CHAPTER 11: MONOPOLISTIC COMPETITION AND OLIGOPOLY

Introduction
While perfect competition and monopoly represent the extremes of market structures, most American firms are found in the two market structures between those extremes. Monopolistic competition is very similar to perfect competition, though the firm has a small amount of market power. The oligopoly is very similar to the monopoly, though the firm does have a few competitors and the rivalry among those firms leads to an interdependent relationship among firms. Chapter 11 introduces these two models and explains the decision making of firms in these industries. This chapter completes the discussion of the market structures, which constitute the heart of the microeconomics course. Material from Chapter 11 consistently appears on the AP microeconomics exam in a few multiple-choice questions and, in recent years, in free-response questions.

Monopolistic Competition
Monopolistic competition is a market structure in which a large number of firms produce a differentiated product and firms can easily enter or exit the industry. Each firm in the industry sells a very small portion of the market share and has very little market power. Firms act independently, and one firm’s actions have little or no effect on the other firms.

In these ways, the monopolistically competitive firm sounds very similar to the perfectly competitive firm. However, the key difference is product differentiation. While products are substantially the same, the firms make slight changes and then heavily advertise those differences in an effort to bring customers to their firm instead of the competing firm. One gas station may offer a car wash, while another may sell food inside the station. One dry cleaner may offer one-hour service, while another offers alterations. One motel may offer convenience to a major highway, while another offers small kitchens in the rooms.

Monopolistically competitive firms are very competitive, so where does the monopoly part of the term come from? Consider how many gas stations are located within a 20-mile radius of your home. Do you tend to use the same station repeatedly? Most people do because of the location, price (including discounts for using the company’s card), or another feature. The market is quite competitive, but you act almost as though there’s a monopoly because you keep returning to that station. As a result, the monopolistically competitive firm has a little control over the price. Due to customer brand loyalty, the firm can slightly raise the price without losing many customers. However, if the firm significantly raises its price, customers could easily change behavior to buy a substitute.

This brand loyalty also serves as a barrier to entry for new firms. New firms can easily enter a perfectly competitive industry because customers cannot distinguish which firm is producing the identical products. In monopolistic competition, the differences between products matter. So a new firm has to not only introduce its own product but also break customers’ brand loyalty to the product they are currently purchasing.
Taking the EEK! Out of Economics
It is very important that you make the distinction between monopolistic competition and monopoly. The terms look similar but the markets are very different. Focus on the word “competition,” and it will help you remember that monopolistic competition is very similar to perfect competition, except that the products are differentiated rather than identical. The monopoly is very distinctly different, as it is the only firm in the industry.

Price and Output Determination for Monopolistic Competition

A monopolistically competitive firm: short run and long run

The graph for monopolistic competition is very similar to the monopoly. Demand is downward sloping because the firm must lower its price to sell more. Marginal revenue is below the demand curve, because when the firm reduces its price, it must reduce the price of all of the units of output. As with the monopoly, a monopolistically competitive firm maximizes profit at the output where marginal cost equals marginal revenue and sets the price on the demand curve at the point directly above the point where MC = MR.

As was true for perfectly competitive and monopoly models, changes in costs have effects on the output and profit of the firm. If a per-unit cost (a variable cost like labor or resources or a per-unit tax) increases, marginal cost and average total cost both increase for the firm. Because marginal cost shifts up, it now crosses marginal revenue at a lower output. So the firm reduces its output and sells its product at a higher price. But also notice that the higher average total cost shifts up, leaving the firm producing at a loss in the short run until the industry adjusts. If a per-unit cost falls (from lower production costs, lower per-unit taxes, or a per-unit subsidy), the firm increases its output and sells at a lower price. The firm will also enjoy a short-run economic profit until the industry adjusts.

If a lump sum cost (a fixed cost such as a property tax or a licensing fee) increases, only the average fixed cost and the average total cost increase. Marginal cost does not change, so output and price do not change. Because ATC increases, the firm will incur a short-run loss until the industry adjusts. Conversely, if a lump sum cost falls (from lower production costs, a lump sum tax cut, or a lump sum subsidy), the firm still will not change output or price, but the firm will enjoy short-run profit until the industry adjusts.

There are important differences between the graphs for monopolistic competition and the monopoly. First, notice that the demand and marginal revenue curves are much flatter for the monopolistic competitor. The demand curve is more elastic in monopolistic competition exactly because there is so much competition. It is easy for consumers to buy a competitor’s product if
the firm increases the price too much. In this way, the monopolistically competitive firm begins to act more like a perfectly competitive firm.

