Econ 362 - Government Regulation of Business
College of William and Mary
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September 27, 2012

Midterm 1

You have until 3:20pm to complete the exam, be certain to use your time wisely. Answer all questions directly on the exam. You must show all of your work to receive full credit. Non-graphing calculators may be used (no graphing calculators or phones can be used). You may leave answers as fractions. Unless a problem says otherwise, you can assume that firms can produce fractions of units and charge non-integer prices (so a firm could produce 82.4 units and sell at a price of \$5.325 per unit). Remember to put your name on the exam. Good luck!

Name: **ID Number:**

1. (15 points) One issue with collusion from a firm's perspective is that it is hard to keep other firms from breaking the agreement. What features of a collusive agreement would help ensure that the other firms keep their word? (It is useful to think about the common features of the examples discussed in class). In what types of markets would collusion be most likely to take place without firms breaking the collusive agreement? Be certain to explain your answer.

2. (25 points) Two farmers are selling squash at the Williamsburg farmers market. Farmer A is from Williamsburg and each additional squash he brings to the market raises his total costs by \$2. Farmer B is from Richmond and each additional squash he brings to the market increases his costs by \$5 due to the higher transportation costs. Demand for squash at the farmers market is given by:

$$D(p) = 500 - 50p \tag{1}$$

   (a) Write down the total cost and marginal cost functions ($C_A(S_A)$ and $MC_A(S_A)$) for farmer A in terms of the number of squash he brings to the market, S_A. Write down the total cost functions for farmer B as well ($C_B(S_B)$ and $MC_B(S_B)$). You can assume that fixed costs for both farmers are zero.

   (b) What is the efficient quantity of squash sold at the farmers market?

   (c) Assume the farmers compete on price. In other words, they each announce their price and the farmer announcing the lower price gets all of the demand at that price. If they announce the same price, they split the demand evenly. If the farmers can only choose integer prices (\$5, \$4, and so on but not \$5.50 or \$4.50), what will the equilibrium price be?

   (d) Calculate consumer surplus, producer surplus for farmer A and producer surplus for farmer B in the equilibrium outcome from part (c).

   (e) Suppose that the Virginia legislature is considering subsidizing transporation costs for farmers to get their produce to farmers markets. This would lead to the state government paying farmer B \$1 for each squash he transports to the farmers market. Farmer A would not get a subsidy because he is already located in Williamsburg. With this subsidy in place, what is the new equilibrium price for squash?

   (f) Should the state government proceed with passing this legislation? Your answer should address whether the benefits of the subsidy exceed the costs to the state government and should be supported by numerical evidence.

3. (25 points) Think about the Cournot duopoly model we discussed in class in which firms compete on quantity. This model can be extended to include additional firms. Suppose that we have three identical firms producing hats. Each individual firm i has the following total cost and marginal cost functions

$$C_i(y_i) = 5y_i \tag{2}$$

$$MC_i(y_i) = 5 \tag{3}$$

where y_i is firm i's output (so total output is $\sum_{i=1}^{3} y_i$). The inverse demand curve for hats is given by:

$$p(y) = 10 - \frac{1}{100}y \tag{4}$$

   (a) Write down firm 1's profits as a function of firm 1's output, y_1, and the outputs of the other two firms ($y_2 + y_3$).

   (b) Find an expression for firm 1's marginal revenue as a function of $y_2 + y_3$.

