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| Regulation & Antitrust Policy (Econ 180) | Signature: |  |
| Drake University, Spring 2011  William M. Boal | Printed name: |  |

**FINAL EXAMINATION VERSION A**

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Mobile phones or other wireless devices are NOT permitted. Points will be subtracted for illegible writing or incorrect rounding. Point values for each question are noted in brackets. Maximum total points are 200.

**I. Multiple choice:**  Circle the one best answer to each question. [1 pt each: 12 pts total]

(1) Suppose a sandwich vendor with market power is now selling 10 sandwiches per hour at a price of $5. If she cuts the price to $4.90, she can sell one more sandwich per hour (that is, a total of 11 sandwiches per hour). The vendor's marginal revenue for the 11th sandwich is therefore

1. $0.10 .
2. $1.00 .
3. $3.90 .
4. $4.90 .
5. $5.00 .
6. $9.90 .

(2) U.S. antitrust laws are enforced through

1. prosecution in federal court by the Department of Justice.
2. lawsuits brought by private parties claiming damages.
3. orders of the Federal Trade Commission.
4. all of the above.

(3) Suppose a certain industry is served by a symmetric Cournot oligopoly of five firms. If the elasticity of market demand is -2, the Lerner index (or "price-cost margin") in equilibrium equals

1. 0.04 .
2. 0.05 .
3. 0.10 .
4. 0.20 .
5. 0.25 .
6. 0.50 .

(4) In private antitrust suits against price-fixing, injured parties can collect damages

1. multiplied by two.
2. multiplied by three.
3. multiplied by four.
4. multiplied by ten.

(5) Which hypothesis claims that higher industry concentration is *not* associated with a loss of social welfare?

1. collusion hypothesis.
2. differential efficiency hypothesis.
3. Both of the above.
4. None of the above.

(6) According to the DOJ-FTC *Horizontal Merger Guidelines*, the ability of a hypothetical monopolist to impose a "small but significant and nontransitory increase in price” should be used to

1. compute a merged firm’s Lerner index.
2. define the extent of a market.
3. decide whether a merger should be opposed.
4. compare with any cost savings.
5. regulate price in a market.
6. distinguish vertical, horizontal, and conglomerate mergers.

(7) The view that vertical mergers may be a problem, because less-simple models, analyzed using game theory, show that they can sometimes both be profitable and decrease welfare, is called the

1. Traditional or Harvard School view.
2. Chicago School view.
3. Post-Chicago view.
4. Supply-side view.

(8) According to the Areeda-Turner (1975) rule, a firm should be presumed to be engaging in predatory pricing if its price is less than its

1. average variable cost.
2. average fixed cost.
3. average total cost.
4. marginal cost

(9) The principle that regulated firms are entitled to a "fair return" was established by the Supreme Court in the case of

1. Nebbia v. New York.
2. Smyth v. Ames.
3. Munn v. Illinois.
4. Standard Oil v. United States.

(10) Assume that in some wholesale electricity market, all producers get paid the same equilibrium price, and that no firm has the ability to manipulate the final price. Then each firm's optimal bid is

1. greater than its true marginal cost.
2. less than its true marginal cost.
3. equal to its true marginal cost.
4. zero.

(11) "Cream-skimming" refers to entry by unregulated competitors into markets whose prices have been set by regulators

1. below average cost.
2. above average cost.
3. below average incremental cost.
4. above average incremental cost.

(12) Why was trucking regulated?

1. Shippers lobbied heavily for regulation of trucking.
2. Trucking is a natural monopoly.
3. Railroads were losing money.
4. Informal cartels had been keeping rates above competitive levels.
5. All of the above.

**II. Problems:** Insert your answer to each question below in the box provided. Feel free to use the margins for scratch work⎯only the answers in the boxes will be graded. Work carefully⎯partial credit is not normally given for questions in this section.

(1) [Monopoly, markup formula, Lerner index: 4 pts] Bigscreen Movie Theatre enjoys a local monopoly. Its marginal cost per customer is $6. The management believes the elasticity of demand for its movies is -4.

