MODULE 7: PRODUCTION AND COSTS

Businesses engage in production. What does that mean exactly? What is involved? How is steel production different from growing wheat? In this section, we will begin to learn about the behavior of firms, how they make production decisions, and how production costs depend on a firm's production function.

Definition: Production is the process (or processes) a firm uses to transform inputs (e.g. labor, capital, raw materials) into outputs, i.e. the goods or services the firm wishes to sell.

Economists divide factors of production into several categories:

Natural Resources – Land and Raw Materials

Labor – When we talk about production, labor means human effort, both physical and mental.

Capital – When economists uses the term capital, they do not mean financial capital (money); rather, they mean physical capital, the machines, equipment, and buildings that one uses to produce the product.

Technology – Technology refers to the process or processes for producing the product.

Entrepreneurship – Production involves many decisions and much knowledge. Who makes those decisions? Ultimately, it is the entrepreneur, the person who creates the business, whose idea is to combine the inputs to produce the outputs.

Cost is the monetary value of goods and services that producers and consumers purchase.

Fixed cost is a cost that does not change with an increase or decrease in the amount of goods or services.

Variable cost is a corporate expense that changes in proportion to production output. Variable costs increase or decrease depending on a company's production volume: they rise as production increases and fall as production decreases. Examples of variable costs include the costs of raw materials.

Total cost is the sum of all costs incurred by a firm in producing a certain level of output.

Marginal cost is the cost of producing one more unit of a good. Marginal cost includes all of the costs that vary with the level of production. For example, if a company needs to build a new factory in order to produce more goods, the cost of building the factory is a marginal cost.

Average and Marginal Costs - The cost of producing a firm's output depends on how much labor and capital the firm uses. A list of the costs involved in producing cars will look very different from the costs involved in producing computer software or haircuts or fast-food meals. We can measure costs in a variety of ways. Each way provides its own insight into costs. Sometimes firms need to look at their cost per unit of output, not just their total cost. There are two ways to measure per unit costs. The most intuitive way is average cost. Average cost is the cost on average of producing a given quantity. We define average cost as total cost divided by the quantity of output produced.

$$AC = TC/Q$$

If producing two widgets costs a total of \$44, the average cost per widget is

$$\$44/2 = \$22$$

The other way of measuring cost per unit is marginal cost. If average cost is the cost of the average unit of output produced, marginal cost is the cost of each individual unit produced. More formally, **marginal cost** is the cost of producing one more unit (or a few more units) of output. Mathematically, marginal cost is the change in total cost divided by the change in quantity:

$$MC = \Delta TC/\Delta Q$$

If the cost of the first widget is \$32.50 and the cost of two widgets is \$44, the marginal cost of the second widget is

$$\$44 - \$32.50 = \$11.50$$

Short-Run Costs - In a short-run perspective, a firm's total costs can be divided into fixed costs, which a firm must incur before producing any output, and variable costs, which the firm incurs in the act of producing.

Long Run Costs - The long run is the period of time when all costs are variable. The long run depends on the specifics of the firm in question—it is not a precise period of time. If you have a one-year lease on your factory, then the long run is any period longer than a year, since after a year you are no longer bound by the lease. No costs are fixed in the long run. A firm can build new factories and purchase new machinery, or it can close existing facilities. In planning for the long run, the firm will compare alternative production technologies (or processes).