

ECON 103, 2008-2  
ANSWERS TO HOME WORK ASSIGNMENTS

Due the Week of July 7

**Chapter 9**

WRITE [2]

Compare the elasticity of the monopolistically competitive producer's demand curve with that of (a) a pure competitor, and (b) a pure monopolist. Assuming identical long-run costs, compare graphically the prices and output which would result under pure competition and monopolistic competition. Contrast the two market structures in terms of allocative and productive efficiency. Explain: "Monopolistically competitive industries are characterized by too many firms, each of which produces too little."

*ANS: Less elastic than a pure competitor and more elastic than a pure monopolist. Your graphs should look like Figures 8-12 and 10-2(c) in the chapters. Price is higher and output lower for the monopolistic competitor. Pure competition:  $P = MC$  (allocative efficiency);  $P = \text{minimum ATC}$  (productive efficiency). Monopolistic competition:  $P > MC$  (allocative efficiency) and  $P > \text{minimum ATC}$  (productive inefficiency). Monopolistic competitors have excess capacity, meaning that fewer firms operating at capacity (where  $P = \text{minimum ATC}$ ) could supply the industry output.*

WRITE [7] Answer the following questions, which relate to measures of concentration:

- a. What is the meaning of a four-firm concentration ratio of 60 percent? 90 percent? What are the shortcomings of concentration ratios as measures of monopoly power?
- b. Suppose that the five firms in industry A have annual sales of 30, 30, 20, 10, and 10 percent of total industry sales. For the five firms in industry B the figures are 60, 25, 5, 5, and 5 percent. Calculate the Herfindahl index for each industry and compare their likely competitiveness.

*ANS: A four-firm concentration ratio of 60 % means the largest four firms in an industry account for 60 % of sales; a four-firm concentration ratio of 90 % means the largest four firms account for 90 percent of sales. Shortcomings: (1) they pertain to the whole nation, though relevant markets may be localized; (2) they do not account for inter-industry competition; (3) the data are for Canadian products, not imports; and (4) they don't reveal the dispersion of size among the top four firms.*

*Herfindahl index for A: 2,400 (= 900 + 900 + 400 + 100 + 100). For B: 4,300 (= 3,600 + 625 + 25 + 25 + 25). We would expect industry A to be more competitive than Industry B, where one firm dominates and two firms control 85 percent of the market.*

WRITE [9]

Explain the general meaning of the following profit payoff matrix for oligopolists C and D. All profit figures are in thousands.

- Use the payoff matrix to explain the mutual interdependence which characterizes oligopolistic industries.
- Assuming no collusion between C and D, what is the likely pricing outcome?
- In view of your answer to "b", explain why price collusion is mutually profitable. Why might a temptation to cheat on the collusive agreement exist?

		<u>C's possible prices</u>	
		<u>High</u>	<u>Low</u>
<u>D's possible prices</u>	<u>High</u>	A 57 60	B 59 55
	<u>Low</u>	C 50 69	D 55 58

ANS. The matrix shows the four possible profit outcomes for each of two firms, depending on which of the two price strategies each follows. Example: If C sets a low price and D a high price, C's profits will be \$59,000, and D's \$55,000.

- C and D are interdependent because their profits depend not just on their own price, but also on the other firm's price.
- Likely outcome: Both firms will set a low price. If either charged a high price, it would be concerned the other would charge the low price. At a low price for both; C's profit is \$55,000, D's, \$58,000 (cell "D"). The point is, if D charges a low price, C's best strategy is to also charge a low price (55,000 is better than 50,000). If C charges a low price, D's best strategy is to also charge a low price (58,000 is better than 55,000). Since both are afraid the other will opt for the low price, each also takes the best strategy given that fear.
- Through price collusion—agreeing to charge a high price—each firm would achieve higher profits (C = \$57,000; D = \$60,000, in cell "A"). But once both firms agree on the high price, each sees it can increase its profit even more by secretly charging the low price while its rival maintains the high price. If both cheat, they will of course end up in cell "D".

WRITE [10] Consider the following payoff matrix in which the numbers indicate the profit in millions of dollars for a duopoly based either on a high-price or a low-price strategy.

