Second Midterm Exam

FACTOR PROPORTIONS MODEL

1-4 Salsa production relatively intensively uses labor to land compared to corn production. The United States is abundant in labor to land compared to Canada. The countries have the same relative demand.

1. An increase in labor in the United States causes U.S. production of
   a) salsa to rise
   b) corn to rise
   c) salsa to fall
   d) corn to rise and production of salsa to fall
   e) salsa to rise and production of corn to fall

2. An increase in labor in Canada causes Canadian production of
   a) salsa to rise
   b) corn to rise
   c) salsa to fall
   d) corn to rise and production of salsa to fall
   e) salsa to rise and production of corn to fall

3. Under free trade, Canada exports
   a) corn
   b) salsa
   c) corn and salsa
   d) corn and sometimes salsa
   e) salsa and sometimes corn

4. Under free trade, the United States exports
   a) corn
   b) salsa
   c) corn and salsa
   d) corn and sometimes salsa
   e) salsa and sometimes corn

5-8 The United States is abundant in labor to land compared to Canada. The countries have the same technology and the same relative demand. Each country produces both goods.

5. In Canada, who would benefit from free trade?
   a) workers
   b) landowners
   c) both workers and landowners
   d) neither workers nor landowners
   e) depends on spending patterns

6. In Canada, who would object to free trade?
   a) workers
   b) landowners
   c) both workers and landowners
   d) neither workers nor landowners
   e) depends on spending patterns

7. In the United States, who would benefit from free trade?
   a) workers
   b) landowners
   c) both workers and landowners
   d) neither workers nor landowners
   e) depends on spending patterns

8. In the United States, who would object to free trade?
   a) workers
   b) landowners
   c) both workers and landowners
   d) neither workers nor landowners
   e) depends on spending patterns

STANDARD TRADE MODEL

9-12 The United States has comparative advantage over Iraq in steel relative to oil. Free trade prevails and both countries are large. Suppose the United States transfers $10 billion to Iraq (to aid in the post-war recovery).

9. The transfer causes world demand for steel relative to oil to:
   a) rise
   b) fall
   c) stay the same
   d) rise, if Iraq spends more of each dollar on oil
   e) fall, if Iraq spends more of each dollar on oil

10. In world markets, the relative price of steel to oil:
   a) rises
   b) falls
   c) stays the same
   d) rises, if Iraq spends more of each dollar on oil
   e) falls, if Iraq spends more of each dollar on oil

11. The terms of trade for the United States:
   a) improve
   b) deteriorate
   c) stay the same
   d) improve, if Iraq spends more of each dollar on oil
   e) deteriorate, if Iraq spends more of each dollar on oil

12. The terms of trade for Iraq:
   a) improve
   b) deteriorate
   c) stay the same
   d) improve, if Iraq spends more of each dollar on oil
   e) deteriorate, if Iraq spends more of each dollar on oil

13-16 The United States has comparative advantage over Iraq in steel relative to oil. Free trade prevails and both countries are large. Suppose Iraq experiences economic growth as a result of the recovery from war (but the United States does not).

13. The growth in Iraq causes the world supply of steel relative to oil to:
    a) rise
    b) fall
    c) stay the same
    d) rise, if the growth is biased towards oil
    e) fall, if the growth is biased towards oil

14. In world markets, the relative price of steel to oil:
    a) rises
    b) falls
    c) stays the same
    d) rises, if the growth is biased towards oil
    e) falls, if the growth is biased towards oil

15. The terms of trade for the United States:
    a) improve
    b) deteriorate
    c) stay the same
    d) improve, if the growth is biased towards oil
    e) deteriorate, if the growth is biased towards oil

16. The terms of trade for Iraq:
    a) improve
    b) deteriorate
    c) stay the same
    d) improve, if the growth is biased towards oil
    e) deteriorate, if the growth is biased towards oil

FACTOR PROPORTIONS MODEL PROBLEMS

Producing one yard of cloth requires 3 workers and 1 acre of land, while producing one pound of food requires 1 worker and 3 acres of land. Both countries have 1200 workers; the United States has 1200 acres of land, while Canada has 2000. The price of food is always $20/pound; the price of cloth is $20/yard in the United States in autarky and $28/yard in both countries under free trade.

