

## Heckscher-Ohlin Model; Monopolistic Competition

**Study Questions: (not to be handed in)**

## Heckscher-Ohlin Model

1. What does this model assume about the use and mobility of factor inputs within an economy and how is that different from the Ricardian and Specific Factors models?
2. What is the difference between factor abundance and factor intensity?
3. What determines relative demands for factors in a single industry versus relative demands for factors in the economy as a whole?
4. What is the Rybczynski theorem? What is the Stolper-Samuelson theorem?

## Scale Economies

1. Define constant returns to scale (CRS), increasing returns to scale (IRS), IRS internal to the firm, IRS external to the firm.
2. What are some sources of increasing returns to scale internal to the firm, and what are some sources of increasing returns external to the firm (external economies of scale)?
3. Which of these (CRS, IRS internal, IRS external) have we assumed in all our models in class so far (Ricardian, Specific Factors, Heckscher-Ohlin)?
4. How do external scale economies help explain the existence and size of cities?
  - a. Given these reasons, why doesn't everyone live in one enormous city?

## Monopolistic Competition (chp 6)

1. Define intra-industry trade. Why is it a puzzling phenomenon when viewed from the perspective of the Ricardian, Specific Factors, or Heckscher-Ohlin models?
2. Why do firms create distinct varieties of similar goods? Given this, what prevents the existence of an infinite number of subtly different distinct varieties?
3. How does the number of varieties and price of each variety relate to the size of the market in which they are being sold?
4. How does international trade affect the number and price of goods?
5. How are the gains from trade in this model different from what we discussed in the Ricardian, Specific Factors, and Heckscher-Ohlin models?

## Monopoly Pricing.

1. Define marginal revenue.
  - a. How is MR different for a competitive firm and a monopolist?
  - b. Why is this important for a monopolist's pricing decision?
2. Explain how a monopolist chooses quantity to maximize profits. The last part of this answer is an equation for optimal price setting.
3. Given the optimal price equation, what are some reasons that optimal prices vary across different markets internationally?
4. Related, explain why pharmaceutical firms charge higher prices in the US market than in Europe or in Canada.
  - a. What policies might correct this?
  - b. Would such a policy obviously be a good thing for consumers?

## Heckscher-Ohlin Model; Monopolistic Competition

**Questions to be handed in.**

Q1-6. Suppose that Home is endowed with 600 hours of labor and 300 acres of land. Foreign is endowed with 300 hours of labor and 300 acres of land. At current factor prices in Home, one yard of cloth is produced using 20 hours of labor and 5 acres of land, and one ton of food is produced using only 5 hours of labor and 10 acres of land. Both countries have the same production technology.

In autarky

1. Draw the relative demand curves showing how Home will choose input techniques for food and clothing depending on price of land / price of labor. (just show where they are in relation to each other, and use the information above).
2. Assume Home and Foreign initially produce the exact same mix of goods. Draw the relative supply and relative demands for land/labor in the two places. Compare the price of land/ price of labor in Home versus Foreign.
3. In autarky, will Foreign use the same mix of labor/land to produce cloth as in Home, or will it use more or less?

Free Trade

4. Draw the economy-wide relative demand for land/labor in Home under autarky and under free trade. How has that changed?
5. As a result of the move from autarky to free trade, what happens to the price of land / price of labor in each country?
6. As a result of the move from autarky to free trade, what happens to the choice of input technique used to produce cloth and food in Foreign?

**Scale Economies**

Motion Computers produces memory chips and competes in a monopolistically competitive industry. To make memory chips it must incur fixed research and development costs of  $F=\$10$  million and marginal costs per chip of  $c=\$5$ . The demand facing Motion Computers is given by

$$Q = S \left[ \frac{1}{n} - b(P - \bar{P}) \right]$$

where  $S=100$  million chips is total industry sales,  $n$  is the number of firms making computers,  $b=0.1$  measures the sensitivity of sales to prices,  $P$  is the firms' price and  $\bar{P}$  is the average industry price.

7. Show graphically how the total costs, average costs and marginal costs for Motion Computers depend on the level of its sales.

## Heckscher-Ohlin Model; Monopolistic Competition

8. How many computers does Motion have to sell to break even (make zero profits) if
- price is a 10% markup over marginal cost.
  - price is a 50% markup over marginal cost.

Suppose there are  $N$  total firms like Motion computers in the United States, facing the same cost structure and same demand curves. If the US is in autarky ( $Q, P$ ),

9. Show in a graph how product prices and average costs for each firm depends on the total number of firms in the US laptop industry (dollars on the vertical axis, number of firms on the horizontal axis). Label the price curve  $PP$  and the average cost curve  $CC$ .
- explain why each curve slopes this particular way.
  - Discuss the economic significance of the intersection point of  $PP$  and  $CC$ , and the significance of points to the left and to the right of the intersection point.

10. Solve for the number of firms operating in the US laptop market and the optimal price and quantity of memory chips Motion will sell. (You should get numbers.)

Now the US opens up to free trade. Both US and foreign chip makers face the same demand and cost structure and can compete equally in all markets. Total worldwide industry sales of memory chips  $S = 225$  million.

11. Redraw the autarky  $PP$  and  $CC$  curves and show graphically how they change as a result of the move to free trade.
12. Solve for the number of firms operating in the world market, and prices and quantities sold for each firm.
- If the US has half of the world's firms, does trade lead to a rise or a fall in the number of firms producing in the US market?
  - At the new price, can Motion break even? If so, how?
13. Explain why trade may be beneficial in this case. How is this different from the gains from trade in the Ricardian or Heckscher-Ohlin models?