100 pts. total. Answer each question in the space provided.

1. (10 pts.) Sharp recently opened a large new production facility for making LCD televisions. One innovation is that Sharp "has decided to try and cut costs by moving suppliers on site, a kind of hyper-'just-in-time' delivery system." Suppliers have built and paid for their own facilities, and are renting the land from Sharp. Using the concepts of asset specificity and hold-up, explain any advantages or disadvantages you see from this approach.

There are technical efficiencies in the production process for resulting from close proximity of parts suppliers. But investing in such specific irreversible assets leaves input suppliers at risk of opportunistic behavior. Sharp can hold up its parts suppliers once they have built their factories on Sharp's land.

2. (10 pts.) Airbus and Boeing are both potentially capable of producing a super-jumbo jet, but both come to the conclusion that there is only room for one efficient-sized firm in this part of the passenger jet aircraft market. Draw a graph with an LRAC curve and a market demand curve that are consistent with that. Briefly explain your diagram and reasoning.

This market has "natural monopoly" attributes:
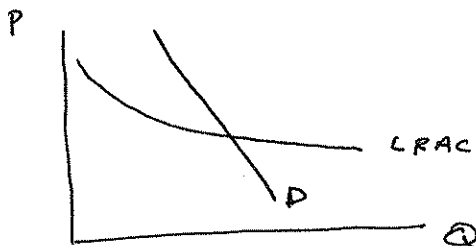


There is only room in the market for one efficient-sized producer. Airbus moved first, so Boeing eventually decided to stay out.

3. (10 pts.) Hondos, a large department in downtown Athens (Greece, not Kentucky), is trying to determine the profit maximizing price for its Aphrodite line of perfume.  The marginal cost of each bottle of perfume is 15€.  The manager of the perfume department has found, through price experimentation, the following information about own-price elasticity of demand:

| At a price of: | A 10% change in price will result in a change in quantity sold of |
| --- | --- |
| 20€ | 30% |
| 25€ | 25% |
| 30€ | 22% |

If you are constrained to price in 5€ increments, e.g. 20€, 25€, or 30€, what price should you choose to maximize profits?  Explain how you arrive at your answer.

Inverse elasticity rule: $\frac{P-mc}{P} = \frac{1}{\epsilon}$ for $\Pi$ max.

(a) $P = 20$, $\epsilon = \frac{30}{10} = 3$, $\frac{20-15}{20} \stackrel{?}{=} \frac{1}{3}$, NO.

(b) $P = 25$, $\epsilon = \frac{25}{10} = 2.5$, $\frac{25-15}{25} \stackrel{?}{=} \frac{1}{2.5}$, YES!

(c) $P = 30$, $\epsilon = \frac{22}{10} = 2.2$, $\frac{30-15}{30} \stackrel{?}{=} \frac{1}{2.2}$, NO.

so maximize profits by setting $P = 25$€

4. (5 pts.) Professor Anspach invented a board game and spent decades fighting Parker Brothers over the rights to use the name he gave to his game.  What did Professor Anspach name his board game?

Anti-Monopoly

5. (5 pts.) What two corporate giants are involved in "Techdom's Two Cold Wars"?

Microsoft     and     Google

6. (15 pts.) From the WSJ, 1/18/07: "Leon Corzine of Assumption, IL, is planting 95% corn on his 3,000 acre farm this year, up from 50% in 2002. The prices he now gets for corn are well above the $2 to $3 a bushel he has come to expect." At the time of the article, corn prices were above $5 per bushel.

