Market Structure: Monopolistic Competition

Overview

Although the conditions necessary for the existence of perfect competitive and monopoly are unlikely to be found in the real world, an analysis of these market structures is important because it provides insights into more commonly encountered industry types. These insights provide guidance in the formulation of public policy to promote the general economic welfare. Unlike monopolies, perfectly competitive firms produce at minimum per unit cost. Thus, perfectly competitive market structures result in an efficient allocation of society's scarce productive resources and tend to maximize consumer and producer surplus.

Although models of perfect competition and monopoly are useful, it is important analytically to bridge the gap between these two extreme cases. The first significant contributions in this direction were provided by Edward Chamberlin and Joan Robinson. These economists observed that in many intensely competitive markets individual firms were able to set the market price of their product. Since these firms exhibit characteristics of both perfect competition and monopoly, this market structure is referred to as monopolistic competition.

The market power of monopolistically-competitive firms is derived from product differentiation and market segmentation. Through subtle and not-so-subtle distinctions, each firm in a monopolistically competitive industry is a sort of mini-monopolist. But, unlike a monopolist, the ability of these firms to set the market price for their product is severely constrained by the existence of many close substitutes. Thus, the demand for the output of
Monopolistically competitive firms is much more price elastic (flatter) than the demand curve confronting the monopolist. A firm in a perfectly competitive industry faces a perfectly-elastic (horizontal) demand curve because its output is a perfect substitute for the output of other firms in the industry. Unlike monopolies and monopolistically-competitive firms, which may be described as price makers, perfectly-competitive firms are price takers.

Monopolistic competition is an example of an imperfectly competitive industry. Firms in these industries exercise a degree of market power, albeit less than that exercised by a monopoly. As in the cases of perfect competition and monopoly, profit-maximizing monopolistically competitive and oligopolistic firms will produce at an output level where \( MR = MC \).

The characteristics of a monopolistically competitive industry are a large number of sellers acting independently, differentiated products, partial (and limited) control over product price, and relatively easy entry into and exit from the industry.

Product differentiation refers to real or perceived differences in goods or services produced by different firms in the same industry. Product differentiation permits market segmentation, which enables individual firms to set their own prices within limits. As in the case of a monopoly, each firm in a monopolistically competitive industry faces a downward-sloping demand curve, which implies that \( P > MR \).

The short-run profit-maximizing condition for a monopolistically competitive firm is \( P > MR = MC \). As in the case of perfect competition, the firm earns economic profit when \( P > ATC \), which will attract new firms into the industry. As new firms enter the industry, existing firms lose market share. This is illustrated graphically by a shift to the left of each firm's demand curve. If \( P < ATC \), the firm earns an economic loss, which will cause firms to exit the industry resulting in an increase in market share and a shift to the right of the demand curve.

In the long run, the firm earns no economic profit since \( P = ATC \). The demand curve for the firm's product is just tangent to the firm's average total cost curve. The long-run competitive equilibrium in monopolistically competitive industries is \( P = ATC > MR = MC \). As in the case of monopoly, since \( MC < ATC \), per unit cost is not minimized, i.e., monopolistically competitive firms produce inefficiently in the long run.

Advertising is an important element of monopolistic competition because it reinforces customer loyalty by highlighting real or perceived product differences between and among products of firms in the industry. The optimal level of advertising expenditures maximizes the firm's profits, which occurs when the firm produces at an output level where marginal cost (which include incremental advertising expenditures) equals marginal revenue.
When compared with the model of perfect competition, in many respects monopolistic competition is considered an inferior market structure. As in the case of monopoly, the demand curve confronting a monopolistically-competitive firm is downward sloping. Thus, monopolistic competition results in lower output levels and higher prices when compared with perfect competition. Moreover, monopolistically competitive firms do not produce at minimum per unit cost. On the other hand, although production is less efficient when compared with perfect competition, the consumer is rewarded with the greater product variety. As in the case of perfect competition, relatively easy entry into and exit from the industry encourages product innovation and development. In the long run, monopolistically-competitive firms earn only a normal rate of return.

