

## **PRINCIPLES OF ECONOMICS - CHAPTER 7 NOTES**

- I. Chapter Learning Objectives.** After reading this chapter, students should be able to:
- A. Give the names and summarize the main characteristics of the four basic market models. (LO 7-1)
  - B. List the conditions required for purely competitive markets. (LO 7-2)
  - C. Describe how purely competitive firms maximize profits or minimize losses. (LO 7-3)
  - D. Explain why the marginal cost curve and supply curve of competitive firms are identical. (LO 7-4)
  - E. Discuss how industry entry and exit produce economic efficiency. (LO 7-5)
  - F. Identify the differences between constant-cost, increasing-cost, and decreasing-cost industries. (LO 7-6)
- II. Four market models will be addressed in Chapters 7–9.**
- A. Pure competition entails a large number of firms, standardized product, and easy entry (or exit) by new (or existing) firms.
  - B. At the opposite extreme, pure monopoly has one firm that is the sole seller of a product or service with no close substitutes; entry is blocked for other firms.
  - C. Monopolistic competition is close to pure competition, except that the product is differentiated among sellers rather than standardized, and there are fewer firms.
  - D. An oligopoly is an industry in which only a few firms exist, so each is affected by the price-output decisions of its rivals.
- III. Pure Competition: Characteristics and Occurrence**
- A. The characteristics of pure competition:
    - 1. Many sellers means that there are enough so that a single seller has no impact on price by its decisions alone.
    - 2. The products in a purely competitive market are homogeneous or standardized; each seller's product is identical to its competitors'.
    - 3. Individual firms must accept the market price; they are price takers and can exert no influence on price.
    - 4. Freedom of entry and exit means that there are no significant obstacles preventing firms from entering or leaving the industry.
    - 5. Pure competition is rare in the real world, but the model is important.
      - a. The model helps analyze industries with characteristics similar to pure competition.
      - b. The model provides a context in which to apply revenue and cost concepts developed in previous chapters.
      - c. Pure competition provides a norm or standard against which to compare and evaluate the efficiency of the real world.
  - B. There are four major objectives to analyzing pure competition.
    - 1. To examine demand from the seller's viewpoint.
    - 2. To see how a competitive producer responds to market price in the short run.
    - 3. To explore the nature of long-run adjustments in a competitive industry.
    - 4. To evaluate the efficiency of competitive industries.

#### IV. Demand as Seen by a Purely Competitive Seller

- A. The individual firm will view its demand as perfectly elastic.
  - 1. Figure 7.1 illustrates this.
  - 2. The demand curve is not perfectly elastic for the industry: It only appears that way to the individual firm, since they must take the market price no matter what quantity they produce.
  - 3. Note from Figure 7.1 that a perfectly elastic demand curve is a horizontal line at the price.
- B. Definitions of average, total, and marginal revenue:
  - 1. Average revenue is the price per unit for each firm in pure competition.
  - 2. Total revenue is the price multiplied by the quantity sold.
  - 3. Marginal revenue is the change in total revenue and will also equal the unit price in conditions of pure competition.

#### V. Profit Maximization in the Short Run

- A. In the short run, the firm has a fixed plant and maximizes profits or minimizes losses by adjusting output; profits are defined as the difference between total costs and total revenue.
- B. Three questions must be answered.
  - 1. Should the firm produce?
  - 2. If so, how much?
  - 3. What will be the profit or loss?
- C. Marginal revenue–marginal cost approach (Figures 7.2, 7.3, 7.4).
  - 1. MR = MC rule states that the firm will maximize profits or minimize losses by producing at the point at which marginal revenue equals marginal cost in the short run.
  - 2. Three features of this MR = MC rule are important.
    - a. Rule assumes that marginal revenue must be equal to or exceed the minimum of average variable cost, or the firm will shut down.
    - b. Rule works for firms in any type of industry, not just pure competition.
    - c. In pure competition, price = marginal revenue, so in purely competitive industries the rule can be restated as the firm should produce that output where  $P = MC$  because  $P = MR$ .
  - 3. Using the rule on Figure 7.2, compare MC and MR at each level of output. At the 10th unit, MC exceeds MR. Therefore, the firm should produce only nine (not the 10th) units to maximize profits.
  - 4. Profit-maximizing case: The level of profit can be found by multiplying ATC (\$97.78) by the quantity (9) to get \$880 and subtracting that from total revenue, which is  $\$131 \times 9$ , or \$1179. Profit will be \$299 when the price is \$131. Profit per unit could also have been found by subtracting \$97.78 from \$131 and then multiplying by 9 to get \$299. Figure 7.2 portrays this situation graphically.
  - 5. Loss-minimizing case: The loss-minimizing case is illustrated when the price falls to \$81 (Figure 7.3). Marginal revenue does exceed average variable cost at some levels, so the firm should not shut down. Comparing  $P$  and MC, the rule tells us to select output level of 6. At this level, the loss of \$64 is the minimum loss this firm could realize, and the MR of \$81 just covers the MC of \$80, which does not happen at the quantity level of 7. Figure 7.3 illustrates this graphically.

