Homework 9

Problem 1 Suppose there are two kinds of workers, productive workers and lazy workers. Firms cannot tell workers apart *ex ante*. If hired, a productive worker increases revenue by 9, while a lazy worker increases revenue by 1. Productive workers can acquire e years of education for a cost of e^2, while lazy workers can get e years for $2e^2$. Education does not increase productivity, but is observable to employers.

Solve for e^*, the minimum number of years of education productive workers must acquire to separate themselves from lazy workers. Show that, given your e^*, productive workers prefer e^* to all other levels of education, while lazy types prefer 0 years of education to all other possible levels.

The equation determining e^* is give by $9 - 2(e^*)^2 = 1$. The left-hand side is a lazy type's utility from getting e^* years education, the right-hand side utility from 0 years od education. Solving this equation yields $e^* = 2$. Employers then pay wages as follows:

$$wage(e) = \begin{cases} 1, & \text{if } e < 2 \\ 9, & \text{if } e \geq 2 \end{cases}$$

Problem 2 Consider an economy where people have two choices: work in the private sector or work at home. People who would be more productive in the private sector are also more productive at home (i.e. "high ability" people can do both things better). Employers cannot observe a workers productivity before the worker is hired. Jobs are permanent: once hired at a given wage, a worker cannot be fired and his wage cannot be changed. Explain how adverse selection could cause the private-sector labor market to break down in this economy so that we could potentially end up with no workers employed in the private sector.

The lecture of 4/16/09 addresses this. The basic story is that if all workers seem identical *ex ante*, employers are willing to pay only for an average worker, but then the very best workers will be unwilling to supply their services, and so average quality will lower, driving the top workers who remain out of the market, lowering the average quality further, and so on. In the extreme case, the market breaks down completely.

Problem 3 Certain universities do not give letter grades. One rationale is that eliminating the letter-grade system reduces the pressure on students, thus enabling to do better in school. Why might this policy help or hurt students?

This policy could help students in the job market if they would have earned poor grades. It will hurt students who would have performed well. It is also likely to harm students who would have received average grades, as employers are unable to determine what their grades would have been. A risk-neutral employer would assume that all students had average grades. However, a risk-averse employer would be unwilling to make that assumption. The loss of ability to signal employers becomes less important if other signals are available to (or even preferred by) employers. An alternative viewpoint is that students feel less pressure to get good grades and spend less time taking courses designed to increase their GPAs. They study and learn more and become more productive as a result.

Problem 4 In *Freakonomics*, economist Steven Levitt discusses the online dating world. According to him, about 40 million Americans a year try to date online. Clearly, there are information problems in online dating, as the person writing the listing has private information about himself/herself. About 70% of online daters list themselves as having "above average" looks, with only about 1% of online daters having "below average looks". Online men claim to be an inch taller than average, and online women claim to be 20 pounds lighter than average. 57% of men and 23% of women posting profiles online never get even one response.

a. Explain why this "market" is not functioning well. What is the economic term we use to describe this problem?

The market is not functioning well because as quality is unobservable, above average people are driven out of the market, lowering the average and driving more people out, etc. This is called adverse selection.

Consider the following simple model of online dating. Suppose 30% of people are of quality 1 (lemons!), 20% are of quality 3, 30% are of quality 5, and 20% are of quality 10, whereh "quality" is some measure of a persons attractiveness to potential dates. Quality is perfectly observable in the real world but completely unobservable in the online world. In the real world (where quality is observable), people of quality 1 can only date other people of quality 1; individuals of quality 3 can date individuals of quality 3 or lower, etc Anyone can find a date matching his/her own quality in the real world if he/she chooses. However, dating online requires much less effort. As such, the utility from going on a date with someone of quality q met in the real world is $u(q) = q$, while the utility from going on a date with someone of quality q met in the online world is $u(q) = 1.5q$.

b. Suppose that all individuals look for a date online, what is the expected utility from going on a date with a person met online?

Expected utility is $.3 * 1.5 * 1 + .2 * 1.5 * 3 + .3 * 1.5 * 5 + .2 * 1.5 * 10 = 6.6$.

c. Considering your answer in b, who will look for a date online and who will look for a date in the real world? Explain briefly.

If individuals believe all types are participating, types 1, 3, and 5 will actually look for a date online.

d. Recompute the expected utility of dating online after considering your result in c. Who looks for a date online now?

If now individuals believe only types 1, 3, and 5 participate, expected utility is $\frac{3}{8} * 1.5 * 1 + \frac{2}{8} * 1.5 * 3 + \frac{3}{8} * 1.5 * 5 = 4.5$. Thus only types 1 and 3 would look for a date online.

e. Again recompute the expected utility of dating online after considering your result in d. Who looks for a date online now?

If only types 1 and 3 are believed to be participating, expected utility is $.6 * 1.5 * 1 + .4 * 1.5 * 3 = 2.7$. Thus only type 1 would look for a date online.

f. Think about the results above Who dates online in the equilibrium of this game? Explain why this is an equilibrium.

If only type 1's are believed to be online, expected utility is 1.5. Given this, type 1's would participate in the market. It is thus an equilibrium for type 1's, and no one else, to participate.

g. Explain why it is not an equilibrium for everyone to date online.

Because online daters cannot differentiate themselves *ex ante*, above average people (type 10's) do better in the real world. If they could select only other type 10's to date, then the market could survive.

h. Is it more efficient in this model for everyone to find dates online or for everyone to find dates in the real world? Why is it not possible to implement the efficient outcome?

Online. Because of lower search costs, utility is higher with online dating, but an efficient outcome does not obtain because of the asymmetric information inherent in the online world.

i. In the used car market, a common way to ameliorate the information problem is to have a car inspected. What is the most common way on dating websites to ameliorate the information problem (i.e. so that "quality 10" person doesnt end up on a date with a "quality 1" person)?

Photos.

j. What kinds of information problems in the dating market are not solved by the technique you identified in i?

Information related to quality which is not conveyed in a photo alone.