1. Determine and compare the relative abundance of factors across countries. Determine and compare the relative intensity of factor use across goods. Determine the pattern of comparative advantage and the pattern of trade.

2. Construct the labor constraint (same for both countries). Construct the U.S. land constraint. Determine the U.S. production bundle that fully employs both factors.

3. Construct the Canadian land constraint. Determine the Canadian production bundle that fully employs both factors. Compare the relative production of cloth to food across countries. *Draw graph of factor constraints. Indicate values for the endpoints and for the quantities produced in each country.*

4. Construct the pricing equation for food (same always for both countries). Construct the U.S. pricing equation for cloth in autarky. Determine U.S. factor prices in autarky that allow both goods to be priced at cost.

5. Construct the pricing equation for cloth under free trade (same for both countries). Determine the factor prices under free trade that allow both goods to be priced at cost. Compare the U.S. relative factor prices under free trade to autarky. *Draw graph of pricing equations. Indicate values for the endpoints and for the factor prices before and after trade.*

6. In the United States, owners of which factor would oppose a free trade agreement? (Do not calculate proportional changes). How can this group be identified, even in autarky?

Second Midterm Exam Solutions

MULTIPLE CHOICE

1e An increase in labor in the United States causes U.S. production of salsa to rise and production of corn to fall.
2e An increase in labor in Canada causes Canadian production of salsa to rise and production of corn to fall.
3a Under free trade, Canada exports corn, its comparative advantage good.
4b Under free trade, the United States exports salsa.

5b Canadian landowners would benefit from free trade.
6a Canadian workers would object to free trade (relatively scarce factor).
7a U.S. workers would benefit from free trade
8b U.S. landowners would object to free trade.

9e The transfer causes world demand for steel relative to oil to fall, if Iraq spends more of each dollar on oil.
10e In world markets, the relative price for steel to oil falls, if Iraq spends more of each dollar on oil.
11e The terms of trade for the United States deteriorate, if Iraq spends more of each dollar on oil.
12d The terms of trade for Iraq improve, if Iraq spends more of each dollar on oil.

13e The growth in Iraq causes the world supply of steel relative to oil to fall, if the growth is biased towards oil.
14d In world markets, the relative price of steel to oil rises, if the growth is biased towards oil.
15d The terms of trade for the United States improve, if the growth is biased towards oil.
16e The terms of trade for Iraq deteriorate, if the growth is biased towards oil.

PROBLEMS

1. The United States is relatively labor abundant

$$1 = \frac{1200}{1200} = \frac{L}{T} > \frac{L^*}{T^*} = \frac{1200}{2000} = \frac{3}{5}$$

Cloth production is relatively labor intensive

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

Thus, the United States has comparative advantage in cloth and Canada in food. The United States will export cloth, while Canada will export food.

2. The labor constraint is

$$a_{LC}Q_C + a_{LF}Q_F = L,\ 3Q_C + Q_F = 1200,\ Q_F = 1200 - 3Q_C$$

The U.S. land constraint is

$$a_{TC}Q_C + a_{TF}Q_F = T,\ Q_C + 3Q_F = 1200,\ Q_F = 400 - \frac{1}{3}Q_C$$

The United States's production of cloth and food that fully employs both labor and land is (show math)

$$Q_C = 300,\ Q_F = 300$$

3. Canada's land constraint is

$$a_{TC}Q_C^* + a_{TF}Q_F^* = T^*,\ Q_C^* + 3Q_F^* = 2000,\ Q_F^* = \frac{2000}{3} - \frac{1}{3}Q_C^*$$