Second, while the monopolistically competitive firm may earn short-run economic profit or loss, in the long run, the firm will earn zero economic profit. If the price is higher than average total cost at the profit-maximizing output, the firm earns a profit; if average total cost is greater than the price at the profit-maximizing (or loss-minimizing) output, the firm incurs a loss. This is the same method of calculating profit or loss we have used for both the perfectly competitive firm and monopoly. The monopoly establishes complete barriers to entry to prevent competitors from entering the industry; therefore, it can sustain long-run profit. The perfectly competitive firm, on the other hand, has no barriers to entry, so other firms are enticed to enter the market when profits occur, and firms exit the industry in periods of loss. The same is true for monopolistic competition; the ease of entry and exit extends to the monopolistically competitive market.

Short-Run Profit/Loss and Long-Run Equilibrium for Monopolistic Competition

When a monopolistic competitor enjoys a short-run economic profit, new firms are drawn into the industry. As the new firms enter, the demand curve for existing firms shifts to the left and becomes more elastic (flatter). This occurs because the new firms increase the total production of output, and the individual existing firms each provide a smaller portion of the total market output. Demand becomes more elastic because the increased competition allows customers to become even more sensitive to price changes. In long-run equilibrium, after adjustments are complete, the average total cost curve for the monopolistically competitive firm lies above the demand curve and then only tangentially touches the demand curve at the point above $MC = MR$ where the price is set.

When a monopolistic competitor incurs short-run loss, some firms will leave the industry. We use the same formula we used for perfect competition and monopoly to determine whether the firm should remain in business when it incurs a loss. At the loss-minimizing output ($MC = MR$), if the product price is equal to or higher than the average variable cost, the firm should remain in business in the short run. In that scenario, the firm is receiving enough revenue to cover all of the variable costs of producing the product and can put any additional revenues toward the fixed cost. But if the price is lower than the average variable cost, the firm should shut down. If one firm remains in operation while other firms leave the industry, the firm’s demand curve shifts to the right and becomes less elastic. Because customers have fewer firms to choose from, the firm will enjoy a greater piece of the market and will have a little market power to raise the price. In the long run, the exit of firms from the industry reduces the loss to zero (which also means zero economic profit). Firms are no longer enticed to either enter or exit the industry, and $ATC$ is again tangential to the demand curve at the point where price is set above the $MC = MR$ output.

Taking the EEK! Out of Economics

Remember that even though the firm is not earning economic profit, the firm is earning accounting profit and paying normal profit to the entrepreneur in order to keep him/her in the industry. Economic profit is just the excess profit that causes other firms to enter the industry. When economic profit falls to zero in the long run, current producers are covering all of their explicit and implicit costs and will remain in business, but there is no excess profit to draw new firms into the industry.
Efficiency and the Monopolistically Competitive Firm

Monopolistically competitive firms do not achieve productive or allocative efficiency. Productive efficiency occurs when the marginal cost equals the average total cost at its minimum point and the firm is producing at its lowest average cost. In the monopolistic competition model, marginal cost crosses average total cost at a higher output than the point where the firm maximizes profit. Because the firm restricts output in order to raise the price, it produces where the average total cost is a little higher than its minimum.

The inefficiency of monopolistic competition

Allocative efficiency is achieved at the point where price (on the demand curve) equals marginal cost. With allocative efficiency, scarce resources are used to produce the products society actually wants. In monopolistic competition, allocative efficiency is also achieved at a higher output than the profit-maximizing output for the firm. The difference in output between the point of allocative efficiency and the point of profit maximization is called excess capacity. Excess capacity is the amount of resources (plant and equipment) that remain unused because the firm has restricted its output from what would be allocatively efficient. Hospitals or hotels that have a number of unused beds or factories that have idle sections are examples of excess capacity that represent inefficiency.

Product Variety Among Monopolistic Competitors

While long-run equilibrium demonstrates that the monopolistically competitive firm will earn no long-run economic profit, such firms certainly have an incentive to be the firm that continues to earn economic profit. These firms have a strong incentive to be innovative and further differentiate their products in order to draw in more customers. This innovation leads to a wide variety of products for consumers. Because of the changes in the product and advertising expenses, production costs can change markedly for the monopolistically competitive firm. While we can demonstrate what long-run equilibrium would look like with this model, in reality, firms struggle to maintain economic profit, and the reality of such markets differs from the model. Remember the smiley (©)?