**MULTIPLE CHOICE QUESTIONS**

9.1 A distinguishing characteristic of monopolistic competition is:
A. Large number of firms.
B. Low entry barriers.
C. Product standardization.
D. Product differentiation.

9.2 Monopolistically-competitive firms may be described as:
A. Price takers.
B. Price creators.
C. Price makers.
D. Price setters.
E. Price negotiators.

9.3 Monopolistically-competitive firms exercise market power because of:
A. Product differentiation.
B. Government franchises.
C. Patent protection.
D. High entry barriers.

9.4 In general, the demand for the product of a monopolistically-competitive firm is:
A. Less elastic compared with that of a monopoly.
B. More elastic compared with that of a monopoly.
C. More elastic compared with that of a perfectly-competitive firm.
D. The same as that for the output of a monopoly.
9.5 Monopolistic competition is similar to perfect competition because of:
   I. A large number of firms in the industry.
   II. Standardized product.
   III. Ease of entry into and exit from the industry by individual firms.
   IV. Positive long-run economic profits.

Which of the following is correct?
A. I and II only.
B. II and III only.
C. III and IV only.
D. I and III only.
E. II and IV only.

9.6 In general, the demand curve confronting a monopolistically competitive firm is:
A. Steeper than the demand curve confronting a monopolist.
B. Flatter than the demand curve facing a monopolist.
C. Horizontal.
D. Steeper than the demand curve facing a perfectly-competitive firm.
E. Both B and D are correct.

9.7 In the short run, monopolistically-competitive firms:
A. May earn positive economic profit.
B. May earn negative economic profit.
C. May earn a normal, above normal, or below normal rate of return.
D. Will continue to produce if $AVC < P < ATC$.
E. All of the above.

9.8 The marginal revenue curve of a monopolistically competitive firm is:
A. Below the demand curve for its product.
B. Above the demand curve for its product.
C. The same as the demand curve for its product.
D. None of the above.

9.9 A profit-maximizing, monopolistically-competitive firm will produce at an output level where:
A. $P = ATC$.
B. $MR = MC$.
C. $MR = ATC$.
D. $AVC > MR$.
E. $P = MR$. 
9.10 Profit-maximizing, monopolistically-competitive firms are similar to monopolies in that:
   A. $P = MR$.
   B. $P = MC$.
   C. $P = ATC$.
   D. $P > MR$.

9.11 In the short run, a profit-maximizing, monopolistically-competitive firm will incur an economic loss because:
   A. $MC > MR$.
   B. $ATC > P$.
   C. $ATC > AVC$.
   D. $MC > ATC$.
   E. The slope of the total revenue curve is greater than the slope of the total cost curve.

9.12 In the long run, a monopolistically competitive firm will produce at an output level where:
   A. $P = MC$.
   B. $P = MR$.
   C. $P = ATC$.
   D. $TR > TC$.
   E. $P = AVC$.

9.13 In the long run, profit-maximizing, monopolistically-competitive firms differ from profit-maximizing, perfectly-competitive firms in that:
   A. They earn economic profit.
   B. They produce at minimum per unit cost.
   C. They are price takers.
   D. Price does not equal minimum average total cost.

9.14 In the long run, profit-maximizing, monopolistically-competitive firms tend to:
   A. Produce less output and charge a higher price than perfectly-competitive firms.
   B. Produce greater output and charge a lower price than perfectly-competitive firms.
   C. Produce less output and charge a lower price than perfectly-competitive firms.
   D. Produce greater output and charge a higher price than perfectly-competitive firms.
9.15 Refer to Figure 1. The profit-maximizing, monopolistically-competitive firm depicted will produce at:
A. $Q_1$ units of output.
B. $Q_2$ units of output.
C. $Q_3$ units of output.
D. $Q_4$ units of output.

9.16 Refer to Figure 1. The profit-maximizing, monopolistically-competitive firm depicted will charge a price of:
A. $P_1$.
B. $P_2$.
C. $P_3$.
D. $P_4$.

9.17 Refer to Figure 1. The profit-maximizing, monopolistically-competitive firm depicted is:
A. Earning zero economic profit.
B. In short-run monopolistically-competitive equilibrium.
C. In long-run monopolistically-competitive equilibrium.
D. Earning negative economic profit.
E. Both A and C are correct.

