Chapter 6
Competitive Markets

After reading Chapter 6, COMPETITIVE MARKETS, you should be able to:

- List and explain the characteristics of **Perfect Competition** and **Monopolistic Competition**
- Explain why a perfectly competitive firm cannot set its own price and must charge the market price.
- Explain how a perfectly competitive firm decides how much output to produce in order to maximize profits.
- Derive the supply curve for a perfectly competitive firm and industry.
- Discuss the short-run and long-run market equilibrium for a perfectly competitive industry.
- Describe the equilibrium for a **Monopolistic Competitive Firm**.
- Explain the benefits for society from competitive industries
- List and discuss policies that have been used to promote competition, such as **Deregulation**, **Anti-Trust Laws**, and removal of restrictive licensing requirements and work rules.

## Outline

I. Competitive Markets
   A) **Perfect Competition** is a market with the following characteristics:
      1. The product’s price is the same for each buyer and seller. Each firm is a **Price Taker**.
      2. The product is homogeneous.
      3. Buyers and sellers have perfect information about prices and product qualities.
      4. There are a large number of buyers and sellers.
      5. There is freedom of entry into and exit from the industry.
   
   B) **Monopolistic Competition** is a market with the same characteristics as perfect competition except:
      1. The product’s price is different for each seller.
      2. Each firm produces a slightly different product.

II. The Firm and the Market: Perfect Competition
   A) The *market* demand curve is downward sloping.
   
   B) The *firm’s* demand curve is horizontal or perfectly elastic. Since each firm has only a tiny share of the total market, it can sell all the output it wishes at the going market price.
III. The Competitive Firm in the Short Run

A) Marginal Revenue \((MR)\) is the increase in total revenue from selling an additional unit of output. The marginal revenue a perfectly competitive firm receives for the sale of an extra unit of output is the price of the good, that is, \(MR = P\).

B) A firm maximizes its profits by producing just enough output so that marginal revenue equals marginal cost. Since \(MR = P\) for a perfectly competitive firm, it produces a level of output where marginal cost equals price, \(P = MC\). This is illustrated below, where the firm produces \(Q\) and charges the going price \(P\).

![Graph showing the relationship between price, marginal cost, and output in a competitive market.]

D) In the short run, a perfectly competitive firm can earn:
   1. an economic profit when price is greater than min ATC.
   2. a normal profit when price is equal to min ATC.
   3. an economic loss when price is less than min ATC.

E) The supply curve of a perfectly competitive firm is its marginal cost curve above the minimum average variable cost curve because this shows the amount of the firm’s production at any potential price. If the price is less than the average variable cost, the firm minimizes its losses by shutting down.

F) The market supply curve is the horizontal summation of all the supply curves of each firm. The market equilibrium, which determines the equilibrium price, is where the market demand curve and market supply curves cross.

IV. Long Run Adjustments

A) In the long run, new firms can enter the industry, existing firms can expand output, and/or firms can exit the industry.
   1. If firms are earning an economic profit new firms will enter the industry. This will increase supply and drive the market price down.
   2. If firms are earning an economic loss firms will exit the industry. This will reduce supply and drive the market price up.
B) In the long run, firms in a perfectly competitive industry:
1. earn zero economic profits; that is, they earn a normal profit.
2. produce where average costs are minimized.

V. Monopolistic Competition
A) An industry characterized by monopolistic competition is like a perfectly competitive industry with the exception that each producer sells a product slightly different from the other sellers and each firm can set its own price.

B) Each firm sells a product differentiated from other producers, so the firm’s demand curve is slightly downward sloping.

C) In the long run, each monopolistic competitive firm earns zero economic profits since there is free entry and exit.

D) Unlike perfect competition, however, in the long run monopolistically competitive firms produce where output is less than minimum efficient scale.

VI. Policies to Promote Competition
A) Perfectly competitive industries benefit society by pushing the price of the product down so that the price just covers the lowest cost of production. Output is produced at minimum efficient scale.

