

PRINCIPLES OF ECONOMICS - CHAPTER 6 NOTES

I. Chapter Learning Objectives. After reading this chapter, students should be able to:

1. Identify the features of the corporate form of business organization that have made it so dominant. (LO 6-1)
2. Explain why economic costs include both explicit (revealed and expressed) costs and implicit (present but not obvious) costs. (LO 6-2)
3. Relate the law of diminishing returns to a firm's short-run production costs. (LO 6-3)
4. Describe the distinctions between fixed and variable costs and among total, average, and marginal costs. (LO 6-4)
5. Use economies of scale to link a firm's size and its average costs in the long run. (LO 6-5)

II. The Business Population

A. Related definitions:

1. Plant: an establishment where production or distribution takes place (factory, farm, website, or store).
2. Firm: business organization (or legal entity) that owns and operates the plants.
3. Industry: a group of firms, producing the same or similar products.
 - a. Examples include the automobile industry or the airline industry.
 - b. Confusion often occurs because many businesses are multiproduct firms.
4. Types of multiplant firms:
 - a. Horizontally integrated: a firm with multiple plants in the same stage. Examples: Macy's retail chain store, Coca-Cola bottling plant.
 - b. Vertically integrated: a multiplant firm in which the company owns plants at different production stages. Example: A steel company may own ore and coal mines as well as different plants in different stages of the manufacturing process.
 - c. Conglomerate: a firm that owns plants in different industries or markets. Example: Procter and Gamble produces laundry detergent, soap, feminine products, and diapers.

B. Advantages of corporations

1. Corporations finance expansion of their operations in two main ways (besides past sales or profits):
 - a. Stocks represent a share of ownership in the corporation. Owners are entitled to vote for company officers and share in dividends.
 - b. Bonds represent loans to the corporation. Bond holders do not have ownership rights but are promised payments of fixed amounts at specified future dates.
2. Corporate securities (stocks and bonds) are attractive because they are easily bought and sold, and are often less risky than other types of assets.
3. Corporate owners (stockholders) have limited liability. Personal assets beyond the shares of stock are not at risk should the corporation fail.
4. Corporations can easily attract financial capital and exploit economies of scale through expansion.
5. Corporations are independent legal entities that can theoretically go on forever. This "immortality" promotes long-range planning and growth.

C. Principal-agent problem

1. Divergent interests of owners (principals) and managers (agents) lead to decisions not in the best interests of the owners.

2. **Applying the Analysis: Unprincipled Agents**

Executive stock options in the 1990s to correct the principal-agent problem led to fraud and abuse, as in the Enron and Arthur Anderson cases. Deceptive (and in some cases illegal) accounting practices were used to inflate company stock prices so that executives could sell their shares and reap huge windfalls.

III. Economic Costs

- A. Payments a firm must make, or incomes it must provide, to resource suppliers to attract those resources away from their best alternative production opportunities. Payments may be explicit or implicit. (Recall opportunity-cost concept in Chapter 1.)
- B. Explicit costs are payments to nonowners for resources they supply. In the text's example, this would include cost of the T-shirts, clerk's salary, and utilities, for a total of \$63,000.
- C. Implicit costs are the money payments the self-employed resources could have earned in their best alternative employments. In the text's example, this would include forgone interest, forgone rent, forgone wages, and forgone entrepreneurial income, for a total of \$33,000.
- D. Normal profits are considered an implicit cost because they are the minimum payments required to keep the owner's entrepreneurial abilities self-employed. This is \$5,000 in the example.
- E. Economic or pure profits are total revenue less all costs (explicit and implicit including a normal profit). Figure 6.1 illustrates the difference between accounting profits and economic profits. The economic profits are \$24,000 (after \$63,000 + \$33,000 are subtracted from \$120,000).
- F. Economic profit steers resources in such a way that is allocatively efficient.
- G. The short run is the time period that is too brief for a firm to alter its plant capacity. The plant size is fixed in the short run. Short-run costs, then, are the wages, raw materials, etc., used for production in a fixed plant.
- H. The long run is a period of time long enough for a firm to change the quantities of all resources employed, including the plant size. Long-run costs are all costs, including the cost of varying the size of the production plant.

IV. Short-Run Production Relationships

- A. Production costs depend on the quantity and prices of resources needed to produce a given amount of output. Resource prices depend on resource supply and demand.
 1. Total product (TP) is the total quantity, or total output, of a particular good produced.
 2. Marginal product (MP) is the change in total output resulting from each additional input of a variable resource (labor).
 3. Average product (AP), also called labor productivity, is the total product divided by the total number of workers.
- B. Law of diminishing returns
 1. As successive units of a variable input are added to a fixed input, beyond some point the marginal product of additional units of the variable input will decline.
 2. **Illustrating the Idea: Diminishing Returns from Study**

As additional units of study time per day are added, diminishing returns to course learning will set in. At some point, $MP = 0$.

3. Relevance to firms
 - a. There are limits to how much firms can increase output in the short run by adding more inputs.
 - b. If diminishing returns were not present, the world's food supply could be grown in a flowerpot.
4. The law of diminishing returns assumes all units of variable inputs—workers in this case—are of equal quality. Marginal product diminishes not because successive workers are inferior but because more workers are being used relative to the amount of plant and equipment available.
5. Figure 6.2 presents a numerical and graphical example of the law of diminishing returns.
6. Figure 6.2 illustrates the law of diminishing returns graphically and shows the relationship between marginal, average, and total product concepts.
 - a. When the marginal product begins to diminish, the rate of increase in the total product stops accelerating and grows at a diminishing rate.
 - b. The average product declines at the point at which the marginal product slips below the average product.
 - c. Total product declines when the marginal product becomes negative.
 - d. **Illustrating the Idea: Exam Scores**

A student can raise her average grade if the next (marginal) exam grade she receives is higher than her current average grade. However, if she receives a lower grade than her current average grade on her next (marginal) exam, her average will fall.

