

## How to Study for Class 9 Costs of Production in the Long Run and Market Structures

Class 9 continues the principles concerning costs of production by bringing in the long-run.

1. Begin by looking over the Objectives listed below. This will tell you the main points you should be looking for as you read the chapter.
2. New words or definitions and certain key points are highlighted in italics and in red color. Other key points are highlighted in bold type and in blue color.
3. You will be given an In Class Assignment and a Homework assignment to illustrate the main concepts of this chapter.
4. There are several new words in this chapter. Be sure to spend time on the various definitions. There are also new calculations. Go over each carefully. Be sure you understand how each number was derived (do the calculations for yourself). Then, plot the calculations on graph paper to see how the graph is derived. Check your graphs against the one in the text.
5. When you have finished the text, the Test Your Understanding questions, and the assignments, go back to the Objectives. See if you can answer the questions without looking back at the text. If not, go back and re-read that part of the text. When you are ready, take the Practice Quiz for Class 9.

## Objectives for Class 9 Costs of Production in the Long Run and Market Structures

At the end of Class 9, you will be able to answer the following:

1. Define what is meant by the "**long-run**".
2. Explain what is meant by "**economies of scale**" and why they exist?
3. Explain what is meant by "**learning by doing**" or the "**learning curve**" and what is meant by "**dynamic increasing returns to scale**".
5. Explain what is meant by "**diseconomies of scale**" and why they exist.
6. Explain what is meant by "**constant returns to scale**".
7. What does the long-run average total cost actually look like for most products?
8. Explain what is meant by "**minimum efficient scale**" and what has been happening to it over time? Why has this been happening?
9. What are the four characteristic of **perfect competition**?
10. What are the three characteristics of **pure monopoly**?
11. What are the characteristics of **monopolistic competition**?
12. What are the characteristics of **oligopoly**?
13. What is a **cartel**?

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(latest revision August 2004)

### 1. Costs of Production in the Long-Run

In the last class, the *long-run was defined as the time period in which all factors of production are variable*. We can now vary the amount of capital. We can expand or

contract the size of the business. Or perhaps a new business can enter the industry or an existing business can go out of business permanently.

### **Economies of Scale**

When the company is producing more houses per year, it will be a larger sized company. ***The larger company can produce at a lower cost per house than the smaller one.*** This is a familiar phenomenon for many products. Albertsons and Vons can produce groceries cheaper per unit than Mom and Pop. General Motors can produce automobiles cheaper than a very small company. Anyone starting a new business knows that it is very hard to compete against companies that are much larger. This phenomenon is called ***"economies of scale" or "increasing returns to scale"*** ("scale" refers to size and to "economize" means to save).

There are several reasons that larger companies have cost advantages over smaller companies. **One reason is that larger companies can take advantage of specialization.** Not only can they have more specialized workers, they can also have more specialized types of machinery. **A second reason is that the use of a large machine may be more efficient than any other form of production.** Steel and automobiles have been just two of the products that could not be produced cheaply without using large amounts of machinery. In some cases, a large amount of capital is necessary to be able to take advantage of a cost-reducing technology. **A third reason is commonly called "learning by doing" or the "learning curve".** The phenomenon was first noticed in the study of airframe manufacturing in the 1920s. It was found that if one measures the cost per unit vertically and the **CUMULATIVE** number of units produced horizontally, the result is a downward-sloping curve. This means that, as companies produce more of a product, it becomes cheaper for them to produce that product. Cumulative number of units produced measures the experience the organization has had in producing this product. Since the mid-1960s, hundreds of products have been studied. **No study has identified a good whose cost per unit did not decline as cumulative production increased.** (This phenomenon is known as ***"dynamic increasing returns to scale"***. The word "dynamic" refers to the process occurring over time.) Some of this learning may be individual. When I work at a new computer for the first time, I work very slowly while I learn how it works. As I do the same procedures over and over, I am able to do them faster and faster. The rest of this learning is organizational. Faced with a problem (such as how to meet or beat the competition), the members of the organization act as a team to solve it. In doing so, they learn much about the factors that will reduce costs. The solution may involve developing the ability to use lower-cost materials or parts. Or it may involve learning ways to organize the business more efficiently. The learning curve phenomenon is the reason that so many products that were once considered luxuries are now common in most households --- televisions, VCRs, Camcorders, washing machines, and so forth.