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| a. What admission price should Bigscreen set, to maximize profit? | $ |
| b. Compute this monopolist's Lerner index (also called the "price-cost margin" or the "markup ratio"). Recall that the Lerner index is defined as L = (P-MC) / P . | L = |

(2) [Structure-Conduct-Performance paradigm: 10 pts] Classify each of the following as industry "structure," "conduct," or "performance."

|  |  |
| --- | --- |
| a. Degree of price competition. |  |
| b. Exclusionary practices. |  |
| c. Advertising. |  |
| d. Consumer and producer surplus. |  |
| e. Industry concentration. |  |

(3) [Game theory: 8 pts] An industry consists of two firms. Each firm chooses a low price or a high price. Payoffs are shown in the following game in normal (or strategic) form.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Firm B | |
|  |  | High price | Low price |
| Firm A | High price | Firm A’s profit = $10 million  Firm B’s profit = $10 million | Firm A’s profit = $1.  Firm B’s profit = $15 million. |
| Low price | Firm A’s profit = $15 million.  Firm B’s profit = $1 million. | Firm A’s profit = $2 million.  Firm B ’s profit = $2 million. |

|  |  |
| --- | --- |
| a. What strategy is Firm A’s best reply when Firm B plays “high price”? |  |
| b. What strategy is Firm B’s best reply when Firm A plays “low price”? |  |
| c. How many Nash equilibria[[1]](#footnote-1) are there in this game? Describe each equilibrium by listing the strategies played by each firm. |  |
|  |  |

(4) [Measuring industry concentration: 18 pts] Suppose two industries each consist of six firms with the following market shares.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Industry A | |  | Industry B | |
| Firm #1 | 40% |  | Firm #1 | 30% |
| Firm #2 | 15% |  | Firm #2 | 20% |
| Firm #3 | 15% |  | Firm #3 | 20% |
| Firm #4 | 10% |  | Firm #4 | 20% |
| Firm #5 | 10% |  | Firm #5 | 5% |
| Firm #6 | 10% |  | Firm #6 | 5% |

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| a. Suppose Industry A is a Cournot oligopoly. Which firm must have higher marginal cost—Firm #1 or Firm #6? |  |
| b. Compute Industry A’s four-firm concentration ratio (4CR). |  |
| c. Compute Industry B’s four-firm concentration ratio (4CR). |  |
| d. Which industry is more concentrated according to the 4CR? |  |
| e. Compute Industry A’s Hirschman-Herfindahl index of concentration (HHI). |  |
| f. Compute Industry B’s Hirschman-Herfindahl index of concentration (HHI). |  |
| g. Which industry is more concentrated according to the HHI? |  |
| h. Assume Industry A is a Cournot oligopoly and that the industry's elasticity of demand is -5. Compute its average Lerner index (or "price-cost margin"). [Hint: Recall the formula: avg L = HHI / (10,000 ||) .] |  |
| i. Assume Industry B is also a Cournot oligopoly and that the industry's elasticity of demand is also -5. Compute its average Lerner index. |  |

(5) [Statutes: 10 pts] Consider the following six statutes:

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| --- | --- |
| * *Celler-Kefauver Act* * *Clayton Act, Section 7* * *Federal Trade Commission Act* | * *Hart-Scott-Rodino Act* * *Sherman Act, Section 1* * *Sherman Act, Section 2.* |

For each description or quote below, write the appropriate statute.

|  |  |
| --- | --- |
| a. "Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony…" |  |
| b. Prohibits merger by acquiring the *stock* of a rival corporation, where the effect is to lessen competition. |  |
| c. Prohibits merger by acquiring the *assets* of a rival corporation, where the effect is to lessen competition. |  |
| d. Requires prior notification of mergers to the Federal Trade Commission and the Antitrust Division of the Department of Justice. |  |
| e. "Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared to be illegal." |  |

(6) [Successive monopolies with fixed proportions: 26 pts] Suppose an upstream monopoly firm produces a patented electronic chip that is used by a downstream monopolist to make a wireless device. The upstream firm has constant marginal cost (equal to average cost) of MCC= $3. Each device requires exactly one chip and $4 of other inputs in fixed proportion. Therefore the downstream industry has constant marginal cost (equal to average cost) of $4 plus the price of the chip, PC, which is set by the upstream monopolist. The key assumptions are

Marginal and average cost of chip: MCC = ACC = $3.

Marginal and average cost of device: MCD = ACD = $4 + PC

Demand for device: PD = 15– (Q/100).

a. [3 pts] Find the equation for the marginal revenue curve for the device.

MRD =

Now compare market outcomes under two scenarios: (i) upstream and downstream markets are both monopolized, and (ii) upstream and downstream are served by a vertically-integrated monopoly.

[problem continues on next page]

(i) First suppose both upstream and downstream markets are both monopolized. This is the scenario of "successive monopolies."

b. [3 pts] Find the equation for the derived demand curve for the chip. [Hint: Set the marginal cost of the device equal to MRD and solve for PC.]

PC =

c. [3 pts] Find the equation for the marginal revenue curve for the chip.