Oligopoly

An oligopoly is a market dominated by a few large firms. Products can be standard, such as oil or steel, or differentiated, such as cars or sodas. Using a four-firm concentration ratio, if the four largest firms in the industry control 40 percent of the market, the industry is an oligopoly. "A few" firms could range from two to dozens, but the key is that this small number of firms controls...
the industry through barriers to entry. Like monopolies, oligopolies use economies of scale, ownership of resources, patents, licensing, strong consumer loyalty, or other means to repel the entry of new competitors into the industry. Oligopolistic firms can develop by differentiating their product enough to attract great numbers of consumers or by merging with other firms to grow significantly larger.

**Price and Output Determination for the Oligopoly**

The oligopoly graph looks just like the monopoly. The downward-sloping demand curve shows that the firm must lower its price in order to sell more products, though the demand curve is slightly more elastic because there are a few competitors. Marginal revenue falls faster than demand, because when the firm lowers price to sell more, it must lower the price of all of its products. The firm maximizes profit at the point where $MC = MR$ and sets its price on the demand curve directly above that point. Just as with monopoly and monopolistic competition, changes in per-unit costs will change the firm’s output, price, and profit/loss, while changes in lump sum costs will only change the level of the firm’s profit/loss. The level of economic profit is determined by the distance between the price (on the demand curve) and average total cost. Due to significant barriers to entry into the industry, firms are able to continue economic profit in the long run. If the firm incurs a short-run loss, it remains in business as long as the price is higher than the average variable cost and shuts down if the price is lower than the average variable cost. Just like the monopoly, the oligopoly does not achieve either productive or allocative efficiency.

**Bear in Mind**
The theory of the kinked demand curve for the oligopoly has not been addressed in questions on the AP microeconomics exam, so it will not be detailed here. When one firm in an oligopoly lowers its price, its rivals will generally lower their prices as well in order to avoid losing customers. If one firm increases its price, however, the other firms are likely not to match the price increase, hoping that customers will leave the high-priced firm and instead buy the rivals’ product. It is important to understand that oligopolistic firms will respond to the actions of competitors, but no questions requiring the actual graphing of the oligopoly market have appeared on previous exams.
Mutual Interdependence and Strategic Behavior

While the oligopoly looks like the monopoly, the oligopoly differs from the monopoly in an important way. Firms in an oligopoly are mutually interdependent. When one firm makes a decision about price and output, its profit depends on how its rivals react. So the oligopolist must make strategic decisions by anticipating the reaction of its competitors. This characteristic makes the oligopoly different from the other three market structures.

Game Theory

![Profit payoff matrix for a two-firm oligopoly](image)

The study of these strategic decisions is known as game theory. The payoff matrix in this figure shows the choices available to two firms in an oligopoly. RareAir and Uptown can each choose to set a high or low price for their shoes. But the profit each earns from its decision depends on the decision of the other firm. If both firms set a high price, each firm earns $12 million profit. But if Uptown sells its shoes for a high price and RareAir sells its shoes for a low price, many customers will buy from RareAir instead of Uptown, and RareAir’s profit will increase to $15 million while Uptown’s profit will fall to $6 million. If Uptown anticipates RareAir’s low-price strategy, Uptown could also use a low-price strategy so that both firms would earn $8 million profit. Lower prices and profits are better for consumers, but remember that firms seek to maximize profit.

But there is another solution that would allow both firms to increase profit. If the firms collude, agreeing to set prices and output, RareAir and Uptown could agree to a high-price strategy so that both firms earn the higher $12 million profit. Though both firms are better off colluding rather than settling for the $8 million profit they would each earn alone using a low-price strategy, each firm is still eyeing that higher $15 million profit for taking the low-price strategy alone. If Uptown cheats on the agreement so that RareAir keeps its high-price strategy and Uptown uses the low-price strategy, Uptown’s profit will increase from $12 million to $15 million, while RareAir’s profit will fall from $12 million to $6 million. Once RareAir figures out that Uptown has cheated, it will use the low-price strategy as well, and both will return to $8 million profit. This incentive to cheat on collusive agreements, as well as differences in costs and demand among firms and the potential entry of new firms, explains why cartels find it so difficult to maintain collusive agreements. The clearest example of a cartel is OPEC, the Organization of Petroleum Exporting Countries. OPEC oil ministers agree to restrict output by each country in order to keep oil prices higher than they would be if the rivals competed. Cartels and their
collusive activities are illegal in the United States under antitrust legislation. But because we import products produced by cartels, an understanding of their operation is important.