Canada's production of cloth and food that fully employs both labor and land is (show math)

$$Q_C^* = 200,\ Q_F^* = 600$$

The United States produces more cloth relative to food than Canada

$$1 = \frac{300}{300} = \frac{Q_C}{Q_F} > \frac{Q_C^*}{Q_F^*} = \frac{200}{600} = \frac{1}{3}$$

4. The food pricing equation is

$$a_{LF}w + a_{TF}r = P_F,\ w + 3r = 20,\ r = \frac{20}{3} - \frac{1}{3}w$$

The U.S. cloth pricing equation under autarky is

$$a_{LC}w^A + a_{TC}r^A = P_C^A,\ 3w^A + r^A = 20,\ r^A = 20 - 3w^A$$

The U.S. factor prices that permit both goods to sell at cost under autarky is (show math)

$$w^A = 5,\quad r^A = 5$$

5. The cloth pricing equation under free trade is

$$a_{LC}w + a_{TC}r = P_C,\ 3w + r = 28,\ r = 28 - 3w$$

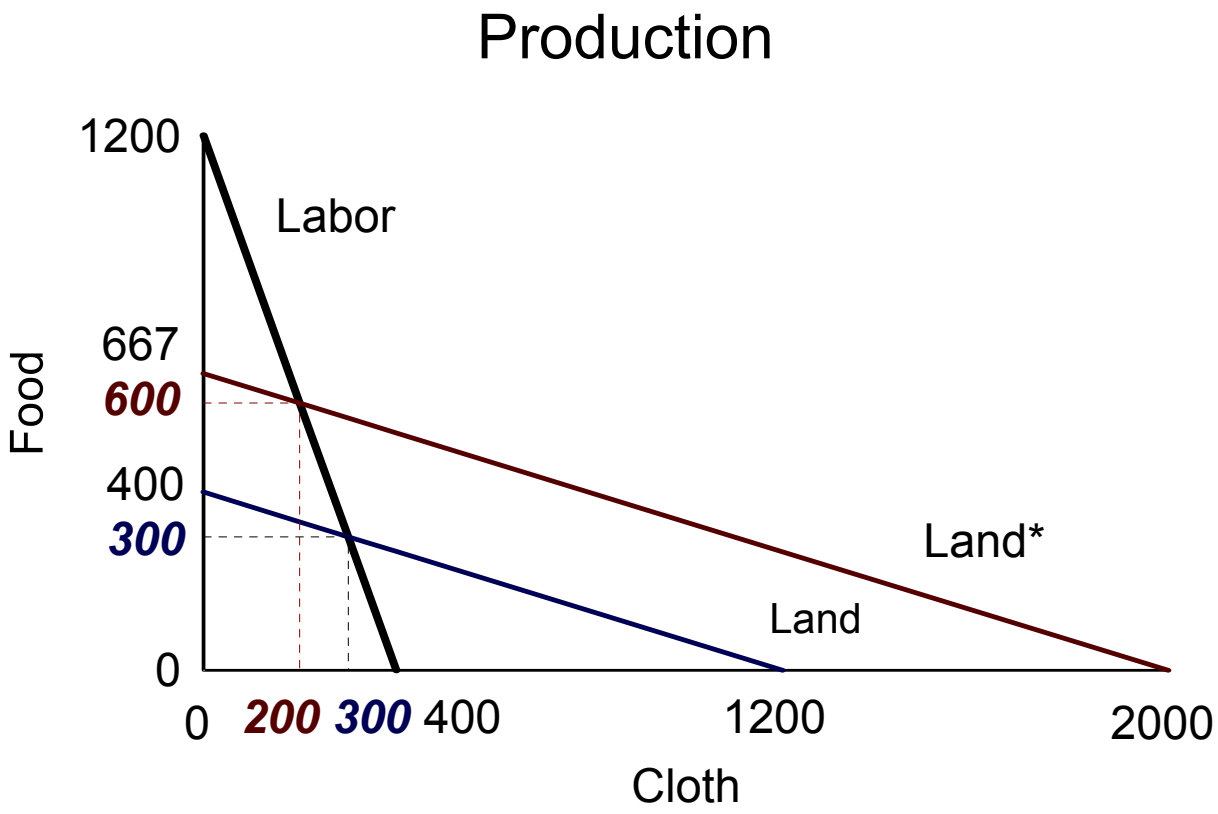
The factor prices that permit both goods to sell at cost under free trade is (show math)