B) A number of policies have been followed to help promote competition:
1. **Removal of Trade Barriers** provides additional competition for domestic firms by allowing more foreign firms to enter the market.

2. **Deregulation**, the elimination of government regulatory controls over an industry, substitutes competition among firms for government policies that stifle competition.

3. **Antitrust Laws** set the legal rules businesses must obey and are designed to help foster competition.

4. **Reducing Restrictive Licensing Requirements and Work Rules** removes constraints that help limit the extent of competition.
Review Questions

True/False

If the statement is correct, write true in the space provided; if it is wrong, write false. Below the question give a short statement that supports your answer.

_____ 1. A perfectly competitive industry is identified, in part, by the presence of many different firms, each selling a good that cannot be distinguished from that of another producer.

_____ 2. Each firm in a perfectly competitive industry sells a good that is identical to that of its competitors; each firm in a monopolistic competitive industry sells a good slightly different from its competitors.

_____ 3. The wheat industry is a good example of a monopolistic competitive industry.

_____ 4. For a perfectly competitive firm, marginal revenue is equal to the price of the good it produces; that is, \( MR = P \).

_____ 5. In order to maximize its profit, a firm should produce the amount of output such that marginal revenue exceeds marginal cost by the largest possible amount.

_____ 6. If a monopolistic competitive firm raises its price, it loses some but not all of its customers; if a perfectly competitive firm raises its price, it loses all of its customers.

_____ 7. The demand curve faced by a perfectly competitive firm is downward sloping.

_____ 8. In the long run, both perfectly competitive and monopolistic competitive firms produce at the point of minimum long-run average costs.

_____ 9. If firms deduce the presence of an economic profit, they can enter a perfectly competitive industry but not a monopolistic competitive industry.

_____ 10. In the long run, the price of a good in a competitive industry equals the average cost of producing the good.

_____ 11. Deregulation refers to the substitution of government rules and regulations for competition produced by the marketplace.

_____ 12. As firms enter a perfectly competitive industry, the market supply curve shifts to the right.

_____ 13. If firms are making zero economic profit, they will tend to leave the industry.
14. In the long run, a perfectly competitive industry produces enough output so that the price of the good equals its marginal cost and also equals the minimum average cost of providing the good.

15. A perfectly competitive firm shuts down whenever the price of its product is less than its average total costs; that is, $P < ATC$.

**Multiple Choice Questions**

*Circle the letter corresponding to the correct answer.*

1. Perfectly competitive industries are characterized by all of the following except
   (a) the product’s price is the same for each buyer.
   (b) there are a large number of different buyers and sellers.
   (c) there is freedom for entry and exit into the industry.
   (d) each buyer and seller has perfect information about prices.
   (e) each producer sells a product slightly different from the other producers.

2. What rule can a perfectly competitive firm follow to maximize its profits?
   (a) Produce until $MR = P$.
   (b) Produce so that $P = \text{long run } ATC$.
   (c) Produce until $P > MC$.
   (d) Produce so that $MR = MC$.
   (e) Produce until $MR = \text{long run } ATC$.

3. A good example of monopolistic competitive firms would be
   (a) automobile producers.
   (b) producers of wheat.
   (c) fast food hamburger restaurants.
   (d) steel producers.
   (e) electric utility companies.

4. Which of the following is not true about the long-run equilibrium in a perfectly competitive industry?
   (a) $P = MC$.
   (b) $P = \text{the minimum long-run } ATC$.
   (c) $MC = MR$.
   (d) $P = MR$.
   (e) They are all true in the long-run equilibrium.

5. The demand curve faced by a perfectly competitive firm ________the market demand curve.
   (a) is always more horizontal than
   (b) always has the same slope as
   (c) is always steeper than
   (d) with about equal probability can be either more or less steep than
   (e) None of the above because there is no general relationship.
6. When can perfectly competitive firms earn an economic profit?
   (a) In only the short run.
   (b) In only the long run.
   (c) In both the short run and long run.
   (d) Never.
   (e) Depending on market conditions, in either the long run or the short run but not both.