**Dominant Strategy and the Nash Equilibrium**

Even when firms do not collude, it is possible they will find long-run equilibrium. Using the example of RareAir and Uptown, each firm needs to determine if it has a dominant strategy—a choice that is better for the firm, regardless of the other firm’s decision.

If Uptown chooses a low-price strategy, it would earn $15 million if RareAir chooses a high-price strategy and $8 million if RareAir chooses a low-price strategy. Both of these positions are better off than the profit Uptown would have earned if it had chosen a high-price strategy and RareAir chose a high-price strategy ($15 > $12) or a low-price strategy ($8 > $6). Therefore, Uptown’s dominant strategy is to choose a low-price strategy, as it is better off, regardless of what RareAir chooses to do.

At the same time, RareAir must determine if it has a dominant strategy. If RareAir chooses a low-price strategy, it would earn $15 million if Uptown chooses a high-price strategy and $8 million if Uptown chooses a low-price strategy. Both positions result in a higher profit for RareAir than if it had chosen a high-price strategy and Uptown chose a high-price strategy ($15 > $12) or a low-price strategy ($8 > $6). As a result, RareAir also has a dominant strategy to choose a low-price strategy.

In this case, both RareAir and Uptown will choose a low-price strategy, and each firm earns $8 million in profit. Both firms recognize the dominant strategy for their firm, so this arrangement, called Nash Equilibrium, will tend to remain stable and long-lasting. (It is named for John Nash, the Nobel Prize–winning economist whose story is the subject of the film *A Beautiful Mind*). Not all games will have a dominant strategy, and the lack of a dominant strategy can explain the volatility of some oligopolistic markets.

**Bear in Mind**

Applications of game theory in payoff matrices have appeared consistently in multiple-choice and free-response questions on recent AP microeconomics exams. It is important to understand the mechanics of the matrix, determine whether a dominant strategy exists for either firm or both, and the profit for each firm. A thorough understanding of the one-time game in the Chapter 11 Appendix is essential for success in this portion of the exam.

**Price Leadership in the United States**

Because cartels and collusion are illegal in the United States, firms instead rely on price leadership. When one major firm in the industry changes its price, the other firms quickly match it. When fuel prices rose significantly in early 2008, one airline began adding a surcharge for each checked suitcase. Other airlines quickly followed suit.

Given the difficulty of predicting how rivals will respond to price changes, oligopolists prefer not to compete with other firms on the basis of price. Instead, these firms focus on product differentiation and heavily advertise those differences. This brand of cereal contains more vitamins and minerals. That brand of tissue is softer. While advertising may provide consumers with important product information to make informed choices, some advertising is also misleading, so consumers must beware of advertising claims.
In review, the most important characteristics of the four market structures are as follows:

<table>
<thead>
<tr>
<th>Number of firms</th>
<th>Perfect competition</th>
<th>Monopolistic competition</th>
<th>Oligopoly</th>
<th>Monopoly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms interdependent?</td>
<td>Independent</td>
<td>Independent</td>
<td>Interdependent</td>
<td>The only firm</td>
</tr>
<tr>
<td>Products identical?</td>
<td>Identical</td>
<td>Differentiated</td>
<td>Standardized or differentiated</td>
<td>Only product</td>
</tr>
<tr>
<td>Barriers to entry</td>
<td>None</td>
<td>Few</td>
<td>Significant</td>
<td>Complete</td>
</tr>
<tr>
<td>Firm’s control over price</td>
<td>None</td>
<td>Little</td>
<td>A lot, limited by mutual interdependence</td>
<td>Complete</td>
</tr>
<tr>
<td>Demand curve for the firm</td>
<td>Perfectly elastic</td>
<td>Relatively elastic</td>
<td>Relatively inelastic</td>
<td>Relatively inelastic</td>
</tr>
</tbody>
</table>

Multiple-Choice Questions

1. Each of the following is a characteristic of monopolistic competition EXCEPT
   (A) A large number of firms produce in the industry.
   (B) The products produced by the industry are homogeneous (identical).
   (C) Firms can easily enter and exit the industry.
   (D) The firms in the industry act independently.
   (E) Firms rely on advertising the qualities of their product.

2. Why is the monopolistically competitive firm’s marginal revenue curve below its demand curve?
   (A) The competition forces the firm to lower its prices.
   (B) To sell more products, the firm must lower the price of all of its products.
   (C) The firm’s costs are lower than its revenues at each unit of output.
   (D) The firm has no rivals, so price is significantly higher than marginal cost.
   (E) As output increases, the firm’s average total cost of production decreases.

