Practice problem set 26

Networks and technological standards

Industrial Economics
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ICEF - HSE

This problem set constitutes recommended material for the relevant lab. The choice of tasks to be presented instructionally in every lab is in the discretion of the individual teacher. Students are expected to work on practice problems, however, are not required to submit written solutions. It is non-negotiable policy in this course to not provide hand-outs with the solutions of practice problem sets.

1. Two banks compete for the checking and savings deposit business of a small town. Each bank has its own ATM network that works only on its own bankcards, but bank 1 has three times as many ATM machines as bank 2. Depositors value a bank's services as an increasing function of the number of machines on the network. Bank 2 approaches bank 1 and suggests that they merge their ATM networks so that depositors of either bank can use either bank's machines.
   (a) Is this merger in the interest, of deposit consumers in general?
   (b) Do you think that bank 1 will agree with bank 2's proposal?

New problem – 2018

2. Assume that consumers contemplating buying a network service have reservation prices uniformly distributed on the interval [0, 50] (measured in dollars). Demand by a consumer with reservation price w_i for this service is

$$q_i^D = \begin{cases} 0 & if \quad fw_i < p \\ 1 & if \quad fw\_i \geq p \end{cases}$$

   (a) Calculate the demand function for this service.
   (b) What is the critical mass if price is set at \$5?
   (c) What is the profit maximizing price for the service?

New problem – 2018

3. Many social customs exhibit network effects. Assume that the number of people who actually come to a party depends on how many people are expected to attend. The more people that are expected to attend, the more fun it will be for each attendee and, hence, the more people will actually come. These effects are captured by the following equation: $A = 20 + 0.95A^e$, where A is the number of people actually attending the party and A^e are the ones who are expected to go.
   (a) If potential party attendees are sophisticated and understand the equation describing actual party attendance, how many people are likely to attend the party?
   (b) Suppose that each party attendee costs to the organizers \$2 in refreshments so that a fee p needs to be charged for attending the party. Suppose as well that with the introduction of the fee the equation for attendance becomes $A = 20 + 0.95A^e - p$. What value of p should the organizers set if they want to maximize their profit from the party? How many people will come to the party at that price?

New problem – 2018

4. Imagine that Consumer valuations v_i are distributed uniformly between 0 and 100. Each consumer will buy at most one unit of the good depending on his or her willingness to pay. However, that willingness to pay depends on the fraction f of population that buys the good. In particular, consumer i will buy one unit of the good only if $(0.4 + 6f^2)v_i \geq p$. Otherwise, consumer i buys zero.
   (a) Assume that the price is $p = \$50$. Show that the marginal consumer has basic valuation $v^M = 50/(0.4 + 6f^2)$.
   (b) Show that at this price, two non—zero. market equilibria are possible: one with $f = 0.1905$ and one with $f = 0.906$. Which, if either of these, is stable?

New problem – 2018

5. Two firms are competing in their choice of technologies. The payoff matrix for the game between them is given below.

Firm 1 \ Firm 2	Technology 1	Technology 2
Technology 1	a, b	c, d
Technology 2	e, f	g, h

   (a) Identify constraints on the payoffs such that the firms' choices reflect network externalities.
   (b) Assume that the constraints in (a) are satisfied. Identify further constraints that must be satisfied for the game between the two firms to be of the form of the "Sidewalk" adoption.
   (c) Assume that the constraints in (a) are satisfied. Identify further constraints that must be satisfied for the game between the two firms to be of the form of the "Pesky Little Brother" adoption.

New problem – 2018

6. A monopolist faces seven potential consumers. Consumers affect each other's preferences in the following asymmetric way. Consumer's 1 reservation price is affected positively by the decisions of all other consumers to buy the monopolist's product. Consumers' 2-7 reservation prices are also positively affected by the decision of consumer 1. However, consumers' 2-7 reservation prices are not correlated with each other. The reservation price for a unit of the good for the ith consumer ($i = 1, \dots, 7$) is given by $r(k)$, where k is the number of consumers that affect i and bought the product before i. Then, $r(0) = 1$, $r(1) = 3$ and $r(n) = 4$ $\forall\, n \geq 2$. The monopolist knows all the above information and can prevent arbitrage. He can also make offers to individual customers sequentially. Is there room for the monopolist to apply price discrimination? If no, why? If yes, how?

End of 3rd Module Examination – 2014