

Chapter 7: Businesses and the Costs of Production

Now that we have a better understanding of consumer behavior, it is time to turn to the decision making of firms. Cost determination is vital for firms to determine the most efficient factory size and profit-maximizing output. Chapter 7 introduces short-run and long-run costs of production, explains the calculations, and graphically illustrates relationships among cost curves.

While an accountant only considers explicit production costs, an economist also includes implicit production costs (payments to investors and the entrepreneur) because they bear an opportunity cost and would invest elsewhere if they were not compensated. As a result, the accountant may calculate an accounting profit for the firm, while the economist (who subtracts normal profit) may see a smaller economic profit or even a loss. This is a key concept because economic profit draws more firms into an industry and economic losses cause firms to exit.

The Law of Diminishing Returns states that as more units of input (workers) are added to a fixed resource (a factory), output per worker will, after some point, decrease. One employee working at the factory will be frantic. Additional employees lead to specialization and increasing returns, as marginal product for each new worker increases. But at some point specialization wears off; diminishing returns occur as each additional worker adds to output, but not as much as the first workers. Finally negative returns occur, as additional workers take away from total product when they overwhelm the fixed capital. When marginal product is greater than average product, the average is rising; a marginal product lower than average product pulls down the average. Don't confuse diminishing returns with diminishing marginal utility!

In the short run plant size is fixed, so the firm's primary decision is profit-maximizing output. Fixed costs (a mortgage or interest) do not change with output; variable costs (wages and materials) increase with output. Total cost is the sum of fixed and variable costs, while marginal cost is the additional cost to produce one more unit of output. The average fixed cost decreases as output rises, because the same cost is divided over more units of output. Average variable cost is U-shaped, decreasing at first because of increasing returns, and then increasing because of diminishing returns. Average total cost is also U-shaped, as the vertical sum of average fixed cost and average variable cost. The marginal cost looks like a checkmark, first falling and then rapidly increasing due to diminishing returns. The marginal cost curve crosses both average variable cost and average total cost at their minimum points, because if the marginal cost is lower than the average cost, it pulls down the average; a marginal cost above the average pulls up the average. The minimum average total cost, where the marginal cost curve crosses it, represents productive efficiency, the point of lowest-cost production for the firm.

In the long run the plant size is variable, so the firm's primary decision is to select the plant size that minimizes costs. There are no long-run fixed costs, only marginal and total costs. The long-run average total cost curve is also U-shaped, created from the minimum points on the short-run average total cost curves for a variety of plant sizes. Economies of scale (the downward-sloping portion of the curve) occur when the plant becomes more efficient the larger it becomes, generally due to labor and management specialization and more efficient use of capital. Diseconomies of scale occur where the average total cost of production rises as the firm gets larger, generally because of the

costs of increasingly large management and communication problems. The minimum point on the long-run average total cost curve, where it crosses the marginal cost curve, represents the output where the firm minimizes its production costs.

Material from Chapter 7 consistently appears in several multiple-choice questions on the AP Microeconomics Exam. Concepts from this chapter form the basis for free-response questions about output and pricing decisions that appear on nearly every AP Microeconomics Exam. It is important to know how to construct the diminishing returns table, as well as how to interpret the total, average, and marginal product graphs and the relationship among the curves. It is also critical to be able to calculate each of the production costs, draw the short-run and long-run cost curves with the correct relationships among them, explain the reasons for the shape of each curve, and identify the lowest-cost output points.