7. When can monopolistic competitive firms earn an economic profit?
   (a) In the short run only
   (b) In the long run only
   (c) In both the short run and long run
   (d) Never
   (e) Depending on market conditions, in either the long run or the short run, but not both

8. Suppose a firm’s marginal revenue exceeds its marginal cost. In order for it to maximize its profit, the firm should
   (a) not change its production.
   (b) reduce its production.
   (c) expand its production.
   (d) either not change or else reduce its production.
   (e) It is impossible to tell how the firm should alter its level of production from the information provided.

9. In a perfectly competitive industry, if some firms are suffering an economic loss, in the long run firms will ________, so the supply curve will ________ and the price will ________.
   (a) leave the industry; shift to the right; rise.
   (b) leave the industry; shift to the left; fall.
   (c) enter the industry; shift to the right; fall.
   (d) enter the industry; shift to the left; fall.
   (e) leave the industry; shift to the left; rise.

10. The supply curve of a perfectly competitive industry is the horizontal summation of each firm’s
    (a) $\text{MC}$ curve above the average variable cost curve.
    (b) long-run $\text{ATC}$ curve below the $\text{MC}$ curve.
    (c) $\text{P}$ curve.
    (d) $\text{MR}$ curve.
    (e) None of the above.

11. In the long run, in which industry can a firm earn an economic profit: one that is perfectly competitive or one that is monopolistically competitive?
    (a) A perfectly competitive one
    (b) A monopolistically competitive one
    (c) Both can always earn an economic profit
    (d) Neither
    (e) Either one may earn an economic profit, depending on other factors about the market structure
12 Which of the following statements best applies to deregulation?
   (a) Deregulation raised prices and lowered quality in the U.S.
   (b) The U.S.’s deregulation model has spread to Europe.
   (c) Deregulation generally lowered prices in deregulated industries.
   (d) Deregulation has been declared a failure.
   (e) Both b and c are correct.

**Essay Questions**

*Write a short essay or otherwise answer each question.*

1. Which is more likely to advertise its product: a firm in a perfectly competitive industry or a company in a monopolistically competitive industry? Why?

2. Explain why the demand curve faced by a perfectly competitive firm is horizontal.

3. Complete the following table:

<table>
<thead>
<tr>
<th>Quantity of Output</th>
<th>Total Cost</th>
<th>Marginal Cost</th>
<th>Price</th>
<th>Total Revenue</th>
<th>Marginal Revenue</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1000</td>
<td>XXX</td>
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<td>___</td>
<td>$6000</td>
<td>$3000</td>
<td>$15000</td>
<td>$3000</td>
<td>___</td>
</tr>
</tbody>
</table>

4. In Question 3, what level(s) of output maximized profits? At these level(s), what did MC equal? MR? Could this be the long-run equilibrium of a firm in a perfectly competitive industry? Why?

5. Draw a diagram illustrating the short-run equilibrium of a perfectly competitive firm that is enjoying economic profits. Label the ATC curve and identify the equilibrium price and level of output.

6. Draw a diagram representing the long-run equilibrium of a perfectly competitive firm. Label the long-run ATC curve and identify the equilibrium price and level of output.

7. Draw a diagram illustrating the long-run equilibrium of a monopolistically competitive firm. Label the long-run ATC curve and identify the equilibrium price and quantity.

8. What methods have been used to promote competition? Why is competition promoted?

**Answers to Review Questions**

**True/False**

1. True. In addition to these requirements, the product’s price is the same for each buyer and seller, buyers and sellers know about prices and qualities, and there are no limitations on entering or exiting the industry.

2. True. This is the key difference between perfectly competitive and monopolistically competitive industries.
3. False. One farmer’s wheat is indistinguishable from another farmer’s, so this is a perfectly competitive industry.

