You did the questions in Workouts chapter 37 for this assignment and you have the answers. Some of these questions in slightly modified form have found their way onto final exams for Econ 393. Here are the questions and their answers.

1. (like 37.6) Each year 1000 risk-neutral citizens in Winnipeg sell their used cars (one per car owner) and buy new cars. All used cars must be sold. Sellers know the true value of each vehicle. Buyers, who are also risk-neutral, know only that the values to each buyer are uniformly distributed between 0 and $4000. This is scenario A. Scenario B is identical except that in B, Rod’s Garage will certify the true value of a car for $400, payable by each car owner who wants her/his car inspected. Describe as precisely as you can who wins and who loses in moving from scenario A to scenario B.

**Answer**

**Scenario A**

If all 1000 used cars must sold the expected car value is \( (0 + 4000)/2 = 2000 \). We have a pooling equilibrium in which every car sells for 2000 dollars.

**Scenario B**

The owner whose car is worth nothing won’t pay 400 dollars to have the car stamped with a zero; his car will be sold in a ‘pool’ of cars with low values. The owner whose car is worth 4000 dollars will be happy to pay Rod 400 dollars to have her car stamped with 4000 as its value; her car will sell in the ‘separating’ market segment where cars sell for their true values. Let \( x \) be the car value that is the border between the pooling component of the market and the separating component of the market. All the cars in the pool will sell for their average value which is \( x/2 \). If the owner of the car worth \( x \) chose to go into the separating part of the market and use Rod’s garage he would net \( x - 400 \) dollars. So the equation for \( x \) is

\[
\frac{x}{2} = x - 400 \text{ or } x = 800.
\]

One-fifth of the 1000 cars, that is, all those cars worth less than 800 dollars, go into the pool and the rest of the cars sell for their true value.
Buyers

Risk neutrality is a strong assumption. The buyers would be indifferent between the options of paying 2000 dollars for the average car as in scenario A or paying 400 dollars for a car in the pool in scenario B or paying the true value for any of the cars marketed in the separating part of the market in scenario B. Buyers are indifferent between scenario A and scenario B.

Rod’s garage

Rod doesn’t exist in A. In B he evaluates $800 = 1000(1 - 800/4000)$ cars for 400 dollars each. So Rod likes scenario B better.

Sellers

The graph at the end of this pdf shows the net gain to sellers in scenario A minus the net gain to sellers in scenario B. The seller whose car is worth 2400 dollars is indifferent between A and B; $(1000)(2400)/4000 = 600$ of the 1000 sellers are better off in A.

2. (like 37.7) Consider a market for used cars. Assume car quality is uniformly distributed on the interval $[0, a]$, $a > 0$. Buyers cannot observe car quality but if they could observe car quality they would be willing to pay $X + b, 0 < b < a/2$ dollars for a car of quality $X$. Furthermore, assume buyers are risk-neutral expected-utility maximizers. Assume the seller of a car of quality $X$ is willing to sell the car for at least $X$ dollars.

(a) Is there an equilibrium in which all used cars sell? Justify your answer.

(b) Describe all the equilibria in this model, or, if no equilibrium exists, explain why this so.

ANSWER

(a) If there were an equilibrium with all cars on the market buyers would be willing to pay $a/2 + b$. Since we have assumed $b < a/2$ buyers are willing pay less than $a$. Given that no seller of a car of quality $X$ is willing to sell it for less than $X$ dollars, not all sellers put their cars on the market. This proves that there cannot be an equilibrium with all cars on the market.

(b) If an equilibrium exists it would have to be a pooling equilibrium where cars with quality less than or equal to $X^* < a$ are on the market and cars with quality greater than $X^*$ are not on the market. In this setting buyers would be willing to pay $X^*/2 + b$ dollars for each car in the pool. And sellers need at least $X^*$ to be willing to put their cars up for sale in this pool. Therefore, for this equilibrium to exist,

$$\frac{X^*}{2} + b = X^* \text{ or } X^* = 2b < a.$$

The only equilibrium is one where cars with quality in the interval $[0, 2b]$ are on the market and higher quality cars are not.
Net gain in A - Net gain in B

-1600

Q: Question 1