# Chapter 16: Oligopoly

**Questions for Review: Answers**

1. If a group of sellers could form a cartel, they'd try to set quantity and price like a monopolist. They'd set quantity at the point where marginal revenue equals marginal cost, and set price at the corresponding point on the demand curve.

2. Firms in an oligopoly produce a quantity of output greater than the level produced by monopoly at a price less than the monopoly price.

3. Firms in an oligopoly produce a quantity of output less than the level produced by a perfectly competitive market at a price greater than the perfectly competitive price.

4. As the number of sellers in an oligopoly grows larger, an oligopolistic market looks more and more like a competitive market. The price approaches marginal cost, and the quantity produced approaches the socially efficient level.

5. The prisoners' dilemma is a game between two people or firms that illustrates why it is difficult for opponents to cooperate even when cooperation would make them all better off. If they were cooperating, each person or firm would have a great incentive to cheat.

6. The arms race, advertising, and common resources are some examples of how the prisoners' dilemma helps explain behavior. In the arms race in the Cold War, the United States and the Soviet Union couldn't agree on arms' reductions because each was fearful that after cooperating for a while, the other country would cheat. In advertising, two companies would be better off if neither advertised, but each is fearful that if it doesn't advertise, the other company will. When two companies share a common resource, they'd be better off sharing it. But fearful that the other company will overuse it, each company overuses it.

7. Antitrust laws prohibit firms from trying to monopolize a market. The laws are used to prevent mergers that would lead to excessive market power in any single firm and to prevent oligopolists from acting together in ways that would make their markets less competitive.

8. Resale price maintenance occurs when a wholesaler sets a minimum price that retailers can charge. This might seem to be anticompetitive because it prevents retailers from competing on price. But that's doubtful because: (1) if the wholesaler has market power, it can exercise it through the wholesale price; (2) wholesalers have no incentive to

discourage competition among retailers since doing so reduces the quantity sold, and (3) maintaining a minimum price may be valuable so retailers provide customers good service.

**Problems and Applications: Answers** (Q 1 – 10)

1. a. OPEC members were trying to reach an agreement to cut production so they could raise the price.

   b. They were unable to agree on cutting production because each country has an incentive to cheat on any agreement. The turmoil is a decline in the price of oil because of increased production.

   c. OPEC would like Norway and Britain to join their cartel so they could act like a monopoly.

2. a. If there were many suppliers of diamonds, price would equal marginal cost ($1 thousand), so quantity would be 12 thousand.

   b. With only one supplier of diamonds, quantity would be set where marginal cost equals marginal revenue. The following table derives marginal revenue:

| Price ($ thousands) | Quantity (thousands) | Total Revenue ($ millions) | Marginal Revenue ($ millions) |
|---|---|---|---|
| 8 | 5 | 40 | |
| | | | 2 |
| 7 | 6 | 42 | |
| | | | 0 |
| 6 | 7 | 42 | |
| | | | -2 |
| 5 | 8 | 40 | |
| | | | -4 |
| 4 | 9 | 36 | |
| | | | -6 |
| 3 | 10 | 30 | |
| | | | -8 |
| 2 | 11 | 22 | |
| | | | -10 |
| 1 | 12 | 12 | |

With marginal cost of $1 thousand per diamond, or $1 million per thousand diamonds, the monopoly will maximize profits at a price of $7 thousand and quantity of 6 thousand. Additional production would lead to marginal revenue (0) less than marginal cost.

c. If Russia and South Africa formed a cartel, they would set price and quantity like a monopolist, so price would be $7 thousand and quantity would be 6 thousand. If they split the market evenly, they'd share total revenue of $42 million and costs of $6 million, for a total profit of $36 million. So each would produce 3 thousand diamonds and get a profit of $18 million. If Russia produced 3 thousand diamonds and South Africa produced 4 thousand, the price would decline to $6 thousand. South Africa's revenue would rise to $24 million, costs would be $4 million, so profits would be $20 million, which is an increase of $2 million.

d. Cartel agreements are often not successful because one party has a strong incentive to cheat to make more profit. In this case, each could increase profit by $2 million by producing an extra thousand diamonds. Of course, if both countries did this, both would lose profits.

3. a. Buyers who are oligopolists try to decrease the price of goods they buy.

b. The owners of baseball teams would like to keep players' salaries low. This goal is difficult to achieve because each team has an incentive to cheat on any agreement, since they'll be able to attract better players by offering more money.

c. The salary cap would have formalized the collusion on salaries and prevented any team from cheating.

4. Game theory is helpful for understanding markets with a few firms because with a small number of firms each firm must act strategically. Game theory isn't helpful for understanding markets with many firms, since each firm is so small that strategic interactions with other firms are not important.

5. Many answers are possible, such as picking which movie to see with your friend or negotiating the price of a car. The common link among all the activities is that there are just a few people involved who act strategically.

6. a. If ~~Mexico~~ imposes low tariffs, then the ~~United States~~ is better off with high tariffs, since it gets $30 billion with high tariffs and only $25 billion with low tariffs. If ~~Mexico~~ imposes high tariffs, then the ~~United States~~ is better off with high tariffs, since it gets $20 billion with high tariffs and only $10 billion with low tariffs. So the ~~United States~~ has a dominant strategy of high tariffs.