4. True. We will see in the next chapter that in other types of industry structures, marginal revenue differs from price.

5. False. If marginal revenue exceeds marginal cost, the firm should expand production: If it does so, the gain in revenue (the marginal revenue) is greater than the increase in cost (the marginal cost), so the firm’s total profits rise.

6. True. This reflects the distinction between the downward sloping demand curve of the monopolistic competitor and the horizontal demand curve of the perfect competitor.

7. False. It is important to realize that the demand curve faced by a perfectly competitive firm is horizontal.

8. False. Perfectly competitive firms produce at the point of minimum average costs; however, monopolistically competitive firms produce where average costs are higher than the minimum.

9. False. Both perfectly competitive industries and monopolistically competitive industries have complete freedom of entry.

10. True. The fact that the price of the good just equals the average cost of the good means that firms are earning a normal profit rather than an economic profit.

11. False. The question reverses the definition: Deregulation refers to the removal of government regulations in favor of competition.

12. True. This causes the price of the good to fall, thereby erasing the economic profit that attracted the new entrants and in this fashion leading to the long-run equilibrium where there is no economic profit.

13. False. In this case, firms are making the same normal profit they could earn anywhere else in the economy, so they will be content to stay in the industry.

14. True. The fact that \( P = \text{Minimum long-run } ATC \) is important because it means that the goods are being produced at the lowest possible total cost to society.

15. False. The shutdown rule is to close whenever the price is less than the average \textit{variable} price; that is, whenever \( P < AVC \).

\textbf{Multiple Choice Questions}

1. (e) In a perfectly competitive industry, each business produces a product that is exactly the same as all the other firms.

2. (d) Discussed in the next chapter is the fact that monopolistic firms follow the identical rule.

3. (c) There are thousands of different fast-food hamburger restaurants; entry and exit into this industry is unhindered; and each different brand of restaurant produces a hamburger slightly distinct from its competitors.
4. (e) In the next chapter, we shall contrast these results with the long-run equilibrium conditions of monopoly industries.

5. (a) The market demand curve is downward sloping, while the demand curve faced by a perfectly competitive firm is perfectly horizontal.

6. (a) In the short run, an increase in the market demand curve allows perfectly competitive firms to earn an economic profit. In the long run, however, the expansion of output from the established firms and/or newly entered companies squeezes out all economic profits.

7. (a) As is true for perfectly competitive firms, monopolistically competitive firms can earn an economic profit in the short run, but the free entry of new competitors ultimately eliminates all economic profits in the long run.

8. (c) If the firm expands its production, the gain in revenue (the marginal revenue) exceeds the increase in costs (the marginal cost) so that its total profit rises.

9. (e) The higher price reduces the economic losses. Once the losses are eliminated, firms no longer leave the industry, the supply curve stops shifting, and the price is constant.

10. (a) Each firm’s $MC$ curve above its $AVC$ curve shows how much output the firm will supply at each price. (If the price is below the average variable cost, the firm shuts down.) Adding all of the firms’ $MC$ curves gives the total industry supply curve.

11. (d) In both industries, the fact of free entry squeezes out all economic profit.

12. (e) Deregulation lowered prices and is being copied in Europe.

**Essay Questions**

1. Firms in a monopolistically competitive industry are more likely to advertise. These firms try to shift outward the demand curve for their particular variation of the product. Perfectly competitive firms have little to gain from advertising their products. Even if they succeed in shifting outward the demand curve for their industry’s product, they benefit little because consumers will make the additional purchases from all firms in the industry.

