B.E. International Program

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Mock up Final Exam for EE481

1. **(25 points)** Suppose you have a bar and you are facing with two kinds of customers: those who love drinking and those who love dancing. There are 500 dancers, each with the same demand curve for drinks:

$$Q_{drinker} = 5\text{-}P$$

and there are 500 drinkers, each with an individual demand curve for drinks:

$$Q_{dancer} = 10\text{-}2P.$$

Cost function is $TC = 1000 + 0.5Q$ where Q is number of drinks. 1000 Euro is a fixed cost.

a. Plot the two demand curves and marginal cost curve in the same diagram.
b. Suppose that your first strategy will be to try to get both customers (it is not necessarily the best strategy). Therefore the cover charge cannot be larger than the consumer surplus of the customer with the smallest consumer surplus. In this case the Dancers will always have smaller consumer surplus. The cover charge (T) is a function of P: $T = f(P)$. From the demand curves in your diagram, find the function of cover charge ($T(P)$).
   (Hint: the area of Dancer's consumer surplus = cover charge you will set, given the price you will charge.)
c. Afterwards, with the function of cover charge you have derived, find the profit function and the do the First order condition (F.O.C.) to get the optimal price, i.e., the price that maximizes profits. Draw the price line into the diagram you constructed above.
d. Calculate the optimal cover charge, amount of drinks that an individual customer of each type will consumer ($Q_{drinker}$, Q_{dancer}), and the total profits.

2. **(25 points)** What are the differences between Predatory Pricing and Limit Pricing? Fully explain with the support of diagrams.

3. **(25 points)** Suppose there is a monopolistic manufacturer selling a single product to two retail firms that compete by playing Nash-in-quantities in a single market. The marginal cost of production for the good is given by c. When the firms are separately owned, the upstream firm (manufacturer) sets a single wholesale price, P^W. The two retail firms each choose the quantity of the good to purchase (conditional on P^W). For simplicity, assume that the downstream firms face no other costs (i.e., no fixed costs, and the wholesale price they pay to acquire the good from the manufacturer is the same). Assume that demand in the downstream market is given by

$$Q = A - bP \text{ (or inverse demand is } P = (A-Q)/b)$$

where P is the price charged to the final end-user in the retail market. $Q = q_1+q_2$

a) Write down the retailers' profit functions for the two identical retail firm ($ie., \pi_1^R$ and π_2^R) and solve for the optimal retail quantities (i.e., $Q^* = q_1+q_2$) and price (P).

b) As the optimal retail quantities (Q^*) derived from a) being the demand function for the manufacturer, write down the manufacturer's profit function (π^W) and solve for the optimal wholesale price (P^W) and the optimal wholesale quantity (Q)

c) Compute profits for the manufacturer (π^W) and profits each retailer obtain (π_1^R and π_2^R) when the manufacturer charges the optimal wholesale price and the retails play their best response in the Nash-in-quantities game.

Hint: In a retailer's profit function, recall that its marginal cost (or average cost) is actually equal to the wholesale price charged by the manufacturer (P^W)

d) Suppose the manufacturer acquired both retailers in a vertical merger. What would be the optimal retail price (P) and quantity (Q) on the market for the merged firm to set? What are profits to the merged firm?

e) Compare the total industry profits in parts c) and d), i.e, $\pi^{unmerged}$ and. π^{merged}. Briefly discuss the result.

Further Advice: Try to do the related problems to our lecture in Chapters 9-13. Answers to odd-numbered problems are given at the back of the textbook.