- What will be the result when each firm chooses a high-price strategy?
- What will be the result when Firm A chooses a low-price strategy while Firm B maintains a high-price strategy?
- What will be the result when Firm B chooses a low-price strategy while Firm A maintains a high-price strategy?
- What will be the result when each firm chooses a low-price strategy?
- What two conclusions can you draw about collusion?

		<u>Firm A</u>	
		<u>High</u>	<u>Low</u>
<u>Firm B</u>	<u>High</u>	A 500 500	B 650 300
	<u>Low</u>	C 300 650	D 400 400

ANS:

- a) Each firm will earn \$500 million in profit for a total of \$1,000 million for the two firms.
- b) Firm A will earn \$650 million and Firm B will earn \$300 million. Compared to the high-price strategy, Firm A has an incentive to cut prices because it will earn \$150 million more in profit and Firm B will earn \$200 million less in profit. Together, the firms will earn \$950 million in profit, which is \$50 million less than with a high-price strategy.
- c) Firm B has an incentive to cut prices because it will earn \$650 million and Firm A will earn \$300 million. Compared to a high-price strategy, Firm B will earn \$150 million more in profit and Firm A will earn \$200 million less in profit. Together, the firms will earn \$950 million in profit, which is \$50 million less than with a high-price strategy.
- d) Each firm will earn \$400 million in profit for a total of \$800 million for the two firms. This total is \$200 million less than with a high-price strategy.
- e) (1) The two firms have a strong incentive to collude and adopt the high-price strategy because there is the potential for \$200 million more in profit for the two firms than with a low-price strategy, or the potential for \$50 million more for the two firms than with a mixed-price strategy. (2) There is also a strong incentive for each firm to cheat on the agreement and adopt a low-price strategy when the other firm maintains a high-price strategy because this situation will produce \$150 million more in profit for the cheating firm compared to honoring a collusive agreement for a high-price strategy.

CONSIDER [12]

Why is there so much advertising in monopolistic competition and oligopoly? How does such advertising help consumers and promote efficiency? Why might it be excessive at times?

ANS: Monopolistically competitive firms maintain economic profits through product development and advertising. Advertising can increase demand for a firm's product. An oligopolist would rather not compete on a basis of price. Oligopolists can increase market share through advertising financed with economic profits from past advertising campaigns. Advertising can act as a barrier to entry.

Advertising provides information about new products and product improvements to the consumer. It may result in an increase in competition by promoting new products and product improvements. Advertising may result in manipulation and persuasion rather than information. An increase in brand loyalty through advertising will increase the producer's monopoly power. Excessive advertising may create barriers to entry into the industry.

## Chapter 10

WRITE [3]: How would you expect anti-combines authorities to react to (a) a proposed merger of Ford and General Motors? (b) evidence of secret meetings by contractors to rig bids for highway construction projects? (c) a proposed merger of a large shoe manufacturer and a chain of retail shoe stores? and (d) a proposed merger of a small life insurance company and a regional candy manufacturer?

ANS:

- (a) They would block this horizontal merger (unless Ford, due to its very high pension liabilities was on the verge of going bankrupt -- there is a "failing firm" exemption to merger policy -- if the acquired firm was going to fail anyway, the authorities would likely allow the merger).
- (b) They would charge these firms with price fixing.
- (c) They would allow this vertical merger, unless both firms had very large market shares.
- (d) They would allow this conglomerate merger.

WRITE [4] In the table below are data on five different industries and the market shares for each of the firms in the industry. Assume that there is no foreign competition, entry into the industry is difficult, and that no firm in each industry is on the verge of bankruptcy. In the column to the right of the table, calculate the Herfindahl index.

- Which industry has the most monopoly power and which industry has the least monopoly power?
- If the *sixth* firm in the automotive industry sought to merge with the *fifth* firm in that industry, would the government be likely to challenge the merger?
- Would a *conglomerate* merger between the *first* firm in the computer industry and the *second* firm in the textiles industry likely be challenged by the government?