2. The demand curve is completely horizontal (which means it is perfectly elastic) because the firm sells a good identical to many other competitors. Since the company is a tiny fraction of the market, it can sell all it produces at the market price. Thus, the firm sees no need to lower its price. If it tries to raise its price, it will lose all its customers, as they shift their purchases to the many other firms who produce an identical product and who have not raised their price.
3. To see how to calculate these answers, start with the row where the quantity of output equals 2. Recall that the marginal cost of the second unit of output equals the difference between the total cost of producing 2 units minus the total cost of producing 1 unit. Hence, the total cost of producing 2 units simply equals the total cost of 1 unit plus the marginal cost of the second unit, or $1000 + $2000 = $3000. Next, profit equals total revenue minus total cost, so for 2 units of output profit equals $6000 minus $3000, or $3000 as given in the table. The row where the quantity of output equals 3 shows how to compute the marginal cost and marginal revenue. The marginal cost of the third unit equals the total cost when 3 units are produced, $6000, minus the total cost when 2 are produced, $3000, so that \( MC = 6000 - 3000 = 3000 \). Analogously, the marginal revenue of the third unit equals the total revenue when 3 are sold, $9000, minus the total revenue when 2 are sold, $6000, or $3000. Alternatively, since this is a perfectly competitive firm, marginal revenue also equals the price. Finally, in the row where 4 are produced, total revenue simply equals the price of $3000 times the quantity sold of 4, or $12000.

4. Profit is maximized at output levels 2 and 3. The \( MC \) of producing 3 units rather than 2 units equals $3000. The \( MR \) equals $3000. Notice that it is indeed the case that \( MR = MC \) at the profit maximizing level(s) of output! This cannot be the long-run equilibrium of a perfectly competitive firm because the maximum (economic) profit does not equal zero.

5. As shown below, the firm produces where \( MR = MC \), which for a perfectly competitive firm is identical to the requirement that \( P = MC \). Hence, \( Q \) is the equilibrium quantity produced, and \( P \) is the equilibrium price. The firm is earning an economic profit because the price, \( P \), exceeds the average total cost of producing \( Q \) worth of output.

<table>
<thead>
<tr>
<th>Quantity of Output</th>
<th>Total Cost</th>
<th>Marginal Cost</th>
<th>Price</th>
<th>Total Revenue</th>
<th>Marginal Revenue</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>$6000</td>
<td>$3000</td>
<td>$15000</td>
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<td>$2000</td>
</tr>
</tbody>
</table>
6. In the long run, a perfectly competitive firm continues to maximize its profit by producing where $MR = MC$ (which for a perfectly competitive firm is equivalent to producing where $P = MC$). In the diagram below, the firm produces $Q$ and the price is $P$. In the long run, the firm cannot earn an economic profit; it can earn only a normal profit. Hence, in the long run, the level of production is such that the average total cost, $ATC$, of producing the output equals the price, $P$, as shown.

7. A monopolistically competitive firm has a downward sloping demand curve. As shown below, the firm produces $Q$ and sets price $P$. The price equals the long-run average total cost of production ($ATC$) because, similar to a perfectly competitive firm, in the long run a monopolistically competitive firm cannot earn an economic profit.

8. Several policies have historically been used to promote competition in our economy. These range from removing trade barriers, to deregulation, to antitrust laws, to removing restrictive licensing requirements and work rules. The goal of all these actions is to encourage more competition among firms. For instance, removing trade barriers allows foreign competitors to enter the market; deregulating removes government-imposed regulations that inhibit competition; antitrust laws have been designed to help foster competition, and removing restrictive licensing requirements allows new competitors to enter a market. The basic idea behind all of these policies is that competition is good for society. Competition forces firms to produce their products efficiently and to set the lowest possible prices. For example, in the long run, perfectly competitive firms are forced to produce at the minimum average total cost. By producing their products as efficiently as possible and setting low prices, competition makes society and consumers as well off as possible.
Additional Questions

1. For each of the following situations calculate how much profit the perfectly competitive firm currently earns. Explain whether or not the firm should increase its output, decrease its output or keep its output the same.