MRC =

Compute the quantity of chips (and thus devices) sold Q, the price of the chip PC, the upstream chip monopolist's profit, the price of the device PD, and the downstream device monopolist's profit. Insert your answers in column (i) in the **Table of Results** below.

(ii) Second, assume the upstream and downstream industries are served by a vertically-integrated monopoly. The marginal cost of devices for the vertically-integrated monopoly is therefore MCD = $3 + $4. Compute the quantity of devices, the price of devices PD, and the integrated monopolist's profit. Insert your answers in the unshaded boxes in column (ii) of the **Table of Results** below.

|  |  |  |
| --- | --- | --- |
| **Table of Results** [27 pts] | **(i) Successive monopolies** | **(ii) Vertically integrated monopoly** |
| Q = quantity of chips (and devices) |  |  |
| PC = price of chips | $ |  |
| Profit of upstream firm | $ |  |
| PD = price of devices | $ | $ |
| Profit of downstream firm | $ |  |
| Total upstream + downstream profits | $ | $ |

d. [3 pts] Suppose this industry were initially organized as successive monopolies. Then suppose the upstream firm proposed to merge with the downstream firm. Should the government try to block the merger? Why or why not?

(7) [Cases: 10 pts] Consider the following list of important cases:

|  |  |
| --- | --- |
| * Standard Oil v. U.S. (1911). * U.S. v. U.S. Steel (1920). * U.S. v. Alcoa (1945). * U.S. v. United Shoe Machinery (1953). | * U.S. v. Grinnell Corps (1966). * Utah Pie v. Continental Baking (1967). * Berkey Photo v. Kodak (1979). * MCI v. AT&T (1982). |

Complete each sentence below with the appropriate case from this list.

|  |  |
| --- | --- |
| a. One remedy for monopolization is to break up the firm, as was done in the case of |  |
| b. The Supreme Court stated that "the law does not make mere size an offense" in the case of |  |
| c. The Seventh Circuit Court articulated the "essential facilities" doctrine in the case of |  |
| d. The Supreme Court often makes the mistake of “protecting competitors instead of protecting competition,” according to Justice Potter Stewart's dissenting view in the case of |  |
| e. A Circuit Court decision admitted the right of a dominant firm to “compete aggressively” in the case of |  |

(8) [Market-segmenting price discrimination: 4 pts] Suppose an airline enjoys monopoly power on a particular route. Marginal cost per passenger is $40. The elasticity of demand by business travelers is -3. The elasticity of demand by tourists is -6.

|  |  |
| --- | --- |
| a. Compute the profit-maximizing price for tickets sold to business travelers. | $ |
| b. Compute the profit-maximizing price for tickets sold to tourists. | $ |

(9) [Theories of regulation: 6 pts] In each box, insert one of the following answers.

* “normative analysis as positive theory” (NAPT) (also called the "public interest" theory).
* capture theory.
* Stigler-Peltzman theory.
* Becker theory.

|  |  |
| --- | --- |
| a. Regulation is an outcome of pressures applied by competing interest groups according to the... |  |
| b. Regulation is supplied by legislators and demanded by private groups according to the... |  |
| c. Regulation maximizes social welfare according to the... |  |

(10) [Pricing with economies of scale: 20 pts] The following graph shows average cost, marginal cost, and demand for a firm subject to price regulation.

First, suppose the regulator uses marginal-cost pricing.

|  |  |
| --- | --- |
| a. What price would be set? | $ |
| b. Does the firm experience economic profit, loss, or neither? |  |
| c. How much? | $ million |
| d. Compute the social deadweight loss from this policy. | $ million |

Second, suppose the regulator uses average-cost pricing.

|  |  |
| --- | --- |
| e. What price would be set? | $ |
| f. Does the firm experience economic profit, loss, or neither? |  |
| g. How much? | $ million |
| h. Compute the social deadweight loss from this policy. | $ million |

Third, suppose the regulator uses a two-part tariff to maximize social welfare (efficiency) while permitting the firm to break even.

|  |  |
| --- | --- |
| i. What per-unit price would be set? | $ |
| j. What per-customer fixed charge (or "entry fee") would be set? Assume the firm has **2** million customers with identical individual demands. | $ |

(11) [Peak-load pricing: 20 pts] Suppose cost and demand for electricity are given by the following graph. Costs are shown as short-run marginal cost (SRMC) and long-run marginal cost (LRMC) curves. LRMC includes the cost of building new capacity. Demands are shown as peak demand and off-peak demand. Assume for simplicity that peak and off-peak periods are the only periods, and they are of equal duration.

a. Explain in words why SRMC bends up vertically at 70 thousand kilowatt hours.