3. If a monopolistically competitive firm is initially in short-run equilibrium and the government places a lump sum tax on production, how would the following change in the short run?

<table>
<thead>
<tr>
<th>Output</th>
<th>Price</th>
<th>Short-Run Profit/Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase</td>
<td>Increase</td>
<td>Incur a profit</td>
</tr>
<tr>
<td>Decrease</td>
<td>Increase</td>
<td>Incur a loss</td>
</tr>
<tr>
<td>No change</td>
<td>Increase</td>
<td>No change</td>
</tr>
<tr>
<td>Decrease</td>
<td>No change</td>
<td>Incur a loss</td>
</tr>
<tr>
<td>No change</td>
<td>No change</td>
<td>Incur a loss</td>
</tr>
</tbody>
</table>

4. When the monopolistically competitive industry adjusts to profit in the long run, what happens to the demand curve for the individual firm?
   (A) It shifts inward.
   (B) It becomes vertical.
   (C) It becomes horizontal.
   (D) It shifts outward.
   (E) It does not change.
5. The inefficiency generated by the monopolistically competitive firm results in
(A) lower prices.
(B) higher output.
(C) excess capacity.
(D) long-run economic profit.
(E) higher wages.

6. One characteristic that makes oligopolies unique among the market structures is
(A) long-run economic profit.
(B) productive and allocative efficiency.
(C) their role as price-takers.
(D) product differentiation.
(E) mutual interdependence among the firms.

7. When oligopolistic firms successfully maintain a long-term collusive agreement,
(A) in the United States, the government supports the agreement with a subsidy to firms.
(B) the product price is higher than the marginal cost.
(C) the output is higher than it would have been under perfect competition.
(D) the price is lower than it would have been if there was no agreement.
(E) the long-run economic profit falls to zero.

8. It is difficult for cartels to maintain collusive agreements because
(A) the agreements are illegal in all countries.
(B) firms recognize an obligation to their customers to keep prices low.
(C) competitors can easily enter the industry.
(D) each firm has an incentive to cheat to increase its own profit.
(E) the products are so similar that customers cannot distinguish the differences between them.

Questions 9–10 are based on the payoff matrix below.

<table>
<thead>
<tr>
<th></th>
<th>Morning Paper</th>
<th>Evening Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tom's Times</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Producing Strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning Paper</td>
<td>$500, $500</td>
<td>$600, $400</td>
</tr>
<tr>
<td>Evening Paper</td>
<td>$400, $600</td>
<td>$300, $300</td>
</tr>
</tbody>
</table>

The payoff matrix above shows the profits per day that can be earned by two firms producing local newspapers. The first number in each cell shows the profit for Tom’s Times, and the second number shows the profit for Robert’s Review.

9. If the two firms do not collude and each uses its best strategy to maximize profit,
(A) the dominant strategy for Tom’s Times is to produce a morning paper.
(B) the dominant strategy for Robert’s Review is to produce an evening paper.
(C) each of the firms will earn $300 per day profit in the short run.
(D) both firms would increase their profits by bringing a third newspaper into the industry.
(E) if Tom’s Times produces an evening paper, Robert’s Review would reap more profit by producing an evening paper rather than a morning paper.
10. If these two firms make a collusive agreement using their best strategies, then
   I. each of the firms will earn $500 profit per day.
   II. both of the firms are following their dominant strategies.
   III. *Tom's Times* will produce a morning paper.
   IV. *Robert's Review* will produce an evening paper.

   (A) I only
   (B) I and III only
   (C) II and IV only
   (D) I, II, and III only
   (E) I, II, III, and IV

**Free-Response Questions**

1. Assume Jenna’s Toy Emporium is a retail toy store operating in a monopolistically
   competitive industry.
   (a) Assume Jenna’s Toy Emporium is earning a short-run economic profit. Draw a
      correctly labeled graph showing each of the following:
         (i) The profit-maximizing output and price
         (ii) The area of profit
   (b) Now draw a new graph for Jenna’s Toy Emporium maximizing profit in long-run
      equilibrium, and answer each of the following:
         (i) Will the firm experience long-run economic profit? Explain.
         (ii) Given your answer in (b)(i), how does the demand curve for the firm
              change in the long run? Explain.
   (c) Will the firm achieve productive efficiency in the long run? Explain.

