

1. (5 pts.) Total output of aluminum in the world market is 50 million tons. It is produced by the following six firms: Alcoa (14 m tons), Rusal (12 m tons), Alcan (8 m tons), Chalco (7 m tons), Rio Tinto (5 m tons), and Hindalco (4 m tons). Compute the Herfindahl-Hirschman Index for this industry.

$$\text{Alcoa: } s_i = \frac{14}{50} = 28\%$$

$$\text{Rusal: } s_i = \frac{12}{50} = 24\%$$

$$\text{Alcan: } s_i = \frac{8}{50} = 16\%$$

$$\text{Chalco: } s_i = \frac{7}{50} = 14\%$$

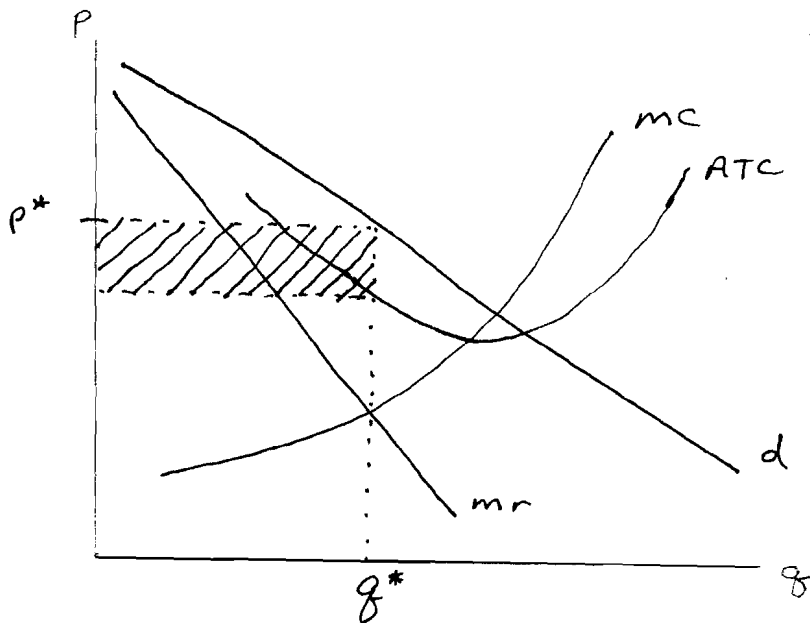
$$\text{Rio Tinto: } s_i = \frac{5}{50} = 10\%$$

$$\text{Hindalco: } s_i = \frac{4}{50} = 8\%$$

$$HHI = \sum_{i=1}^n s_i^2 = 28^2 + 24^2 + 16^2 + 14^2 + 10^2 + 8^2$$

$$HHI = 1976 \quad (\text{or } .1976 \text{ if you did it in decimals})$$

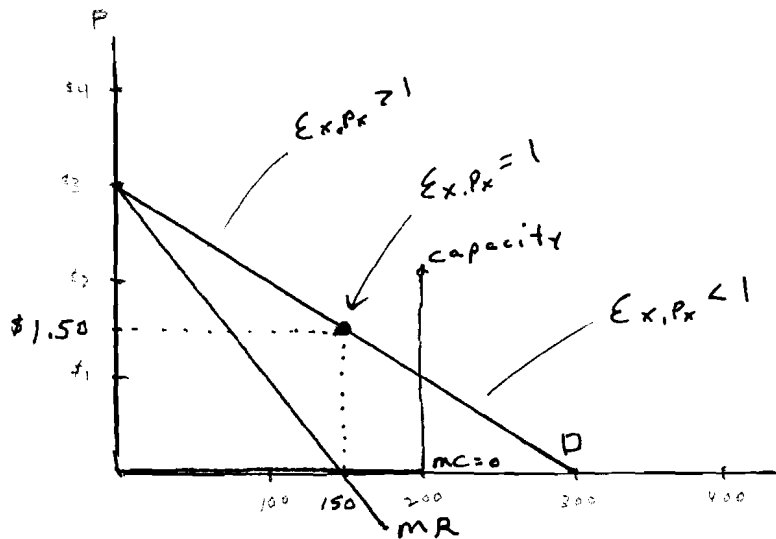
2. (10 pts.) The market for quick service restaurants in the UK campus area is not currently in long-run equilibrium. Expansion of student housing close to campus and growth in enrollment have allowed existing restaurants to earn positive economic profits. Illustrate the demand and cost conditions facing such a restaurant.



Restaurant industry is monopolistically competitive. Demand is currently such that $P > ATC$ and firms are earning positive economic profits.