6. Shutdown case: If the price falls to \$71, this firm should not produce. MR will not cover AVC at any output level. Therefore, the minimum loss is the fixed cost and production of zero. Figure 7.4 illustrates this situation, and it can be seen that the \$100 fixed cost is the minimum possible loss.

**7. Applying the Analysis: The Still There Motel**

Still There Motel, a deteriorating establishment facing severe competition and experiencing declining demand, can be found in many towns across the United States. By staying open, Still There Motel loses less than it would have if it shut down. It earns enough revenue in the short run to cover its total variable costs (and some fixed costs) such that  $P > AVC$ . Since  $P < ATC$ , motel owners in the long run reduce annual maintenance as a way to lower average total costs and temporarily regain profitability.

**VI. Marginal Cost and Short-Run Supply**

- A. Marginal cost and the short-run supply curve can be illustrated by hypothetical prices such as those in Table 7.1. At a price of \$151, profit will be \$480; at \$111 the profit will be \$138 (\$888 - \$750); at \$91 the loss will be \$3.01; at \$61 the loss will be \$100 because the latter represents the shutdown case.
1. Note that Table 7.1 gives us the quantities that will be supplied at several different price levels in the short run.
  2. Since a short-run supply schedule tells how much quantity will be offered at various prices, this identity of marginal revenue with the marginal cost tells us that the marginal cost above AVC will be the short-run supply for this firm (see Figure 7.5).
- B. Changes in prices of variable inputs or in technology will shift the marginal cost or short-run supply curve in Figure 7.5.
1. For example, a wage increase would shift the supply curve upward (decrease in supply).
  2. Technological progress would shift the marginal cost curve downward.
  3. Using this logic, a specific tax would cause a decrease in the supply curve (upward shift in MC), and a unit subsidy would cause an increase in the supply curve (downward shift in MC).
- C. Determining equilibrium price for a firm and an industry:
1. Total-supply and total-demand data must be compared to find most profitable price and output levels for the industry. (See Table 7.3.)
  2. Figure 7.6a and 7.6b shows this analysis graphically; individual firm supply curves are summed horizontally to get the total supply curve  $S$  in Figure 7.6b. If product price is \$111, industry supply will be 8000 units, since that is the quantity demanded and supplied at \$111. This will result in economic profits similar to those portrayed in Figure 7.2.
  3. Loss situation similar to Figure 7.3 could result from weaker demand (lower price and MR) or higher marginal costs.
- D. Firm versus industry: Individual firms must take price as given, but the supply plans of all competitive producers as a group are a major determinant of product price.

