Economic Theory - 2009

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Problem Set 2

(to be returned on Friday, March 13th)

(PLEASE, DROP IT IN MARION'S MAILBOX)

1. **[based on Jehle-Reny 10.6]** Consider the following market for used cars. There are many sellers and buyers of used cars. Each seller has exactly one used car to sell and is characterized by the quality of the used car he wishes to sell. Let $\theta \in [0,1]$ index the quality of a used car and assume that θ is distributed uniformly.
   If a seller of type θ sells his car for a price p, his utility is $u_s(\theta, p)$. If he does not sell his car, then his utility is 0.
   Buyers of used cars receive utility $\theta - p$ if they buy a car of quality θ at price p, and 0 if not.
   There is asymmetric information: sellers know the quality of the car they are selling, but buyers do not. Assume that there are enough cars to supply all potential buyers.

2. Argue that in any competitive equilibrium the *average quality* of the cars sold at price p^* should equal this price, that is, $E(\theta|p^*) = p^*$

   (a) Show that if $u_s(\theta, p) = p - \frac{\theta}{2}$, then any $p \in (0, \frac{1}{2}]$ is an equilibrium price.

   (b) Find the equilibrium price when $u_s(\theta, p) = p - \sqrt{\theta}$. Which cars are traded in equilibrium ?

   (c) Are any of this outcomes *Pareto-efficient ?*

3. **[based on Jehle-Reny 10.13]** Consider the moral hazard insurance problem discussed in class, where there is only one consumer and one insurance company. Let the consumer's von Neumann-Morgenstern utility of wealth be

$$u(w) = \sqrt{(w)}$$

   and her initial wealth be $w_0 = 100$. Suppose that there two levels of accident with losses $l = 0$ and $l = 51$ and two possible levels of effort $e = 0$ and $e = 1$. The disutility of effort is $d(0) = 0$ and $d(1) = \frac{1}{3}$. The different accident probabilities are given by the following table

	$l = 0$	$l = 51$
$e = 0$	$\frac{1}{3}$	$\frac{2}{3}$
$e = 1$	$\frac{2}{3}$	$\frac{1}{3}$

(a) Verify that the probabilities above satisfy the *monotone likelihood ratio* property

(b) Find the consumer's reservation utility $\bar{u}$ assuming that there are not other insurance companies in the market and that the consumer's only other option is to self-insure [HINT: Look at footnote 12 in page 457 in Jehle-Reny]

(c) What level of effort will the consumer exert if no insurance is available (so that he has to self-insure) ?

(d) Show that if information is symmetric, then it is optimal for the insurance company to offer a policy that induces high effort

(e) Show that the policy in (d) will not induce high effort if information is asymmetric

(f) Find the optimal policy when information is asymmetric