3. (15 pts.) You own a theater with 200 seats. The demand for seats is $Q = 300 - 100P$, where Q is the number of tickets you sell and P is the price per ticket. You are currently charging \$1.25 per ticket and selling tickets to 175 people. All of your costs are fixed, i.e. marginal costs are zero.
- (a) Should you cut your price in order to fill the theater? [Hint: this is not a yes-or-no question. Explain the price you should charge to maximize profits.] (b) Illustrate your answer in the diagram below. (c) Does your price accord with the inverse elasticity rule?

(a) Since all costs are fixed, profit maximization is the same as revenue maximization. Revenues are maximized where $MR = 0$ and $E_{x, P_x} = 1$, or where $P = \$1.50$ and $Q = 150$. So raise price, don't lower it.



(b) see diagram

$$(c) \frac{P - MC}{P} \stackrel{?}{=} \frac{1}{E_{x, P_x}}$$

$$\frac{P - 0}{P} \stackrel{?}{=} \frac{1}{1}$$

yes, so Inverse Elasticity Rule holds true.

4. (10 pts.) What do you predict will be the outcome of the following static game? Briefly explain the solution concepts you use in arriving at your answer.

		COLUMN		
		Left	Middle	Right
ROW	Top	3, 1	2, <input type="checkbox"/>	10, 2
	High	4, <input type="checkbox"/>	3, 0	6, 4
	Low	2, 2	<input type="checkbox"/> 4, <input type="checkbox"/>	<input type="checkbox"/> 2, 3
	Bottom	<input type="checkbox"/> 6, <input type="checkbox"/>	4, 5	9, <input type="checkbox"/>

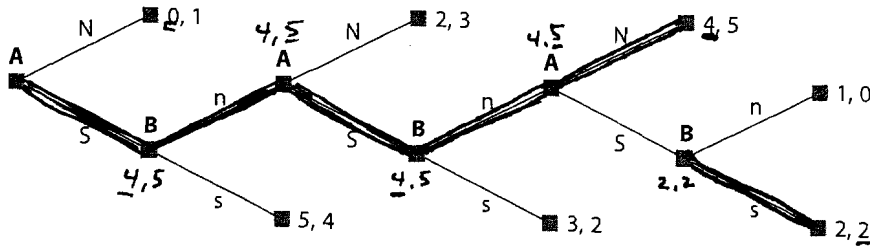
Best responses of row and column players are indicated by \square and \square .

- High strategy is dominated by Bottom strategy for the row player.
- If row player will never play High, then Left strategy is dominated by Right strategy for column player.
- If column player will only play Middle or Right, the row player has a dominant strategy of Low.
- Knowing that, the column player will play Middle.
- Low, Middle is a Nash equilibrium because neither player will experience ex post regret.

5. (10 pts.) Explain conceptually how you determined the scope of the product market and the geographic market in which your Project Connect company competes.

Sensitivity to price: Firms competing in the same geographic market and the same product market will be sensitive to one another's prices.

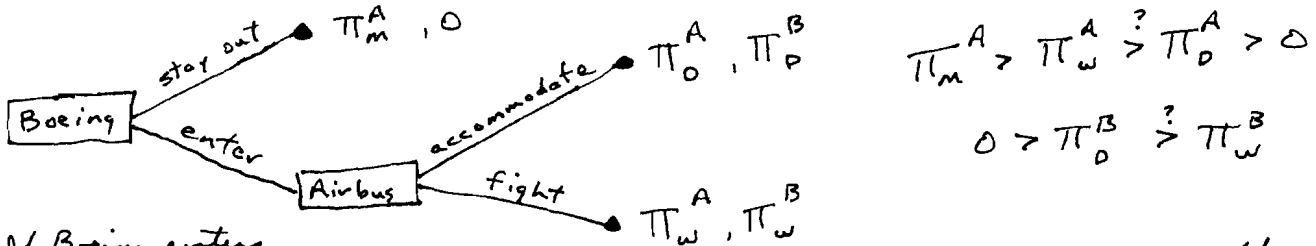
6. (10 pts.) What do you predict will be the outcome of the following dynamic game? Explain the solution concept that you use to solve the game.



The solution to each subgame is indicated by a solid line above. The strategy A-S, B-n, A-S, B-n, A-N is a Nash subgame perfect equilibrium. It is obtained if each player looks ahead and reasons backward.

7. (10 pts.) Airbus entered the super-jumbo jet market first and gained a first-mover learning curve advantage. Boeing was late getting started, and had to decide whether to enter this market that was already occupied by Airbus. Draw a game tree that illustrates this sequence of moves. Explain what sort of payoffs must have been associated with each possible strategy path, given that Boeing decided not to enter this market.