Illustrate the market conditions that existed in 2007 in the diagrams below. Illustrate market supply and demand, along with ATC and MC curves for a typical farmer like Leon. Show Leon's profits or losses.
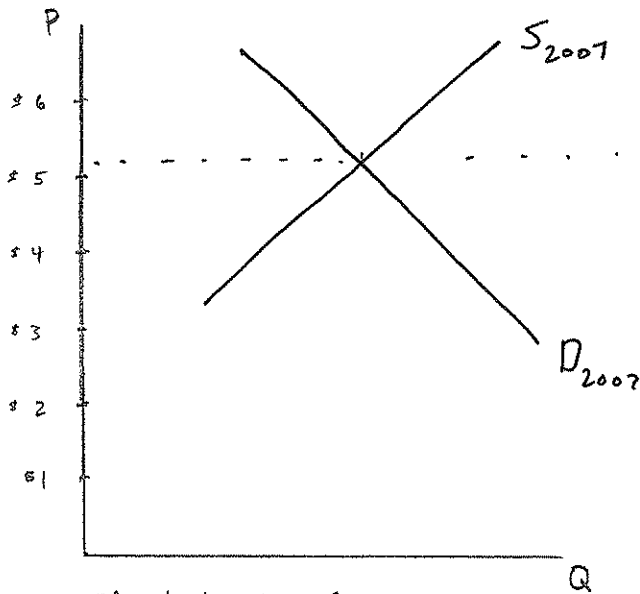


Market for Corn
(billions of bushels)
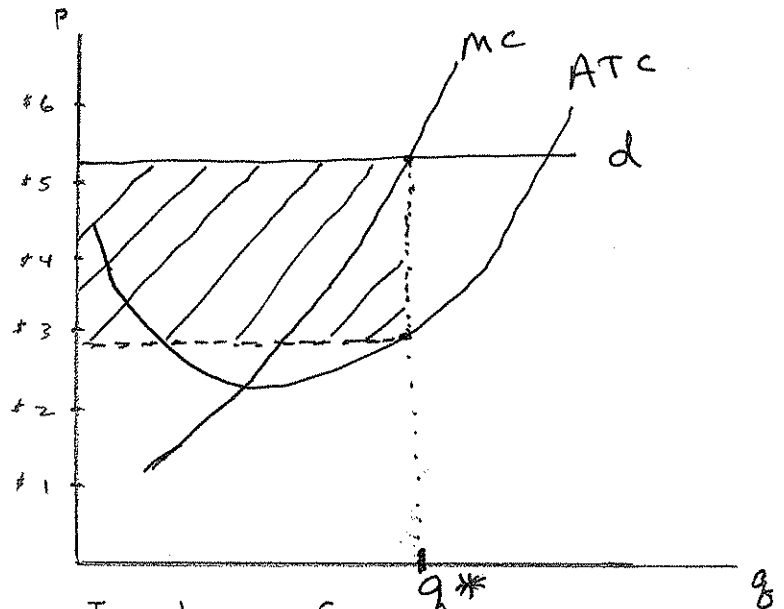
Typical corn farmer
(thousands of bushels)

Leon's profits in 2007.

What would you predict would happen in succeeding years?

Profits from growing corn induce existing producers to expand capacity and new producers to enter the market. Supply shifts right and price falls when that occurs.

7. (15 pts.) Suppose that the diamond industry consists of only two producers, Russia and DeBeers. Russia has two possible strategies: produce either 1 million or 2 million carats per year, and DeBeers has two possible strategies: produce either 4 million or 5 million carats per year. Depending on the strategies chosen by Russia and DeBeers, total output in the world market will be 5, 6, or 7 million carats, resulting in a world price of diamonds that is $2400, $1800, or $1200 per carat, respectively, depending on the combined output of Russia and DeBeers. Production costs are $800 per carat for Russia and $400 per carat for DeBeers. Determine the profit payoffs of Russia and DeBeers for each combination of possible strategies, and then illustrate these payoffs in a 2x2 matrix. What do you predict will be the outcome of this game?

(a) if $D = 4$ and $R = 1$, then $Q = 5$ and $P = 24$

$$\pi_D = 4(24-4) = 80$$
$$\pi_R = 1(24-8) = 16$$

(b) if $D = 4$ and $R = 2$, then $Q = 6$ and $P = 18$

$$\pi_D = 4(18-4) = 56 \; ; \; \pi_R = 2(18-8) = 20$$

(c) if $D = 5$ and $R = 1$, then $Q = 6$ and $P = 18$

$$\pi_D = 5(18-4) = 70 \; ; \; \pi_R = 1(18-8) = 10$$

(d) if $D = 5$ and $R = 2$, then $Q = 7$ and $P = 12$

$$\pi_D = 5(12-4) = 40 \; ; \; \pi_R = 2(12-8) = 8$$

Russia

|  | 1 m | 2 m |
|---|---|---|
| **4 m** | 80, 16 | 56, 20 |
| **5 m** | 70, 10 | 40, 8 |

DeBeers

DeBeers has a dominant strategy of producing 4 million carats. So Russia's optimal response is to produce 2 million carats. The strategy pair of $D = 4$ and $R = 2$ is a Nash equilibrium.

