14.22 Assignment 2 - Due Wednesday, March 3

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Problem 1

Review the model of an insurance market discussed on page 151 of Milgrom and Roberts. Suppose that the parameters of the model were such that $c\bar{x} < v < \bar{x}(1+c)/2$. Show graphically that there is a price at which the insurer breaks even and some people are willing to purchase insurance. What is the formula for that price?

Problem 2

A used-car salesperson and a potential buyer negotiate over the price of an old car. The seller believes that the buyer values the car at 500 with probability x and at 1000 with probability $(1-x)$. The buyer believes that the car is worth 250 to the salesperson with probability $(1-x)$ and 750 with probability x. Under what circumstances should trade occur? How does the probability of efficient trade depend on the value of x? If a mediator specifies that trade should occur at a price of p when the seller claims a value of 250 and the buyer claims a value of 1000, derive two conditions on p that ensure that both parties will report honestly. Solve for the value of x that makes the incentive constraints exactly hold as equalities. Note that for lower values of x, trade is more likely to be efficient but it cannot always be attained. Explain why.

Problem 3

This problem considers a specific example of the Spence job-market signalling game. Suppose that a worker can either be high-ability or low ability. High ability workers produce θ_H in value, while low-ability workers produce θ_L. Naturally, $\theta_H > \theta_L$. Also, it is possible to obtain education at cost $e^2/2\theta_H$ for high types and $e^2/2\theta_L$ for low types. Education in this model also enhances productivity. The productivity of a worker of type θ who obtains education level e is θe. There are competitive firms who stand ready to pay a worker his expected productivity. Workers receive linear utility from money, so that their final utility is their wage net of any cost of education. There are λ high types and $1-\lambda$ low types.

a) Calculate the efficient level of education for each worker.

b) Assume that $\theta_L = 1$. Assume that in a separating equilibrium, low ability workers obtain the efficient level of education. Write the incentive constraints that determine the high ability workers' equilibrium level of education. Assume that $\theta_H = \frac{3}{2}$. Show that the efficient level of education for the high types cannot be sustained in a separating equilibrium.

c) Continuing on part b), find a level of education for the high types that can be sustained in a separating equilibrium. If you can, find the lowest such level of education. Discuss informally what beliefs the firms would have to have about workers who chose levels of education between these two values for this to be sustained as an equilibrium.