Market Share of Firms in Industry							
<b>Industry</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>Herfindahl index</b>
Aviation	25	20	15	15	15	10	1800
Textiles	25	25	25	15	10		2200
Computers	60	10	10	10	10		4000
Chemicals	20	20	20	20	20		2000
Automotive	33	22	14	12	10	9	2094

ANS

- The computer industry has the most monopoly power; the aviation industry has the least.
- Yes. The Herfindahl index for the post-merger industry is 2274, which is higher than the merger guideline of 1800 points used by the government. The merger increases the pre-merger index by 180 points.
- No. The Herfindahl index in each industry would remain the same with this merger

CONSIDER [1] Both competition policy and industrial policy deal with monopoly. What distinguishes their approaches? How does government decide to use one form of remedy rather than the other?

ANS: One of the goals of government in a market economy is to promote competition as a way of achieving efficiency. One approach is to maintain competition by using antitrust laws to discourage the creation of excess monopoly power such as through mergers or by taking action against a firm that is abusing its monopoly power. The other approach, particularly in cases where there is a natural monopoly, is for the government to regulate the firm. The government will choose an approach by analyzing the structure of the industry, the cost structure of the firm, the impact of the firm's actions on its competitors and customers, industry technology, and the likelihood of new competitors entering the industry.

CONSIDER [11] Use economic analysis to explain why the optimal amount of product safety may be less than the amount that would totally eliminate risks of accidents and deaths. Use automobiles as an example.

ANS: To produce an automobile that would totally eliminate the risk of accidents and death would be extremely expensive in terms of materials. Additionally, the cost of operating such a vehicle would likely be expensive because of the weight of the car. As additional design changes are considered, engineers should balance the marginal cost of providing the extra units of safety with the expected marginal benefit received from the design change.

CONSIDER [12] How does social regulation differ from industrial regulation? What types of benefits and costs are associated with social regulation?

ANS: Industrial regulation is concerned with prices, output, and profits specific industries, whereas social regulation deals with the broader impact of business on consumers, workers, and third parties. Benefits: increased worker and product safety, less environmental damage, reduced economic discrimination. Two types of costs: administrative costs, because regulations must be administered by costly government agencies, compliance costs, because firms must increase spending to comply with regulations.

WRITE: There are 15 firms in an industry. The largest holds a 25% market share, the second largest 20%, the third largest 7%, and all the rest are of the same size. What are the four and eight firm concentration ratios and the Herfindahl index?

ANS:

Firm	Marrket Share	Herfindahl
1	25	625
2	20	400
3	7	49
4	4	16
5	4	16
6	4	16
7	4	16
8	4	16
9	4	16
10	4	16
11	4	16
12	4	16
13	4	16
14	4	16
15	4	16

CR 4	56
CR 8	72
HHI	1266

WRITE: Alpha and Beta are the only two makers of widgets, and each, independently, is trying to determine how much to produce. They each know that if they both limit production to 10,000 units a day, they will make the maximum attainable joint profit of \$200,000 a day—\$100,000 a day each. They also know that if either of them produces 20,000 units a day while the other produces 10,000 a day, economic profit will be \$150,000 for the one that produces 20,000 units and an economic loss of \$50,000 for the one that sticks with 10,000 units. And they also know that if they both increase production to 20,000 units a day, they will both earn zero economic profit.

- Construct a payoff matrix for the game that Alpha and Beta must play.
- Find the "prisoners' dilemma" solution to this game.
- What is the likely equilibrium if this game is played repeatedly?

ANS:

a. Payoff matrix ( $k=1,000$ )

		<u>Beta's output</u>	
		<u>10,000</u>	<u>20,000</u>
<u>Alpha's output</u>	<u>10,000</u>	A 100k / 100k	B 150k / -50k
	<u>20,000</u>	C -50k / 150k	D 0 / 0

b. The prisoners' dilemma outcome is cell "D". Both will move to production of 20,000 units because this is the best strategy for each given whatever strategy the other chooses. For example, from Alpha's perspective, if Beta produces 10,000 then it should produce 20,000 (it makes \$150k instead of \$100k); if Beta produces 20,000 units it should produce 20,000 units (it earns zero economic profits instead of a loss of -\$50k). Beta faces the same alternatives. Both will adopt a strategy of 20,000.

c. If the game is played repeatedly, and if they learn to cooperate, the outcome might well be "A" but this is not guaranteed.