

University at Albany
 ECO 360 International Economic Relations
 Test 1
 Oct. 13, 2020

Instructions: This test covers materials in Module 2 - 7. It is open-book, but you are expected to work on all questions **independently**. You could be failed if I find highly unnatural mistakes/typos resulted from copying each other. Please answer **all** of the questions and submit your answers to Blackboard by **10:00 am, Oct. 16**. You can submit pictures of your handwritten answers to Blackboard. Please double check you submit all of your answers.

Question 1 (11 points)

- (1) Suppose Home has 2,000 units of labor available. It can produce two goods, clothing (C) and wheat (W). The unit labor requirement in clothing production is 5, while in wheat production it is 2.
- (1 point) a. Let Q_C and Q_F be the quantities of clothing and wheat produced, derive Home's production possibility frontier (PPF) and graph it.
- (1 point) b. What is the opportunity cost of clothing in terms of wheat?
- (1 point) c. What and how much does Home produce when the relative price of clothing is 3, i.e., $p_C/p_F = 3$?
- (1 point) d. Which workers (clothing workers or wheat workers) earn higher wages when the relative price of clothing is 2.5, i.e., $p_C/p_F = 2.5$?
- (2) Home is as described above. Now suppose there is another country, Foreign, with a labor force of 3,000. Foreign's unit labor requirement in clothing production is 2, while in wheat production it is 4.
- (1 point) a. Which country has an absolute advantage over the other in clothing production? Which has a comparative advantage over the other in wheat production?
- (2 points) b. What and how much do Home and Foreign produce, respectively, when the world relative price of clothing is 0.5, i.e., $p_C/p_F = 0.5$.
- (1 point) c. What is the range for the relative price of clothing under free trade?
- (1 point) d. Suppose the world relative price of clothing under free trade is 2, i.e., $p_C/p_F = 2$. Describe the pattern of trade between Home and Foreign.
- (2 points) e. Show that both Home and Foreign gain from trade at $p_C/p_F = 2$.

Question 2 (11 points)

- (1) Assume Home produces 2 goods, clothing (C) and food (F). Clothing is produced using labor (L) and capital (K), while food is produced using labor (L) and land (T). The total supply of labor, capital, and land are 1,200, 1,000, and 1,600, respectively. Labor is mobile across sectors. All markets are competitive. Home's production functions for clothing and food are given by:

$$Q_C = L_C^{1/3} K^{2/3}$$

$$Q_F = L_F^{1/2} T^{1/2}$$

- (2 points) a. The marginal product of labor employed in clothing production is the first order derivative of Q_C with respect to L_C , i.e., $MPL_C = dQ_C/dL_C$. Substituting K with the total capital stock, the production function for clothing becomes $Q_C = 100L_C^{1/3}$. Applying

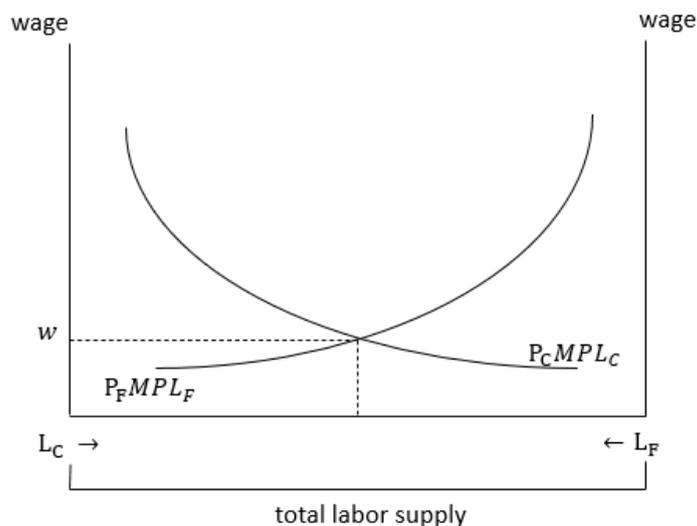


Figure 1

the power rule of differentiation, it yields $MPL_C = dQ_C/dL_C = \frac{100}{3}L_C^{-2/3}$. What is the relationship between MPL_C and L_C ? What can you say about the opportunity cost of labor in clothing production?

(1 point) b. Sketch a PPF which satisfies the above relationship between MPL_C and L_C .

(2 points) c. As shown in Figure 1, the wage level in Home is determined by the intersection of two labor demand curves. Show graphically how labor allocation and output mix respond to an increase in capital stock?

(2) Now suppose there is another country, Foreign, which has a larger supply of clothing than Home. Home and Foreign open up to free trade.

(1 point) a. Describe the trade pattern between Home and Foreign.

(1 point) b. What is the effect of trade on Home's relative price of clothing?

(2 points) c. Show graphically how labor allocation and wage respond to free trade in Home.

(2 points) d. Describe the income effects of trade in this example (Who will gain and who will lose?).

Question 3 (13 points)

(1) Consider Home produces computers(C) and food(F) using capital(C) and labor(L). The unit factor requirements are fixed and given by: $a_{LC} = 2$, $a_{KC} = 6$, $a_{LF} = 3$, $a_{KF} = 4$. The total labor supply is 900 and the total capital stock is 1,500.

(1 point) a. Which good is relatively labor intensive? Which good is relatively capital intensive?

(2 points) b. Derive and draw the PPF of this country. At which point on the PPF are both factors fully employed?

(2 points) c. Suppose Home produces at the point you find in b. According to Rybczynski theorem, what happens to the output mix if the total labor supply increases.

(1 point) d. Suppose autarky prices are given by $P_C = 10$, $P_F = 10$. At which point on the PPF does Home produce?

(2) Now suppose there is another country, Foreign, with a labor supply of 1,200 and a capital stock of 1,800. Foreign shares the same technology with Home (i.e., $a_{LC}^* = 2$, $a_{KC}^* = 6$,

$a_{LF}^* = 3$, $a_{KF}^* = 4$). Home and Foreign engage in free trade. Suppose the world relative price of computers is given by $P_C/P_F = 1.2$.

- (1 point) a. Which country is relatively capital abundant and which labor abundant?
- (1 point) b. Describe the pattern of trade between Home and Foreign.
- (2 points) c. Show graphically the production and consumption of Home under free trade.
- (2 points) d. Who will gain and who will lose from free trade?
- (1 point) e. In which country are wages higher?