## VII. Profit Maximization in the Long Run

- A. Several assumptions are made.
  1. Entry and exit of firms are the only long-run adjustments.
  2. Firms in the industry have identical cost curves.
  3. The industry is a constant-cost industry, which means that the entry and exit of firms will not affect resource prices or location of unit-cost schedules for individual firms.
- B. Basic conclusion to be explained is that after long-run equilibrium is achieved, the product price will be exactly equal to, and production will occur at, each firm's point of minimum average total cost.
  1. Firms seek profits and shun losses.
  2. Under competition, firms may enter and leave industries freely.
  3. If short-run losses occur, firms will leave the industry; if economic profits occur, firms will enter the industry.
- C. The model is one of zero economic profits, but note that this allows for a normal profit to be made by each firm in the long run.
  1. If economic profits are being earned, firms enter the industry, which increases the market supply, causing the product price to gravitate downward to the equilibrium price where zero economic profits are earned (Figure 7.7).
  2. If losses are incurred in the short run, firms will leave the industry; this decreases the market supply, causing the product price to rise until losses disappear and normal profits are earned (Figure 7.8).
  3. **Applying the Analysis: The Exit of Farmers from U.S. Agriculture**
    - a. Declining prices and financial losses in agriculture have resulted in the exit of producers.
    - b. Technological advance has significantly increased supply; however, increases in demand have not kept up with increases in supply.
    - c. In 1950 there were 5.4 million farms in the United States and farm employment represented 15.8 percent of the U.S. workforce. Today there are just over 2 million farms while farm employment represents only 1.2 percent of the workforce.
- D. Long-run supply for a constant-cost industry will be perfectly elastic; the curve will be horizontal. In other words, the level of output will not affect the price in the long run.
  1. In a constant-cost industry, expansion or contraction does not affect resource prices or production costs.
  2. Entry or exit of firms will affect quantity of output but will always bring the price back to the equilibrium price (Figure 7.9a).
- E. Long-run supply for an increasing-cost industry will be upward sloping as industry expands output.
  1. Average-cost curves shift upward as the industry expands and downward as industry contracts because resource prices are affected.
  2. As demand increases, costs will rise as firms enter, and the new equilibrium price must increase if the level of profit is to be maintained at its normal level. Note that the price will fall if the industry contracts as production costs fall, and competition will drive the price down so that individual firms do not realize above-normal profits (Figure 7.9b).

- F. Long-run supply for a decreasing-cost industry will be downward sloping as the industry expands output. This situation is the reverse of the increasing-cost industry. Average cost curves fall as the industry expands and firms will enter until price is driven down to maintain only normal profits.

### VIII. Pure Competition and Efficiency

- A. Whether the industry is one of constant or increasing costs, the final long-run equilibrium will have the same basic characteristics (Figure 7.10a).
1. Productive efficiency occurs where  $P = \text{minimum ATC}$ ; at this point, firms must use the least-cost technology or they won't survive.
  2. Allocative efficiency occurs where  $P = MC$  because price is society's measure of relative worth of a product at the margin or its marginal benefit. And the marginal cost of producing product X measures the relative worth of the other goods that the resources used in producing an extra unit of X could otherwise have produced. In short, price measures the benefit that society gets from additional units of good X, and the marginal cost of this unit of X measures the sacrifice or cost to society of other goods given up to produce more of X.
    - a. If price exceeds marginal cost, then society values more units of good X more highly than alternative products those resources can otherwise produce. Resources are underallocated to the production of good X.
    - b. For units up to  $Q_e$ , demand lies above supply, implying the marginal benefit of those units exceeds the marginal cost, so production of these units creates net benefits for society. (Figure 7.10b)
    - c. If price is less than marginal cost, then society values the other goods more highly than good X, and resources are overallocated to the production of good X.
    - d. For production of any units beyond  $Q_e$ , supply lies above demand, implying that society would prefer a reduction in the production of the good and fewer resources allocated to the production of this good. Other goods with these resources are more highly valued.
  3. Allocative efficiency implies maximum consumer and producer surplus.
    - a. Consumer surplus is the benefit buyers receive by having the market price less than their maximum willingness to pay.
    - b. Producer surplus is the benefit sellers receive by having the market price greater than their minimum, acceptable price.
    - c. Combined consumer and producer surplus is maximized at equilibrium (see Figure 7.10b).
    - d. Any quantity less than equilibrium would reduce both consumer and producer surplus (reducing the green and blue areas of Figure 7.10b).
    - e. Any quantity greater than equilibrium would occur with an efficiency loss that would subtract from combined consumer and producer surplus.
  4. Dynamic adjustments will occur automatically in pure competition when changes in demand or in resource supplies or in technology occur. Disequilibrium will cause expansion or contraction of the industry until the new equilibrium at  $P = MC$  occurs.
  5. "The invisible hand" works in a competitive market system since no explicit orders are given to the industry to achieve the  $P = MC$  result.