2. The payoff matrix below shows the profits per year that can be earned by two firms in an
   oligopolistic industry selling memberships to online political discussion forums. They
   must determine whether the forum will be strictly moderated or whether members will be
   free to say anything. Robbie and Dak cannot change that decision during the year due to
   contracts with the members. The first number in each cell shows Dak’s profit; the second
   number is Robbie’s profit.

<table>
<thead>
<tr>
<th>Dak’s Moderating Strategy</th>
<th>Moderators</th>
<th>No Moderators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderators</td>
<td>$100, $200</td>
<td>$90, $300</td>
</tr>
<tr>
<td>No Moderators</td>
<td>$80, $100</td>
<td>$60, $250</td>
</tr>
</tbody>
</table>

   (a) What kind of market structure is illustrated in this scenario? Explain.
   (b) Identify the dominant strategy for Dak. Explain.
   (c) If Dak chooses to run a forum with moderators, is a forum with or without
       moderators the best strategy for Robbie? Explain.
   (d) If both firms use their dominant strategies and do not collude, what is Robbie’s annual
       profit?
   (e) If firms recognize they can increase their profits by collusive arrangements, why are
       firms in the United States reluctant to collude?
Multiple-Choice Explanations
1. (B) In monopolistic competition, products are differentiated.
2. (B) Because it must lower the price of all of its products, the marginal revenue earned from selling the next product will be lower than the price.
3. (E) A lump sum tax does not affect marginal cost, so output does not change.
4. (A) When new firms enter the monopolistically competitive industry, each firm produces a smaller portion of the industry output, so the demand curve for that firm shifts inward to the left.
5. (C) Because the firm reduces output to maximize profit, the firm produces less than its allocatively efficient output; excess capacity is available for the firm to produce more output, but it chooses not to do so.
6. (E) Mutual interdependence in oligopolies requires each firm to consider its rivals’ reactions to pricing and output decisions. Monopolies have no rivals, and perfectly and monopolistically competitive firms are such a small part of the industry, their decisions do not affect other firms.
7. (B) Oligopolists produce at an output where the price is higher than the marginal cost of producing the output.
8. (D) Because each firm has an incentive to break the agreement in order to increase its own profit, collusive agreements are often unstable.
9. (A) The dominant strategy of Tom’s Times is to produce a morning paper, because it will earn a higher profit from producing a morning paper, regardless of whether Robert’s Review produces a morning paper or an evening paper.
10. (D) Both firms have a dominant strategy of producing a morning paper, because each earns a greater profit doing so than producing an evening paper, regardless of the other firm’s decision.

Free-Response Explanations
1. 11 points (4 + 5 + 2)
   (a) 4 points:
   • 1 point is earned for a correctly labeled graph with a downward-sloping demand curve and marginal revenue lower than demand.
   • 1 point is earned for showing output where MC = MR.
   • 1 point is earned for showing price on the demand curve above where MC = MR.
   • 1 point is earned for correctly illustrating the area of profit.
   (b) 5 points:
   • 1 point is earned for a correctly labeled graph of long-run equilibrium, with the ATC curve above demand, tangential to the demand curve at the price.
   • 1 point is earned for stating that the firm will not earn long-run economic profit.
   • 1 point is earned for explaining that profit draws firms into the industry.
   • 1 point is earned for stating that the firm’s demand curve will shift to the left.
   • 1 point is earned for explaining that as firms enter the industry, each existing firm produces a smaller portion of the industry’s total output.
   (c) 2 points:
   • 1 point is earned for stating that the firm will not achieve productive efficiency.
   • 1 point is earned for explaining that because the firm restricts output in order to maximize profit, it produces where average total cost is higher than its minimum.
2. **8 points** \((2 + 2 + 2 + 1 + 1)\)

(a) 2 points:
- 1 point is earned for stating that this market structure is an oligopoly.
- 1 point is earned for explaining that the firms are mutually interdependent.

(b) 2 points:
- 1 point is earned for stating that Dak’s dominant strategy is to have a moderated board.
- 1 point is earned for explaining that Dak’s profit is higher when he chooses moderators compared to when he has no moderators, regardless of which option Robbie chooses.

(c) 2 points:
- 1 point is earned for stating that Robbie’s best strategy is to have no moderators.
- 1 point is earned for explaining that when Dak chooses moderators, if Robbie chooses no moderators he will earn $300 profit, but if he chooses moderators, he will only earn $200 profit.

(d) 1 point:
- 1 point is earned for stating that Robbie’s annual profit is $300.

(e) 1 point:
- 1 point is earned for explaining that collusion is illegal under United States law.