### **Test Your Understanding**

1. San Marcos Market is a grocery store of about 5,000 square feet. Albertsons is a grocery store of about 20,000 square feet. Albertsons can sell groceries at a lower price than San Marcos Market because its costs of production are lower. Explain why Albertson's costs of production are lower. That is, what cost advantages does Albertsons (or Vons or Ralphs) have just because it

is a larger company?

2. When new products first are introduced, they are very expensive. So, for example, the first color television sets sold more over \$2,000 in today's money, the first VCRs sold for over \$3,000 in today's money, the first pocket calculators sold for over \$300 in today's money, and so forth. After the products are on the market for awhile, the prices tend to fall greatly. Use the principles of **economies of scale** and **dynamic increasing returns to scale** to explain why this phenomenon occurs.

2. Recently, there have been many mergers. Large banks have merged with other large banks. Computer companies have merged with other computer companies. These mergers are justified by the cost savings that occur if the two competing companies become one. In this question, let us consider gas stations. Exxon and Mobil, have merged together into one company, as have Chevron and Texaco. Use the principle of **economies of scale** to explain why there might be a reduction in the cost of production of selling gasoline if these companies merge into one.

### **Diseconomies of Scale**

*When companies become so large, the cost per unit of producing the product rises. This phenomenon is known as "diseconomies of scale".* There are several reasons that diseconomies of scale may exist. (1) If we are referring to a company that manufactures a product, as the factory becomes larger, the company may have to ship its production over a longer distance. **Transportation costs may rise.** (2) There is what is known as *the principal – agent problem*. In a very large company, it is easier for the management to pursue their own individual goals. This may include “empire building”, that is, becoming larger and larger just because larger companies have more prestige. Increasing the size of the company may increase costs. (3) There is *the shirking problem*. As a company becomes larger, it requires more workers. This makes it easier for workers to shirk on the job. The company must hire more supervisors, coordinators, and managers in response. As there are more layers to the management hierarchy, **communication and coordination are impaired**. Some of the information going up or down the hierarchy becomes lost or distorted. This is the problem related to *bureaucracy*. All of this increases costs of production. (4) Finally, if the company manufactures a product, **a large factory often contains many different processes and different specialists**. Often, they work against each other. Occasionally, there is chaos.

### **Test Your Understanding**

It has been argued that (perhaps) the Post Office experiences diseconomies of scale. First, what would this mean? Second, from what you might know about the Post Office and the explanation of this chapter, why might this be true (if indeed it is true)?

### **Constant Returns to Scale and the Minimum Efficient Scale**

*. In reality, economies of scale do exist when companies are small. But, as companies become larger and larger beyond a certain size, the cost per unit of producing the product stays the same. This phenomenon is called "constant returns to scale".* We still expect diseconomies of scale to exist; as companies become larger and larger, the cost per unit will eventually rise. **But the evidence shows that companies do not actually become that large** (those companies that are very large are managed as though they were a series of smaller independent companies).

*There is a certain minimum quantity of houses that must be produced to be able to produce each house at the lowest possible cost. This quantity is known as the "minimum efficient scale".* If we produce a smaller quantity than this, we will have to have less capital; the cost per unit of making the product will be greater. If we produce a larger quantity, we can have more capital; however, the cost per unit will neither fall nor rise. **Any company that can produce this quantity can produce the product as cheaply as any competitor.**

There have been many studies to determine how large the minimum efficient scale is. **Virtually all studies show that the minimum efficient scale is smaller than most people might believe.** For example, one estimate has been that it occurs at 500,000 automobiles (350,000 if we make only small cars). Any company producing less than this will produce automobiles at a higher cost. But once this quantity is reached, a company can produce automobiles as cheaply as any larger company. Considering that the market for automobiles in the U.S. is commonly about 15 to 17 million automobiles, a company that can obtain 3% to 4% of the market (500,000 automobiles) should be able to compete with anyone. Put another way, we could have 25 or more automobile companies, each producing 500,000 automobiles, and the cost of making an automobile would be the same as it is today. For the citrus groves in San Diego County, one estimate is that the minimum efficient scale occurs with a grove of ten acres. This is relatively small. However, for wheat farmers, a farm of 150 to 200 acres is needed to reach the minimum efficient scale. For grocery stores, the minimum efficient scale has been estimated to occur with a store of about 20,000 square feet. This is about the size of the typical grocery store today. Larger stores have no cost advantage.