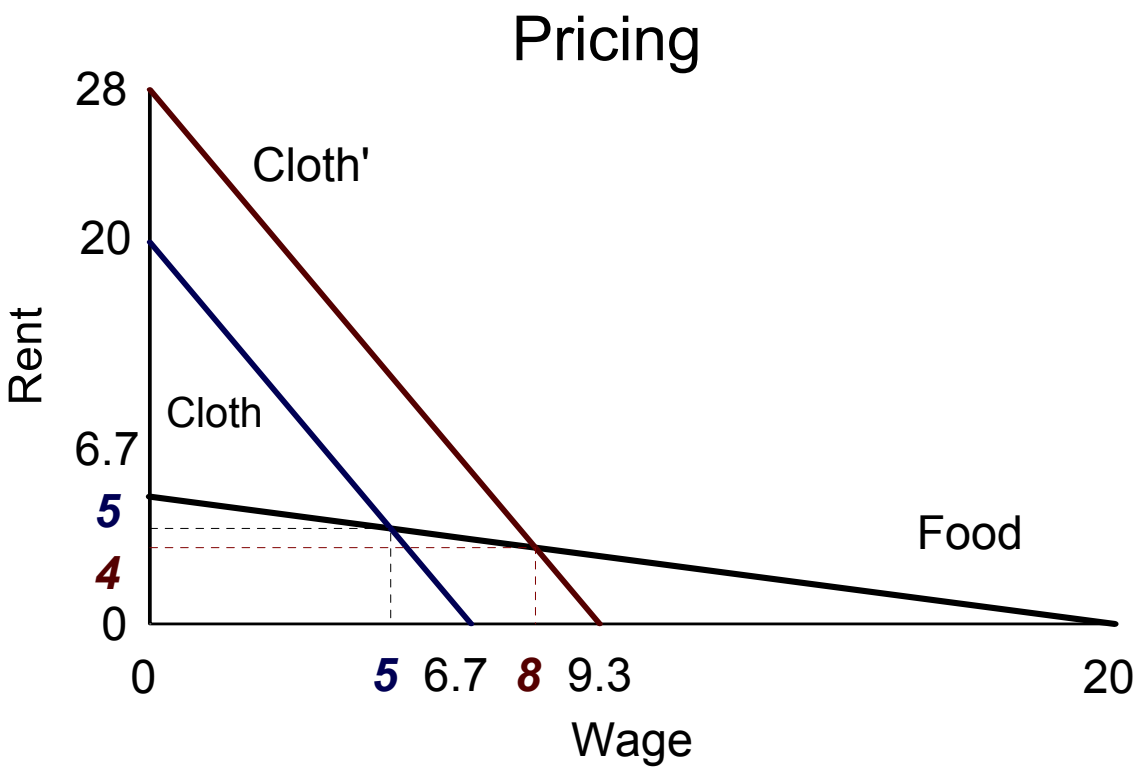
$$w = 8,\quad r = 4$$

The wage relative to the rent rises in the United States in the move from autarky to free trade

$$1 = \frac{5}{5} = \frac{w^A}{r^A} < \frac{w}{r} = \frac{8}{4} = 2$$

6. In the United States, landlords would oppose a free trade agreement. The purchasing power of their income would fall because the rent falls relative to the price of either good. Landlords are the owners of the relatively scarce factor in the United States, which can be determined by comparing factor endowment ratios even in autarky (as done for problem #1).


Production
1200
Labor
667
600
400
300
0
Food
Land*
Land
0
200
300
400
1200
2000
Cloth


Pricing
28
20
Rent
Cloth'
Cloth
6.7
5
4
0
Food
0
5
6.7
8
9.3
20
Wage