If the ~~United States~~ AUS imposes low tariffs, then ~~Mexico~~ NZ is better off with high tariffs, since it gets $30 billion with high tariffs and only $25 billion with low tariffs. If the ~~United States~~ AUS imposes high tariffs, then ~~Mexico~~ NZ is better off with high tariffs, since it gets $20 billion with high tariffs and only $10 billion with low tariffs. So ~~Mexico~~ NZ has a dominant strategy of high tariffs.

b. A Nash equilibrium is a situation in which economic actors interacting with one another each choose their best strategy given the strategies others have chosen. The Nash equilibrium in this case is for each country to have high tariffs.

c. The ~~NAFTA~~ CER agreement represents cooperation between the two countries. Each reduces tariffs and both are better off as a result.

d. The payoffs in the upper left and lower right parts of the box do reflect a nation's welfare. Trade is beneficial and tariffs are a barrier to trade. However, the payoffs in the upper right and lower left parts of the box aren't valid. A tariff hurts domestic consumers and helps domestic producers, but total surplus declines, as we saw in Chapter 9. So it would be more accurate for these parts of the box to show *both* countries' welfare decline if they imposed high tariffs, whether or not the other country had high or low tariffs.

7. a. Dropping the letter grade by two letters (e.g., A to C) if you have no fun gives the payoffs shown in this table:

| | | Your Decision: Work | Your Decision: Shirk |
|---|---|---|---|
| Classmate's Decision | Work | you: C 45%<br>classmate: C 45% | you: B 65%<br>classmate: D 25% |
| | Shirk | you: D 25%<br>classmate: B 65% | you: D 40%<br>classmate: D 40% |

b. The likely outcome is that both of you will shirk. If your classmate works, you're better off shirking, because you'd rather have an overall B (a B grade and fun) than an overall C (an A grade and no fun). If your classmate shirks, you're indifferent between working for an overall D (a B grade with no fun) and shirking for an overall D (a D grade and fun). So your dominant strategy is to shirk. Your classmate faces the same payoffs, so will also shirk. But, if you're likely to work with the same person again, you have a greater incentive to work, so that your classmate will work, so you'll both be better off. In repeated games, cooperation is more likely.

8. Even though the ban on cigarette advertising increased the profits of cigarette companies, it was good public policy because it reduced the quantity of cigarette consumption. Since cigarette consumption imposes an externality because of its health costs, the reduction in quantity is beneficial.

9. a. The decision box for this game is:

| | | American's Decision | |
|---|---|---|---|
| | | low price | high price |
| Braniff's Decision | low price | Braniff: low profits<br>American: low profits | Braniff: high profits<br>American: very low profits |
| | high price | Braniff: very low profits<br>American: high profits | Braniff: medium profits<br>American: medium profits |

b. If Braniff sets a low price, American will set a low price. If Braniff sets a high price, American will set a low price. So American has a dominant strategy to set a low price.

If American sets a low price, Braniff will set a low price. If American sets a high price, Braniff will set a low price. So Braniff has a dominant strategy to set a low price.

Since both have a dominant strategy to set a low price, the Nash equilibrium is for both to set a low price.

c. A better outcome would be for both airlines to set a high price; then they'd both get higher profits. But that outcome could only be achieved by cooperation (collusion). If that happened, consumers would lose because prices would be higher and quantity would be lower.

10. a. If Jones has 10 cows and Smith has 10, for a total of 20 cows, each cow produces $4,000 of milk. Since a cow costs $1,000, profits would be $3,000 per cow, or $30,000 for each farmer.

If one farmer had 10 cows and the other farmer had 20 cows, for a total of 30 cows, each cow produces $3,000 of milk. Profits per cow would be $2,000, so the farmer with 10 cows makes $20,000; the farmer with 20 cows makes $40,000.

If both farmers have 20 cows, for a total of 40 cows, each cow produces $2,000 of milk. Profit per cow is $1,000, so each farmer's profit is $20,000. The results are shown in the table:

| | | Smith's Decision: 10 cows | Smith's Decision: 20 cows |
|---|---|---|---|
| Jones's Decision | 10 cows | Jones: $30,000<br>Smith: $30,000 | Jones: $20,000<br>Smith: $40,000 |
| | 20 cows | Jones: $40,000<br>Smith: $20,000 | Jones: $20,000<br>Smith: $20,000 |

b. If Jones had 10 cows, Smith would want 20 cows. If Jones had 20 cows, Smith would be indifferent (get the same profit) if he had 10 or 20 cows. So Smith has a dominant strategy of having 20 cows.

If Smith had 10 cows, Jones would want 20 cows. If Smith had 20 cows, Jones would be indifferent (get the same profit) if he had 10 or 20 cows. So Jones has a dominant strategy of having 20 cows.

The Nash equilibrium is for each farmer to have 20 cows, since that's the dominant strategy for each. They each make profits of $20,000. But they'd both be better off if they cooperated and each had only 10 cows; then profit would be $30,000 each.

c. Since people tend to overuse common fields, it is more efficient for people to own their own portion of the field. So, over time, common fields have been divided up and owned privately.