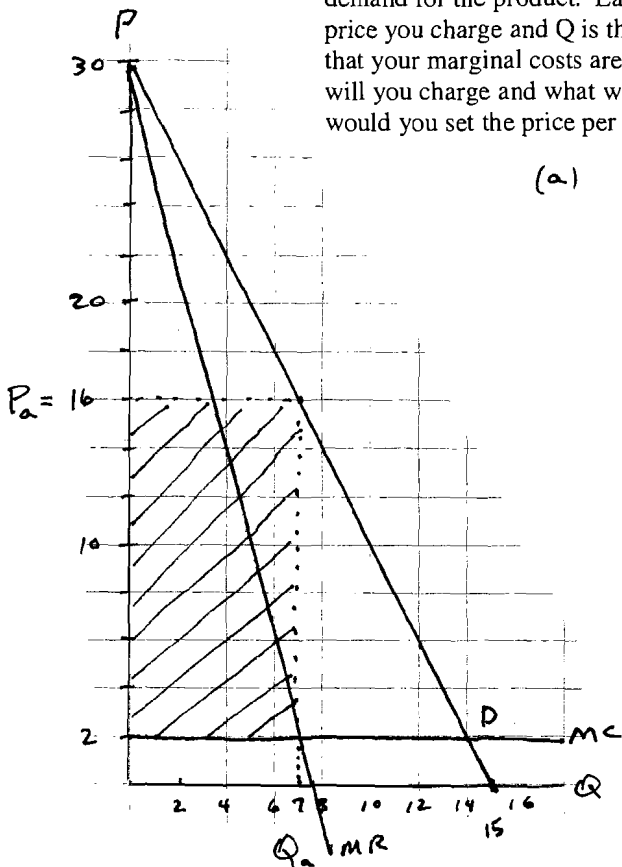
The market size is somewhat limited, with perhaps room for only one competitor. Since Airbus entered the market first, it will always have a learning curve cost advantage and its profits will be greater than Boeing's, i.e. $\pi^A > \pi^B$



If Boeing enters,

Fighting a price war and grabbing a larger share of the market may be better for Airbus than sharing the market with Boeing. Either way, since Boeing didn't enter it must have anticipated negative economic profits if it entered.

8. (10 pts.) You are the first person in the MBA program to acquire the new videogame, Halo Pong. To help pay your out-of-state tuition, you decide to charge your fellow students to play the game on your laptop computer in the MBA lounge. Other students in the program have identical demand for the product. Each person's demand curve is given by $P = 30 - 2Q$, where P is the price you charge and Q is the number of times during the semester they play the game. Assume that your marginal costs are constant and equal \$2. (a) If you can only charge a single price, what will you charge and what will your profits be? (b) If you could charge a two-part price, how would you set the price per play and what would be the entry fee? What would your profits be?



(a) graphically: $P_a = \$16$, $Q_a = 7$, $\pi_a = \$98$
 or algebraically: $TR = (30 - 2Q)Q = 30Q - 2Q^2$
 $MR = \frac{dTR}{dQ} = 30 - 4Q$
 $MR = MC \Rightarrow 30 - 4Q = 2$
 $4Q = 28$, $Q = 7$
 $P = 30 - 2Q = \$16$
 $\pi = TR - TC = 112 - 14 = \98

(b) set $P = MC = \$2$ per play
 charge entry fee equal to entire consumer's surplus area = $\frac{1}{2}(28)(14) = \$196$
 and profits per customer are \$196. Each customer plays the game 14 times during the semester.



9. (10 pts.) Parker Hannifin Corporation makes thousands of different industrial parts. It faces different market conditions for different types of parts that it manufactures. Explain how it used to price its products, and how it prices its products now. Bring the concept of market structure into your answer about its current pricing practices.

Before: standard 35% markup on entire product line of 800,000 parts.

After: evaluate competitiveness of the market for each part. The more competitive the market for a part, the lower the markup over cost.

10. (10 pts.) Briefly describe the market structure of each of the following industries:

a. Charter yachts in the Greek islands - monopolistic competition

many small suppliers
differentiated product
easy entry and exit

b. Pizza in West Liberty, KY - oligopoly

two sellers
differentiated product (pizza is not pizza!)
but hit-and-run entry makes this market behave like a competitive one!

c. Alligators - perfect competition

many small sellers
homogeneous product
easy entry and exit

d. Ivy-league universities - oligopoly

few sellers
differentiated product
high entry barriers
for awhile these universities formed a price-fixing cartel.