9.18 Refer to Figure 1. The profit-maximizing, monopolistically-competitive firm depicted is earning an economic profit of:
A. $(P_4 - P_1)Q_2$.
B. $(P_3 - P_2)Q_2$.
C. $(P_2 - P_3)Q_2$.
D. $(P_3 - P_2)Q_2$.

9.19 Refer to Figure 1. The profit-maximizing, monopolistically-competitive firm depicted can expect:
A. New firms to enter the industry.
B. Some firms to exit the industry.
C. To expand production.
D. To increase the price of its product.
9.20 Refer to Figure 1. The profit-maximizing, monopolistically-competitive firm depicted is:
A. Producing at a technically efficient output level.
B. Producing at minimum per unit cost.
C. Producing at a less than the technically efficient output level.
D. Producing more than the technically efficient output level.
E. Both A and B are correct.

9.21 Refer to Figure 2. The profit-maximizing, monopolistically-competitive firm depicted will produce:
A. $Q_1$ units of output.
B. $Q_2$ units of output.
C. $Q_3$ units of output.
D. $Q_4$ units of output.

9.22 Refer to Figure 2. The profit-maximizing, monopolistically-competitive firm depicted will charge a price of:
A. $P_1$.
B. $P_2$.
C. $P_3$.
D. $P_4$.

9.23 Refer to Figure 2. The profit-maximizing, monopolistically-competitive firm depicted is:
A. Earning zero economic profit.
B. In short-run monopolistically-competitive equilibrium.
C. In long-run monopolistically-competitive equilibrium.
D. Earning negative economic profit.
E. Both A and C are correct.

9.24 Refer to Figure 2. The profit-maximizing, monopolistically-competitive firm depicted can expect:
A. New firms to enter the industry.
B. Some firms to exit the industry.
C. To expand production.
D. To increase the price of its product.
E. To do nothing.
9.25 Refer to Figure 2. The profit-maximizing, monopolistically-competitive firm depicted is:
A. Producing at a technically efficient output level.
B. Producing at minimum per unit cost.
C. Producing at a less than the technically efficient output level.
D. Producing more than the technically efficient output level.
E. Both A and B are correct.

9.26 Advertising by profit-maximizing, monopolistically-competitive firms is important because:
A. It highlights real or perceived product differences between and among products of firms in the industry.
B. It creates and reinforces customer loyalty, which gives the firm limited market power.
C. It reinforces the firm’s market power.
D. All of the above.

9.27 Production by profit-maximizing, monopolistically-competitive firms is not only less efficient than profit-maximizing, perfectly-competitive firms, there is a tendency for firms in the industry to produce increasing similar products.
A. True.
B. False.
C. Uncertain.

9.28 The model of monopolistic competition proposed by Chamberlin and Robinson in the early-1930’s has been criticized because its has been difficult to identify empirically.
A. True.
B. False.
C. Uncertain.

**SHORTER PROBLEMS**

9.1 The demand equation for a profit-maximizing, monopolistically-competitive firm is:

\[ Q = 600 - 2.5P \]

where \( P \) is the price of the product and \( Q \) is the number of units produced. Suppose that the firm’s marginal cost of production is $24. Calculate the firm’s profit-maximizing price and output level.
The demand for the product of a typical profit-maximizing, monopolistically-competitive firm is given by the equation:

\[ Q = 675 - 7.5P \]

where \( P \) is the price of the product and \( Q \) is the number of units produced. The firm’s total cost equation is:

\[ TC = 100 - 50Q + (11/30)Q^2 \]

A. Calculate the firm’s profit-maximizing price and output level.
B. Calculate the firm’s profit at the profit-maximizing output level. Is this firm in short-run or long-run monopolistically competitive equilibrium?
C. Based on your answer to part B, what is likely to happen in this industry in the long run?