8. (10 pts.) In the above game between Russia and DeBeers, suppose DeBeers is able to commit to an output choice first, leaving Russia to choose its output given the strategy chosen by DeBeers. Should DeBeers choose to play a sequential move game instead of a simultaneous move game if it has that option? Explain your answer with a game tree.
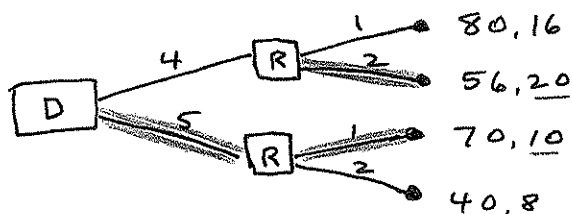


Anticipating how Russia will respond to each of its possible strategies, DeBeers should choose an output of 5m carats, to which Russia will respond by choosing 1m carats. DeBeers is able to earn a payoff of 70, compared with 56 in the simultaneous move game.

9. (20 pts.) Two firms compete in the summertime dinner cruise market on Lake Cumberland. They must commit dinner cruise ships to the various markets they serve months in advance of the summertime dinner cruise season. One is Royal Mediterranean (RM) and the other is Circus Lines (CL). The marketing department of each firm has worked out the following profit matrix depending on the capacity choice of each firm. Each firm typically puts one dinner cruise boat on Lake Cumberland every summer, and the boats owned by each firm have seating capacities of 30, 40, or 60 people. RM's profits are shown as the first entry in each pair, and CL's profits are the second entry:

| | | CL's Capacity Choice | | |
|---|---|---|---|---|
| | | 30 seats | 40 seats | 60 seats |
| RM's | 30 seats | 90, 90 | 75, 100 | 45, 90 |
| Capacity | 40 seats | 100, 75 | 80, 80 | 40, 60 |
| choice | 60 seats | 90, 45 | 60, 40 | 0, 0 |

What do you predict will be the outcome of this game if the two firms set prices simultaneously? Explain the solution concept you used to solve this game.

Capacity = 60 seats is a dominated strategy for both companies, so exclude them from consideration. Then RM and CL both have a dominant strategy of capacity = 45 seats. The strategy pair [RM = 40, CL = 40] is a Nash equilibrium, because neither company experiences ex post regret.

Suppose that Circus Lines must choose its capacity first and stick with it, since its boats come from farther away. Then Royal Mediterranean is free to respond as it chooses to Circus Line's choice of a boat. Draw the game tree and predict the outcome of this sequential move game.
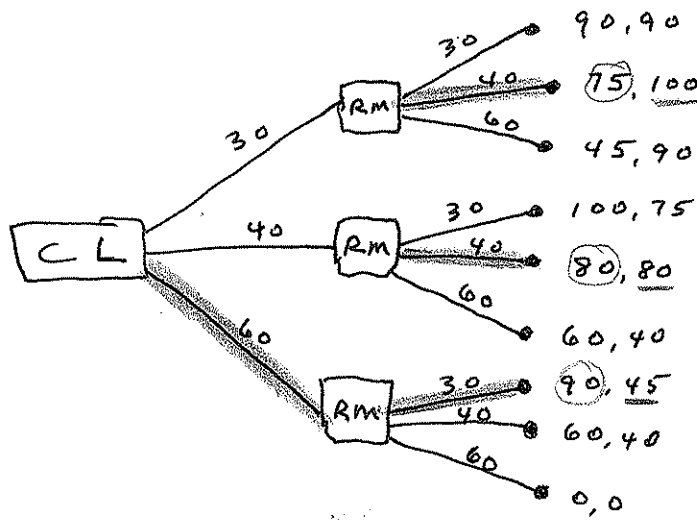


If CL can commit to a capacity of 60 seats, then RM will choose a boat with capacity of 30 seats. CL's payoff will be 90, and RM's payoff will be 45. So CL benefits from being able to choose its capacity first.