Econ 302: Microeconomics II - Strategic Behavior

Problem Set #10 – July 26, 2016

1. True/False/Uncertain? Explain your answer.

   a) The reason private banks will ask for a collateral is adverse selection – banks want to avoid attracting customers with a high default risk.

   b) Cab drivers that lease their cab from the company for a fixed (monthly) fee have less incentive to work hard (taking fewer breaks, picking up new customers etc.) than cab drivers who work for 50-50 share of the profit they generate.

2. Firms hiring in the corporate labor market value high-ability managers at $ 5000 per month and low-ability managers at $ 3000 per month. Mangers know their ability, but firms do not. All managers are hired on one-year contracts and are paid their expected marginal product.
   The business school at UBC offers an evening MBA program. Although the program does not alter the productivity of the participants (they learn nothing new), it has very high fees: completing the program costs $4,000 for high-ability managers and $10,000 for low-ability managers (the latter take longer).

   a) Show that there can be <u>no</u> equilibrium in which managers can signal their high ability through the MBA program. If there is an equal number of either type of manager, how high will the salary of a newly hired manager be? Who will pursue a MBA degree in equilibrium? Is this situation efficient?

   b) Concerned about low enrollment, Ted, a member of the business faculty at UBC proposes to increase the tuition fees: completing the program now costs $10,000 for high-productivity managers and $25,000 for low productivity managers. All other parameters of the problem are unchanged. Determine equilibrium salaries (possibly as a function of education) in this new situation. Who will take the MBA course now?

   c) Other members of the faculty find Ted's proposal silly: after all, how can <u>increasing</u> the cost of the degree lead to <u>higher</u> enrollment? What is your opinion? Explain!

3. A manager can either work hard ($e = 1$) or be lazy ($e = 0$). There are two possible levels of revenue x, the probabilities of which depend on effort:

	$\underline{x} = 10$	$\bar{x} = 50$
$e = 1$	0.3	0.7
$e = 0$	0.8	0.2

The owner of the business is risk neutral and chooses the manager's wage to maximize his profit $\Pi = x - w$. The utility function of the manager is $u = \sqrt{w} - e$. The reservation utility of the manager is $\bar{u} = 1$.

a) Suppose first effort e can be contracted upon. Determine the profit maximizing wage w^* for the principal if i) he wants the manager to work hard and ii) he wants the manager to be lazy. Determine the owner's profit and the manager's utility in both cases. Which effort level is efficient/should the owner ask for?

b) Now suppose effort e is not observable, but revenue is. The owner can therefore pay a bonus $b > 0$ on top of the wage w^* (from a)) if revenue was high, $\bar{x} = 50$. What is the smallest bonus that the owner can choose so that the manager works hard? What is the smallest bonus the owner can choose so that the manger is lazy? Determine the owner's profit and the manager's utility in in both cases and compare to your answer in a). Discuss!

4. Emily is a risk neutral elderly Vancouver lady, who likes going to see her doctor. When she is sick, the doctor will cure her and her utility from a weekly visit equals $ 100. But even when she is healthy, she derives a utility of $ 60 from a weekly visit. Of course, when Emily is healthy, she could always go to the community centre for her social needs, which would give her $ 30 in utility, but she prefers chatting with the the doctor; besides, there're always plenty of fun magazines to read in the waiting room. The doctor's cost per visit is $ 50, which he bills in full to the BC Medical Plan. Emily is sick 25% of the time.

a) Emily is fully covered by the BC Medical Plan for a fixed monthly premium of $ π. How often per month will she visit the doctor on average? And assuming the BC Medical Plan is bound by law to break even, how high does Emily's premium have to be set? Is this situation Pareto efficient?

b) Concerned about rising medical cost and high insurance premiums, a Plan administrator proposes to charge patients a per-visit F each time they see the doctor. This would prevent unnecessary medical consultations and allow a reduction in the monthly premium, he argues. Determine the minimum fee F and the new premium π_F such that i) Emily sees the doctor only if she is sick, and ii) the BC Medical Plan continues to make zero profits. Comparing your findings in a) and b) explain why Emily is better off under the new scheme, making reference to the phenomena of adverse selection and/or moral hazard.

Further Questions for Review:

1. Consider the market for health insurance. About 25 percent of the customers are high risk (smokers), the rest are low risk (non-smokers). Smokers face a 10 percent chance of developing lung cancer in any given year. For non-smokers, the corresponding figure is only 5 percent. Treatment for lung cancer costs $ 3,600. All individuals have the same utility function, $u(y) = \sqrt{y}$ and the same wealth of $y = 10,000$. Suppose there is a single public health insurer who must offer full insurance at actuarially fair rates (i.e. make zero expected profits).

   a) If smoking is observable, what are the rates? Is the outcome efficient?

   b) Now suppose the insurer cannot distinguish smokers from non-smokers. What is the equilibrium under asymmetric information? Is the outcome efficient?

   c) Suppose health insurance is compulsory. How does this affect your answers in part a) and b)? Determine the welfare effects of such a policy.

2. Old MacDonald produces hay. He has a single employee, Jack. Jack can either work hard all day for $e_H = 8$ hours or be lazy and work only for $e_L = 5$ hours. e hours of work produces e bales of hay and costs Jack $e^2/10$. Each bale sells for $2 dollars. Jack's reservation wage is zero.

   a) What is the efficient amount of hours for Jack to work?

   b) Old MacDonald cannot observe the number of hours Jack works, but he does know how many bales of hay are produced. Give the least cost wage contract (contingent on hay production) that would make Jack work the efficient number of hours. How much profit will Old MacDonald make?

   c) Now suppose hay production is not observable, so the contract in b) is no longer feasible. What are the equilibrium hay production, wage payment, and profits?

   d)* Old MacDonald has a clever idea: he rents the hayfield out to Jack. As a renter, Jack receives the profits from hay production. How much hours of work will he put in? And what is the maximum rental price Old MacDonald could ask for? Compare your answer to b) and c) and discuss.

3. In the National Basketball Association (NBA), the owners share revenue but not cost. Suppose that one team, the LA Clippers, sells seats to a home game with the visiting Philadelphia 76ers (Sixers). The inverts demand for the tickets is $p = 100 - .004Q$, the Clipppers cost function for selling the tickets and running the Franchise is $C(Q) = 10Q$.

a) Find the Clippers' profit maximizing number of tickets sold, and the price if the Clippers must give 50% of their revenue to the Sixers. What is the Clipper's profit in this case? Determine joint profit (Clippers and Sixers)

b) Instead, suppose that the Sixers set the Clippers' ticket price, based on the same 50% revenue sharing rule. What are Clippers' profits in this case? Determine joint profit.

c) Now suppose that the Clippers must share their profit, not their revenue. The Clippers keep 45% of the profit and have to give 55% to the Sixers. Find the Clippers' profit maximizing quantity and price. Determine joint profit.

d) Explain why your answers in a), b) and c) differ. In your explanation, use the concepts of marginal revenue and marginal cost, as well as externalities.