Business 3019

Assignment 4

Due Wednesday February 12, 2003, 4:00pm (beginning of class)

1. (2 points) Suppose that, with perfect information, the market value of a jewel (a used car in good condition) is \$2,400 and the market value of a lemon is \$1,200. Assume that, in the absence of perfect information, the market price of a car will be $\$2,400s + \$1,200(1-s)$, where s is the proportion of jewels on the market. There are three groups of potential sellers: 200 owners of jewels whose reservation prices are \$2,000; 400 owners of jewels whose reservation prices are \$1,600; and 400 owners of lemons whose reservation prices are less than \$1,200. Show that the cars in the last two groups–but not the cars in the first group– will be sold. What is the market failure in this case?

2. Two used car dealerships compete side by side on a main road. The first, Harry's Cars, sells high-quality cars that it carefully inspects and, if necessary, services. On average, it costs Harry's \$8,000 to buy and service each car that it sells. The second dealership, Lew's Motors, sells lower-quality cars. On average, it costs Lew's only \$5,000 for each car it sells. If consumers knew the quality of the used cars they were buying, they would gladly pay \$10,000 on average for Harry's cars and pay only \$7,000 for Lew's cars.

   Unfortunately, the dealerships are too new to have established reputations, so consumers do not know the quality of each dealership's cars. Consumers figure, however, that they have a 50-50 chance of ending up with a high-quality car, no matter which dealership they go to, and are thus willing to pay \$8,500 on average for a car.

Harry's has an idea: It will offer a bumper-to-bumper warranty for all cars it sells. It knows that a warranty lasting Y years will cost \$500Y on average, and it also knows that if Lew's tries to offer the same warranty, it will cost Lew's \$1,000Y on average.

(a) (1 point) Suppose Harry's offers a one-year warranty on all cars it sells. Will this generate a credible signal of quality?

(b) (1 point) What if Harry's offers a two-year warranty? Will this generate a credible signal of quality? What about a three-year warranty?

(c) (2 points) If you were advising Harry's, how long a warranty would you urge it to offer? Explain why.

3. Consider a market for a security whose value is either $v = 24$ or $v = 20$. This market is composed of different traders: 10% of the traders know exactly what v is (informed traders); 80% of the traders believe that

$$v = \begin{cases} 24 & \text{with probability } \frac{1}{2}, \\ 20 & \text{with probability } \frac{1}{2} \end{cases}$$

(these are the uninformed traders); 10% of the traders trade randomly, regardless of what happens in the market (liquidity traders). It is assumed that liquidity traders are equally likely to buy or sell. There is one market maker, with the same beliefs as uninformed traders, who sets bid and ask prices such that his expected profit is zero.

(a) (1 point) Given the above parameters, compute the bid and ask prices.

(b) (1 point) If there were no liquidity traders, what would the bid and ask prices be? Would they depend on the fraction of informed traders?

(c) (1 point) What would the bid and ask prices be if 10% of the traders were informed and the remaining 90% were all liquidity traders? Is the bid-ask spread wider or narrower than in (a)?

(d) (1 point) What would the bid and ask prices be if all traders were liquidity traders?