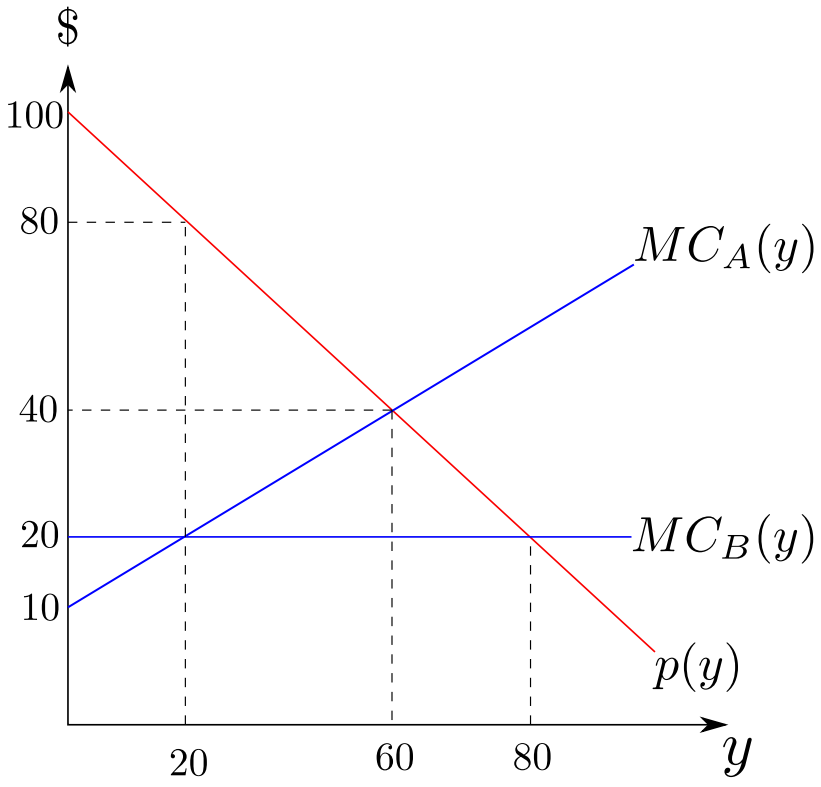
   (c) Given your answer to part (b), find an expression for firm 1's profit maximizing output as a function of $y_2 + y_3$.

   (d) Assume that since all of the firms are identical, each produces $\frac{y}{3}$ if total output is y. If this is true, what will be the equilibrium output per firm and the equilibrium price?

   (e) What would the equilibrium output per firm and the equilibrium price be if there were four identical firms instead of three? (Hint: You should not have to redo all of your work, just notice how the number of firms entered into your equations.)

   (f) The local government is considering running an ad campaign to encourage more firms to enter the industry. What information would you need to determine whether this should be done? Be as specific as possible. Assume the only benefits the government cares about are increases in total surplus.

4. (20 points) The graph below shows the demand curve for a particular market served by a monopolist. Also shown are two different marginal cost curves for the monopolist corresponding to two different production technologies, technology A and technology B. Use the graph to answer the questions below.



(a) Suppose that a regulator can force the monopolist to produce at the efficient quantity (based on the monopolists chosen technology) and charge the price consumers are willing to pay at that quantity. If the monopolist can choose which production technology it wants to use, which will it choose? Use numerical evidence to justify your answer.

(b) Suppose instead that the regulator can choose which technology the monopolist uses. If the regulator is concerned with maximizing total surplus, which technology will the regulator choose? Use numerical evidence to support your answer.

(c) Now suppose that the regulator cannot force the monopolist to produce at a particular quantity. The monopolist is free to set its own prices and quantity. On the graph, label the level of output the firm will choose if it uses technology A and the level of ouput it would choose if it uses technology B.

(d) Still assuming the monopolist can set its own price and quantity, which technology will the monopolist choose? Is there any deadweight loss generated by letting the monopolist choose the technology rather than the regulator in this case? Use numerical evidence to support your answers.

5. (15 points) Suppose that Movie Tavern and New Town are the only two places to watch movies in Williamsburg. They have the same constant marginal costs per movie ticket. Currently, the two theaters compete on price leading to the equilibrium price being equal to marginal cost. Movie Tavern decides to engage in predatory pricing to drive New Town out of business. Movie Tavern prices each ticket to be half of the marginal cost of the ticket. Assume that Movie Tavern's approach works. After ten time periods, New Town shuts down and Movie Tavern is a monopoly from that point on.

   (a) Will this predatory pricing scheme be beneficial or harmful to consumers? Fully explain your answer. Be certain to consider consumers' discount rate (interest rate) when answering.

   (b) Explain why the predatory pricing will lead to inefficient outcomes. Be certain to consider both the periods during which Movie Tavern prices below cost and the periods during which it is a monopoly.