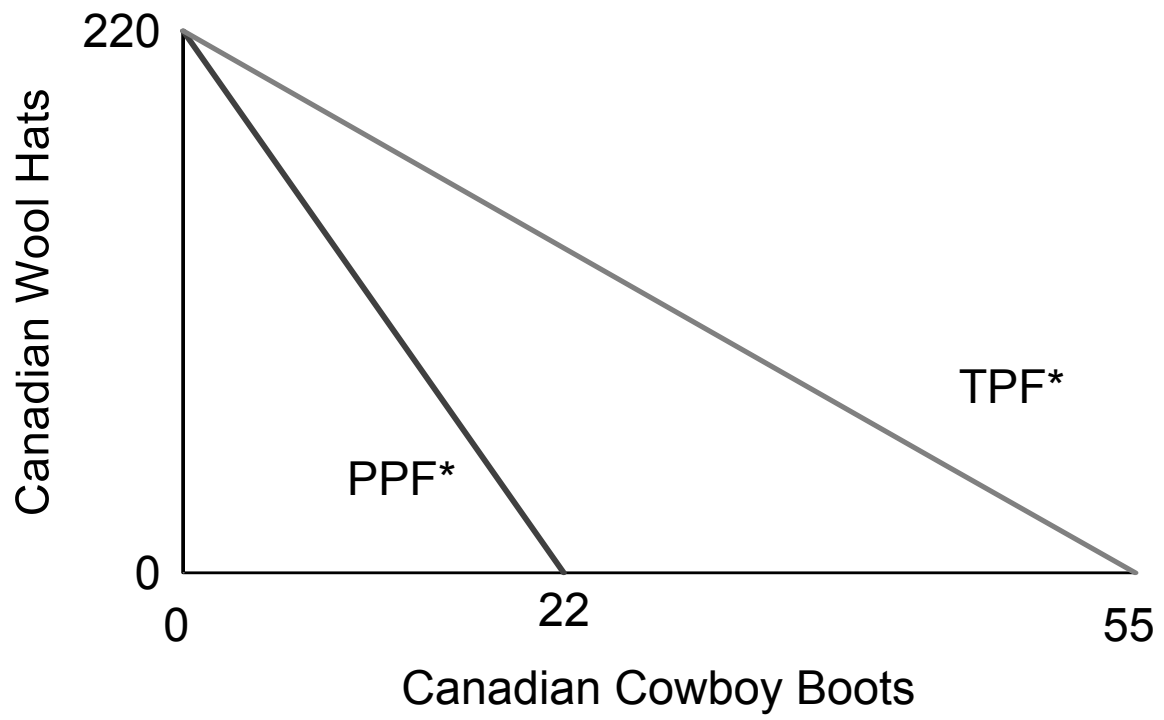
Compare the slopes of the two trade possibilities frontiers.

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

1&5 U.S. PPF and TPF



2&6 Canadian PPF and TPF



3 World RS & RD