V. Short-Run Production Costs

- A. Fixed, variable, and total costs are the short-run classifications of costs; Figure 6.3 illustrates their relationships.
 1. Total fixed costs are those costs whose total does not vary with changes in short-run output.
 2. **Applying the Analysis: Sunk Costs**

Sunk costs should be disregarded in decision making.

 - a. The old saying “Don’t cry over spilt milk” sends the message that if there is nothing you can do about it, forget about it.
 - b. A sunken ship on the ocean floor is lost; it cannot be recovered. It is what economists call a “sunk cost.”
 - c. Economic analysis says that you should not take actions for which marginal cost exceeds marginal benefit.
 - d. Suppose a company spends \$1 million on R&D to bring out a new product; if the new product sells poorly, the firm should not continue its production. In making this decision, the firm should ignore the R&D costs since it is sunk and cannot be recovered.
 3. Total variable costs are those costs that change with the level of output. They include payment for materials, fuel, power, transportation services, most labor, and similar costs.

4. Total cost is the sum of total fixed and total variable costs at each level of output (see Figure 6.3).
- B. Per unit or average costs are shown in Figure 6.3, columns 5 to 7.
1. Average fixed cost is the total fixed cost divided by the level of output (TFC/Q). It will decline as output rises.
 2. Average variable cost is the total variable cost divided by the level of output ($AVC = TVC/Q$).
 3. Average total cost is the total cost divided by the level of output ($ATC = TC/Q$), sometimes called unit cost or per unit cost. Note that ATC also equals $AFC + AVC$.
- C. Marginal cost is the additional cost of producing one more unit of output [$MC = (\text{change in } TC)/(\text{change in } Q)$]. In Figure 6.3 the production of the first unit raises the total cost from \$100 to \$190, so the marginal cost is \$90, and so on for each additional unit produced.
1. Marginal cost can also be calculated as $MC = (\text{change in } TVC)/(\text{change in } Q)$.
 2. Marginal decisions are very important in determining profit levels. Marginal revenue and marginal cost are compared. (Chapters 7–9)
 3. Marginal cost is a reflection of marginal product and diminishing returns. When diminishing returns begin, the marginal cost will begin its rise.
 4. The marginal cost is related to AVC and ATC . These average costs will fall as long as the marginal cost is less than either average cost. As soon as the marginal cost rises above the average, the average will begin to rise. Similar to **Illustrating the Idea: Exams Scores**, students can think of their grade-point averages with the total GPA reflecting their performance over their years in school and their marginal grade points as their performance this term. If their overall GPA is a 3.0, and this term they earn a 4.0, their overall average will rise, but not as high as the marginal rate from this term.

D. Applying the Analysis: Rising Gasoline Prices

As gas prices rise, it causes most firms' short-run variable costs to also increase since most firms use gasoline to some extent, thereby increasing the AVC , MC , and ATC .

VI. In the long run, all production costs are variable, i.e., long-run costs reflect changes in plant size and industry size can be changed (expand or contract).

- A. Figure 6.4 illustrates different short-run cost curves for five different plant sizes.
- B. The long-run ATC curve shows the least per unit cost at which any output can be produced after the firm has had time to make all appropriate adjustments in its plant size.
- C. Economies or diseconomies of scale exist in the long run (Figure 6.6).
 1. Economies of scale or economies of mass production explain the downward-sloping part of the long-run ATC curve; i.e., as plant size increases, long-run ATC decreases.
 - a. Labor and managerial specialization is one reason for this.
 - b. Ability to purchase and use more efficient capital goods also may explain economies of scale.
 - c. Other factors may also be involved, such as design, development, or other "start-up" costs such as advertising and "learning by doing."
 - d. **Applying the Analysis: The Verson Stamping Machine**

In 1996 Verson (a firm located in Chicago) introduced a stamping machine the size of a house weighing as much as 12 locomotives. This \$30 million machine enables automakers to produce in five minutes what used to take eight hours to produce.

2. Diseconomies of scale may occur if a firm becomes too large, as illustrated by the rising part of the long-run ATC curve. For example, if a 10 percent increase in all resources results in a 5 percent increase in output, ATC will increase. Some reasons for this include distant management, worker alienation, and problems with communication and coordination.
 3. Constant returns to scale will occur when ATC is constant over a variety of plant sizes.
- D. Both economies of scale and diseconomies of scale can be demonstrated in the real world. Larger corporations at first may be successful in lowering costs and realizing economies of scale. To keep from experiencing diseconomies of scale, they may decentralize decision making by utilizing smaller production units. E. The concept of minimum efficient scale defines the smallest level of output at which a firm can minimize its average costs in the long run (output q_1 on Figure 6.6a).
1. The firms in some industries realize this at a small plant size: apparel, food processing, furniture, wood products, snowboarding, and small-appliance industries are examples (Figure 6.6c).
 2. In other industries, in order to take full advantage of economies of scale, firms must produce with very large facilities that allow the firms to spread costs over an extended range of output. Examples would be automobiles, aluminum, steel, and other heavy industries. This pattern also is found in several new information technology industries (Figure 6.6b).

F. Applying the Analysis: Aircraft Assembly Plants versus Concrete Plants

The aircraft assembly and ready-mixed concrete industries provide extreme examples of differing MESs. Economies of scale are extensive in manufacturing airplanes, especially large commercial aircraft. As a result, there are only two firms in the world (Boeing and Airbus) that manufacture large commercial aircraft. The concrete industry exhausts its economies of scale rapidly, resulting in thousands of firms in that industry.