   (a)  \( P = 20, \ Q = 200, \ \text{ATC} = 10, \ \text{AVC} = 6, \ \text{MC} = 15 \)
   (b)  \( P = 30, \ Q = 100, \ \text{ATC} = 35, \ \text{AVC} = 25, \ \text{MC} = 30 \)
   (c)  \( P = 15, \ Q = 100, \ \text{ATC} = 45, \ \text{AVC} = 20, \ \text{MC} = 15 \)

2. Suppose a wheat farmer faces the cost schedule given in the table below:

<table>
<thead>
<tr>
<th>Output</th>
<th>Variable Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
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<td>5</td>
<td>65</td>
<td>75</td>
</tr>
<tr>
<td>6</td>
<td>100</td>
<td>110</td>
</tr>
</tbody>
</table>

   (a) For each output level calculate average total cost, average variable cost and marginal cost.
   (b) How much should the farmer produce if the price of wheat is $15.00? What is his economic profit or loss?
   (c) How much should the farmer produce if the price of wheat is $8.00? What is his economic profit or loss?

3. The production schedule for a perfectly competitive bicycle manufacturer is given in the table below.

<table>
<thead>
<tr>
<th>Number of Workers</th>
<th>Number of Bicycles Produced Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
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<tr>
<td>2</td>
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<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>

   Labor is the only variable input and a worker costs $200 per day. If the market price of a bicycle is $200.00, how many workers will the manufacturer hire? If the manufacturer has fixed costs of $500 per day how much profit does the firm earn? Hint: first calculate variable cost and marginal cost.

4. Suppose the popcorn industry is initially operating in a long run equilibrium. Explain what will happen in the short run if a new medical study shows that eating popcorn will increase your life expectancy. What will happen in the long run?

5. Some observers have commented that there are too many firms in a monopolistically competitive industry. Since each firm produces at an output level less than minimum efficient scale, society would be better off if there were less firms with each firm increasing its output to minimum efficient scale. Can you think of a reason why this observation may not be true?
Answers

1. (a) Profit = $20 \times 200 – $10 \times 200 = $2,000.
   The firm is producing at an output where price is greater than marginal cost. Therefore, it should increase production.

(b) Profit = $30 \times 100 – $35 \times 100 = –$500
   The firm is producing at an output where price is equal to marginal cost. It is producing at the point where it maximizes its profits (minimizes its losses) so it should not change the amount it produces.

(c) Profit = $15 \times 100 – $45 \times 100 = –$3,000
   Although the firm is producing at an output where price is equal to marginal cost, the price is less than average variable cost. Therefore, the firm should shut down and produce nothing.

2. (a)

<table>
<thead>
<tr>
<th>Output</th>
<th>Variable Cost</th>
<th>Total Cost</th>
<th>Average Variable Cost</th>
<th>Average Total Cost</th>
<th>Marginal Cost</th>
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</tr>
</tbody>
</table>

(b) If the price is $15 the farmer should produce 4 units. His profit is equal to $5.
(c) If the price is $8 the farmer should shut down since the price is less than minimum AVC. His loss is $10 since he still has to pay his fixed costs.

3. After calculating variable cost and marginal cost you get the following table.

<table>
<thead>
<tr>
<th>Number of Workers</th>
<th>Number of Bicycles Produced</th>
<th>Marginal Product</th>
<th>Variable Cost</th>
<th>Marginal Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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If the price of a bicycle is $200 the firm should produce 9 bicycles. Therefore, the firm should hire 5 workers. If fixed costs are $500, economic profit is equal to $300.

4. The medical study will lead to an increase in the demand for popcorn, which will put an upward pressure on the market price. Firms in the industry will increase the amount of popcorn they supply. Price will be greater than average cost and popcorn firms will earn an economic profit. The economic profits will attract new firms into the market, which will increase supply and drive down the price. Entry will continue until firms earn a normal profit.
5. There is a tradeoff here. If there are less firms, each producing at minimum efficient scale, society would benefit since output is produced at the lowest possible cost. However, if there are less firms, there is less variety in the market, which reduces benefits to society. Under monopolistic competition consumers pay a higher price compared to perfect competition but they can buy a product that better matches their own preferences.