First, suppose efficient peak-load pricing is used.

|  |  |
| --- | --- |
| b. Find the price of electricity during the peak period. | $ per kWh |
| c. Find the quantity of electricity demanded during the peak period. | thousand kWh |
| d. Find the price of electricity during the off-peak period | $ per kWh |
| e. Find the quantity of electricity demanded during the off-peak period. | thousand kWh |

Now suppose instead a uniform price of **$ 0.12** per kilowatt-hour is used in both peak and off-peak periods.

|  |  |
| --- | --- |
| f. Find the quantity of electricity demanded during the peak period. | thousand kWh |
| g. Find the quantity of electricity demanded during the off-peak period. | thousand kWh |
| h. Would generation capacity have to *increase, decrease*, or *stay the same* to accommodate uniform pricing? |  |
| i. By how much? | thousand kWh |
| j. Compute the social deadweight loss from uniform pricing. | $ thousand |

(12) [Evaluating bids: 16 pts] A city has received the following two bids for a particular service (such as cable TV, telephone service, internet access, water, etc.) as follows. Note that OK Services’s bid includes a declining-block tariff for usage.

|  |  |
| --- | --- |
| Bidder | Tariff |
| OK Services | $6 per unit for first 30 units,  $3 per unit thereafter. |
| Alright Services | $4 per unit for all units. |

Suppose demand for the service by a typical resident is as follows.

|  |  |  |
| --- | --- | --- |
|  | OK Services | Alright Services |
| a. How much usage would a typical resident choose under each proposed tariff? | units | units |
| b. How much money would a typical resident spend under each proposed tariff? | $ | $ |
| c. How much consumer surplus would a typical resident enjoy under each proposed tariff? [Hint: consumer surplus is consumer's total benefit minus total amount of money spent.] | $ | $ |

|  |  |
| --- | --- |
| d. Which company should receive the franchise? |  |

e. Why?

(13) [Airline deregulation: 16 pts] Which of the following resulted from deregulation of airlines in the 1980s? Write "TRUE" or "FALSE."

|  |  |
| --- | --- |
| a. More frequent departure times. |  |
| b. Increase in accident rates. |  |
| c. Decreased travel time to reach destinations. |  |
| d. Shift from hub-and-spoke networks to more nonstop flights. |  |
| e. Lower fares for short-haul flights (e.g., Des Moines to Omaha). |  |
| f. Lower fares for long-haul flights (e.g., East Coast to West Coast). |  |
| g. Higher load factors. |  |
| h. Improved on-board services (meals, movies, etc.). |  |

(14) [Value of a statistical life: 6 pts] The following equation has been fitted to data on a large sample of workers:

*annual earnings = - 2,486 + 6,227 E + 45 R*

where E = total education in years, and R = annual occupational death rate per 100,000 workers.

|  |  |
| --- | --- |
| a. Compute the value of a statistical life. | $ |

Suppose a particular factory employs 2000 workers. Suppose an exhaust fan system, designed to remove harmful fumes, would cost $600,000 per year in the factory. It is estimated that the fan would reduce the factory's annual death rate from 4 in 10,000, to 2 in 10,000.

|  |  |
| --- | --- |
| b. Compute the cost of the fan system per statistical life saved. | $ |
| c. Should the fan system be required? |  |

(15) [Optimal stringency of regulation: 10 pts] Suppose the following data have been computed on alternative exposure standards for a certain chemical.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Exposure standard | Cost of compliance | Estimated number of lives saved | Marginal cost  per life saved | Average cost  per life saved |
| A. 0.5 mg/m3 | $600,000 | 3 | $ | $ |
| B. 0.1 mg/m3 | $3,000,000 | 5 | $ | $ |
| C. 0.05 mg/m3 | $12,000,000 | 6 | $ | $ |
| D. 0.01 mg/m3 | $56,000,000 | 7 | $ | $ |

a. [4 pts] Compute the marginal cost per life saved for each exposure standard.

b. [4 pts] Compute the average cost per life saved for each exposure standard.

|  |  |
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| c. [2 pts] Assuming the value of a statistical life (VSL) is about $7 million, which is the efficient standard? |  |

**III. Challenge question:** Write a one-paragraph essay answering the following question. [4 pts]

The graph below shows the demand for cable TV service in a particular Iowa community. Assume that, with only one cable TV company, its average cost and marginal cost per subscriber per month is $20, but the market outcome is monopoly. With two cable TV companies ("overbuild") the average cost and marginal cost is $25 and the market outcome is price competition. Which is better for society—one company or two companies? Why?

[end of exam]

1. Consider only Nash equilibria in pure (not randomized) strategies. [↑](#footnote-ref-1)