Suppose that a typical monopolistically-competitive firm faces the following demand and total cost equations for its product:

\[ Q = 55 - 2.5P \]
\[ TC = 216 - 20Q + Q^2 \]

where \( P \) is the price of the product and \( Q \) is the number of units produced.
A. What is the firm’s profit-maximizing price and output level?
B. What is the relationship between \( P \) and \( ATC \) at the profit-maximizing output level.
C. Is this firm earning an economic profit? Is this firm in short-run or long-run monopolistically competitive equilibrium? Will new firms enter into or exit from this industry?

In the previous problem it was determined that a typical monopolistically-competitive firm earned positive economic profits. As a result of new firms entering into the industry the demand for this firm’s product became:

\[ Q = 20 - (5/3)P \]

where \( P \) is the price of the product and \( Q \) is the number of units produced. As before, the firm’s total cost equation is:

\[ TC = 216 - 20Q + Q^2 \]
A. What is the firm’s profit-maximizing price and output level?
B. What is the relationship between $P$ and $ATC$ at the profit-maximizing output level.
C. Is this firm earning an economic profit? Is this firm in short-run or long-run monopolistically competitive equilibrium? Will new firms enter into or exit from this industry?

9.3 In the previous problem it was determined that the typical monopolistically-competitive firm earned negative economic profits. As a result of some firms exiting into the industry, the demand for this firm’s product became:

$$Q = 32 - 2P$$

where $P$ is the price of the product and $Q$ is the number of units produced. Once again, the firm’s total cost equation is:

$$TC = 216 - 20Q + Q^2$$

A. What is the firm’s profit-maximizing price and output level?
B. What is the relationship between $P$ and $ATC$ at the profit-maximizing output level.
C. Is this firm earning an economic profit? Is this firm in short-run or long-run monopolistically competitive equilibrium? Will new firms enter into or exit from this industry?

ANSWERS TO MULTIPLE CHOICE QUESTIONS

9.1 D. 9.15 B.
9.2 C. 9.16 D.
9.3 A. 9.17 B.
9.4 B. 9.18 C.
9.5 D. 9.19 A.
9.6 E. 9.20 C.
9.7 E. 9.21 B.
9.8 A. 9.22 C.
9.9 B. 9.23 E.
9.10 D. 9.24 E.
9.11 B. 9.25 C.
9.12 C. 9.26 D.
9.13 D. 9.27 B.
9.14 A. 9.28 A.
SOLUTIONS TO SHORTER PROBLEMS

9.1 \[ P = 240 - 0.4Q \]
\[ TR = (240 - 0.4Q)Q \]
\[ = 240Q - 0.4Q^2 \]
Profit is maximized at the output level where \( MR = MC \).
\[ MR = dTR/dQ = 240 - 0.8Q \]
\[ 240 - 0.8Q = 24 \]
\[ Q^* = 270 \text{ units} \]
\[ P^* = 240 - 0.4(270) = 132 \]

9.2 A. \[ P = 90 - (2/15)Q \]
\[ TR = PQ = 90Q - (2/15)Q^2 \]
\[ \pi = TR - TC \]
\[ = [90Q - (2/15)Q^2] - [100 - 50Q + (11/30)Q^2] \]
\[ = -100 + 140Q - 0.5Q^2 \]
\[ d\pi/dQ = 140 - Q = 0, \text{ i.e., the first-order condition for } \pi \]
maximization.
\[ d^2\pi/dQ^2 = -1 < 0, \text{ i.e., the second-order condition for } \pi \]
maximization is satisfied.
Solving the first-order condition for \( Q \) we obtain
\[ Q^* = 140 \text{ units} \]
\[ P^* = 90 - (2/15)(140) = 71.33 \]
B. \[ \pi^* = -100 + 140(140) - 0.5(140)^2 = 9,700 \]
The firm is in short-run monopolistically-competitive equilibrium
since it is earning positive economic profit
C. Positive economics profits will attract new firms into the
industry. Each firm will offer a somewhat different product than
other firms in the industry. As a result, the market share of each
of the other firms in the industry will diminish.
Diagrammatically, each firm’s demand curve will shift toward to
the left and become more elastic.