**Not only is the minimum efficient scale relatively low, but it has been falling.** This means that relatively small companies can compete effectively with larger ones on the basis of costs. Just look at the typical mall. At one time, the small specialty stores were being driven out of business by the large department stores. More recently, the reverse has been occurring. Today, competition is less likely to be based on cost and more likely to be based on differences between products. Consider high fashion apparel shops, microbreweries, and gourmet coffee as examples.

### **Test Your Understanding**

In the chapter, it was argued that **the minimum efficient scale has been falling** in many industries over the past twenty years. Why do you think this phenomenon has been occurring? (That is, why were small stores unable to compete with the larger stores in the past but are better able to compete now?)

### **First Mover Advantages**

If we own a company and we know there are considerable economies of scale, we would desire to become large as quickly as possible. This might mean charging a very low price to gain customers (called "*predatory pricing*"). Even if we lose money for awhile, we will gain in the future as our costs of production fall. Perhaps we can even drive most of our competition out of business? **Companies that are knowledge-based are those likely to have economies of scale or dynamic increasing returns to scale.** These include computers, pharmaceuticals, aircraft, software, telecommunications equipment,

and fiber optics. These companies require large initial amounts of money spent on research, development, and tooling. Experience gained with one product or technology can make it easier to produce new products using related technologies. Because increasing production lowers costs per unit, the company that can first increase its production can eliminate most if not all of its competition. This phenomenon is called a *“first mover advantage”*. It explains in part how the VHS format drove out the Beta format in the videocassette market. It also explains in part the dominance of Microsoft. We will also examine this phenomenon again when we analyze public utilities such as San Diego Gas and Electric, Pacific Gas and Electric, SBC, and so forth.

## 2. Market Structures

Remember that the goal of a company is to maximize its profits. Remember also that *profits are simply the difference between the total revenues and the total costs of production*. We examined the costs of production first because the principles affecting costs are the same for all companies regardless of the industry they are in. But this is not true about the revenues. To analyze the differences in total revenue, **we group industries into four types**. They are classified according to the power a company would have to affect the price of the product.

### (A) Perfect Competition

There are **four criteria** for an industry to be characterized as perfect competition. Of course, nothing is “perfect”. But, while no industry will exactly meet the four criteria of perfect competition, we can learn much from assuming that such an industry does exist.

#### (1) There are so many sellers that no one seller can affect the price by himself or herself.

Think of yourself buying gasoline. The price says \$2.00 per gallon. Suppose you ask to see the manager and then make an offer: you will buy only if the price is reduced to 50 cents per gallon. What will the manager do? The answer is: laugh and ask you to leave. The manager will not take your offer because there are so many others who will pay \$2.00. These others are your competitors. You don't think of them as competitors. Indeed, they may even be your friends. You think of them, like yourself, as subject to impersonal market forces. But nonetheless, they are your competitors. And because they are there, you have no influence at all on the price. We say that you are *a price taker*. If we switch the example and make you a seller instead of a buyer, we have the main characteristic of perfect competition. If a seller charged more than \$2.00 per gallon, no one would buy from him or her. The seller would never charge less than \$2.00 because there is no reason to do so.

#### (2) We assume that all buyers and all sellers have perfect information.

Each knows what the price is, what others are charging, and all relevant features of the product. No one would ever pay \$3.00 for a gallon of gasoline because everyone knows that there are sellers willing to charge \$2.00.

**(3) We assume that there is easy entry into and exit from the industry.**

Any company wanting to leave the industry can do so easily. And there are no barriers preventing entry to any company from coming into the industry.

**(4) We assume that the products of the sellers in the industry are identical.**

One company's product is just the same as another company's product.

Although there are no examples of perfect competition, agriculture is the closest. We will start our analysis of business behaviors with this market structure.

**(B) Pure Monopoly**

Literally, "mono" means one. Therefore, *a pure monopoly is an industry with only one seller*. Such a company should have considerable ability to affect the price that it charges. However, for this to occur, two other characteristics are necessary. **First, there must be high barriers to entry**. If this were not the case, then when the monopoly set a high price and earned high economic profits, new sellers would enter to compete with it. The increased competition would drive down prices, eliminating the economic profits that were being earned. **Second, the demand for the product needs to be relatively inelastic (that is, has few substitutes)**. If this were not the case, then if the monopolistic company raised its price, buyers would simply shift to other substitute products. This would limit its ability to raise the price considerably. We will consider pure monopoly after completing our analysis of perfect competition.