SOLUTIONS TO LONGER PROBLEMS

9.1 A. \[ P = 22 - 0.4Q \]
\[ TR = 22Q - Q^2 \]
\[ \pi = TR - TC \]
\[ = (22Q - Q^2) - (216 - 20Q + Q^2) \]
\[ = -216 + 42Q - 1.4Q^2 \]
\[ d\pi/dQ = 42 - 2.8Q = 0, \text{ i.e., the first-order condition for } \pi \]
maximization.
\[ d^2\pi/dQ^2 = -2.8 < 0, \text{ i.e., the second-order condition for } \pi \text{ maximization is verified.} \]

Solving the first-order condition for \( Q \) we obtain
\[ Q^* = 15 \]
\[ P^* = 22 - 0.4(15) = $16 \]

B. ATC = TC/Q
\[ = (216 - 20Q + Q^2)/Q \]
\[ = 216Q^{-1} - 20 + Q \]
\[ = 216(15)^{-1} - 20 + (15) \]
\[ = $9.4 < P^* \]

C. \( \pi^* = -216 + 42(15) - 1.4(15)^2 = $99 \)
Since this firm is earning positive economic profits then the firm is in short-run monopolistically competitive equilibrium. The existence of positive economic profits will attract new firms into the industry. Each firm in the industry offers a somewhat different product than other firms in the industry. As a result, the market share of each of the other firms in the industry will diminish. Diagrammatically, each firm’s demand curve will shift toward the left and become more elastic.

9.2 A. \( P = 12 - 0.6Q \)
\[ TR = 12Q - 0.6Q^2 \]
\[ \pi = TR - TC \]
\[ = (12Q - 0.6Q^2) - (216 - 20Q + Q^2) \]
\[ = -216 + 32Q - 1.6Q^2 \]
\[ d\pi/dQ = 32 - 3.2Q = 0, \text{ i.e., the first-order condition for } \pi \text{ maximization.} \]
\[ d^2\pi/dQ^2 = -3.2 < 0, \text{ i.e., the second-order condition for } \pi \text{ maximization is verified.} \]
Solving the first-order condition for \( Q \) we obtain
\[ Q^* = 10 \]
\[ P^* = 12 - 0.6(10) = $6 \]

B. ATC = TC/Q
\[ = (216 - 20Q + Q^2)/Q \]
\[ = 216Q^{-1} - 20 + Q \]
\[ = 216(10)^{-1} - 20 + (10) \]
\[ = $11.6 > P^* \]
C. \( \pi^* = -216 + 32(10) - 1.6(10)^2 = -56 \)
Since this firm is earning negative economic profits, then the firm is in short-run monopolistically competitive equilibrium. The existence of negative economic profits result in some firms exiting the industry. Each firm in the industry offers a somewhat different product than other firms in the industry. As a result, the market share of each of the other firms in the industry will increase. Diagrammatically, each firm’s demand curve will shift toward the right and become less elastic.

9.3 A. \( P = 16 - 0.5Q \)
\( TR = 12Q - 0.6Q^2 \)
\( \pi = TR - TC \)
\( = (16Q - 0.5Q^2) - (216 - 20Q + Q^2) \)
\( = -216 + 36Q - 1.5Q^2 \)
\( d\pi/dQ = 36 - 3Q \), i.e., the first-order condition for \( \pi \) maximization.
\( d^2\pi/dQ^2 = -3 < 0 \), i.e., the second-order condition for \( \pi \) maximization is verified.
Solving the first-order condition for \( Q \) we obtain
\( Q^* = 12 \)
\( P^* = 16 - 0.5(10) = 11 \)
B. \( \text{ATC} = \frac{TC}{Q} \)
\( = \frac{(216 - 20Q + Q^2)}{Q} \)
\( = 216Q^{-1} - 20 + Q \)
\( = 216(12)^{-1} - 20 + (12) \)
\( = 11 = P^* \)
C. \( \pi^* = -216 + 36(12) - 1.5(12)^2 = 0 \)
Since this firm is earning zero economic profits, then the firm is in long-run monopolistically competitive equilibrium. Since each firm in the industry is earning zero economic profits, then there will be no incentive for firms to enter into or exit from the industry.