**(C) Monopolistic Competition**

*If there is one seller but a very elastic demand for the product, the industry is called monopolistic competition*. The monopoly part results from there being one seller of the narrowly defined product. **The competition comes from other products that are close substitutes**. Most real-world competition takes this form. There is only one Coca-Cola but there are many close substitutes. There is only one MacDonaldis but there are many close substitutes. There is only one iMac but there are many close substitutes. In each case, **the company can raise its price and not lose all of its sales. However, an increase in price will cause it to lose a considerable portion of its sales**. This limits greatly the power of the company to affect the price. The first three characteristics of perfect competition are similar for monopolistic competition. There are many sellers. The buyers and sellers have perfect information. And there are no barriers to entry. The difference is the fourth characteristic: *in perfect competition, the products are identical whereas in monopolistic competition, the products are differentiated*. Because products are differentiated, monopolistic competition involves considerable use of advertising.

**(D) Oligopoly**

The final structure of an industry is called oligopoly. "Olig" means "few". In this industry, *there are few sellers. How few is "few"? The answer is "few enough that each seller has an ability to affect the price"*. Usually most oligopolies are dominated

by between two and ten companies. Automobiles, steel, tires, cigarettes, accounting firms, and breakfast cereals are among the many examples. Oligopolies are difficult to analyze because each firm, in making a decision, must consider not only the response of the buyers but also the response of the other sellers. Should Ford offer a rebate (lower price) on its cars? The answer depends not only on the way buyers will respond to the rebate but also on Ford's estimate of the response of General Motors, Chrysler, Honda, Toyota, and Nissan.

It would be easier to predict the responses of competitors if the competitors met and discussed their decisions. *Such a meeting of members of an oligopoly to coordinate decisions (especially over the price) is known as a cartel.* Cartels are illegal in the United States; however, some have managed to exist. Examples are the National Collegiate Athletic Association, Major League Baseball, the National Football League, etc. On a world basis, there have been cartels in oil, diamonds, and other natural resources.

If we can imagine measuring **market power (the ability to affect the price of the product one sells)** on a scale of zero to 100 (with 100 being the greatest amount of power), the four market structures would be arranged as follows:

Perfect Competition	Monopolistic Competition	Oligopoly	Cartel	Pure Monopoly
0				100

Notice that pure monopoly does not have a market power of 100 on this imaginary scale. Even if there were only one company, it cannot have total power over the price. Buyers always have the power to not buy the product.

### Test Your Understanding

In each case, state whether you believe the industry should be characterized as perfect competition, pure monopoly, monopolistic competition, or oligopoly. STATE YOUR REASONS.

1. Growers of avocados \_\_\_\_\_
2. Fast-food restaurants \_\_\_\_\_
3. Automobile Producers \_\_\_\_\_
4. Television stations \_\_\_\_\_
5. Computer manufacturers \_\_\_\_\_

### Practice Quiz for Class 9

1. In the **long-run**, all factors of production are
  - a. fixed
  - b. variable
2. "When the quantity produced increases, the amount of capital used can also increase. With a greater amount of capital, the cost per unit of producing the product falls." This statement describes:
  - a. economies of scale
  - b. diseconomies of scale
  - c. constant returns to scale
  - d. economies of scope

3. “When the quantity produced increases, the amount of capital used can also increase. With a greater amount of capital, the cost per unit of producing the product stays the same.” This statement describes:
  - a. economies of scale
  - b. diseconomies of scale
  - c. constant returns to scale
  - d. economies of scope
4. “As the **cumulative** production of the products increases over time, the cost per unit falls.” This statement describes:
  - a. constant returns to scale
  - c. diseconomies of scale
  - b. economies of scope
  - d. dynamic increasing returns to scale
5. **Diseconomies of scale** may exist because of:
  - a. the principal agent problem
  - b. shirking
  - c. poor communication
  - d. all of the above
6. The minimum quantity that must be produced to be able to produce as cheaply as possible is called the:
  - a. economies of scale
  - b. minimum efficient scale
  - c. predatory pricing
  - d. first mover advantage

For questions 7 to 10, choose

- a. perfect competition
  - b. pure monopoly
  - c. monopolistic competition
  - d. oligopoly
7. An industry with many sellers all producing the same product, perfect information, and low barriers to entry
  8. An industry with only one seller but with many close substitute products and low barriers to entry
  9. An industry with few sellers
  10. An industry with one seller, no close substitutes, and high barriers to entry

Answers: 1. B 2. A 3. C 4. D 5. D 6. B 7. A 8. C 9. D 10. B