

Answers for HW6

1. (a) The price of the house is $200q + 180(1-q) = 180 + 20q$

(b) The price of the house is still $180 + 20q$.

(c) In equilibrium the seller, high or low cost, does not acquire information, and updated belief when observing no report is the same as the prior belief.

(d) There is no incentive for any seller to acquire information in equilibrium. It is efficient, because the information has no social value.

2. (a) To support this equilibrium, we assume an out-of-equilibrium belief of the buyer: when there is no report, the furnace is bad.

After gathering information, the furnace is either good or bad equally likely. With the out-of-equilibrium belief, the seller can collect \$196 on average by disclosure, and only gets \$180 with no disclosure. Therefore there is always disclosure.

If there is no gathering, there is no information to report, and the seller only gets \$180. The value of information is \$16, but the cost of information is either \$4 or \$8. Hence it is optimal for all sellers acquire information.

Note that in equilibrium all sellers acquire and disclose information. Therefore, in equilibrium, there is always a report: it is either good or bad. When there is no report, it is out-of-equilibrium. This is why we say that the belief assumption we make is an out-of-equilibrium belief. We can make this assumption because perfect Bayesian equilibrium does not restrict what kinds of belief you can have out-of-equilibrium.

Hence it is a perfect Bayesian equilibrium for all sellers to acquire information and disclose it (supported by the above out-of-equilibrium belief).

(b) Assume that seller finds a bad furnace. If the buyer believes that such a seller will always disclose, then the buyer's updated belief when there is no disclosure is that it must be the case that there is no information available. Hence with probability 0.5 it is a good furnace. When the seller discloses a bad furnace, he gets \$186; when he does not disclose, he gets \$190. Therefore a seller will not disclose a bad furnace. The belief of the buyer is not consistent with equilibrium behavior. Hence it is not a perfect Bayesian equilibrium.

(c) Consider the other possibility: the seller finds a bad furnace and always hides the information. If the buyer believes that such a seller will always hide the information, then the buyer's updated belief when there is no disclosure is that it is a good furnace only if it is a high cost seller, and there is no acquisition of information. The probability of that is $0.5 \cdot 0.4 = 0.2$. The probability of no report is $1 - 0.5 \cdot 0.6 = 0.7$. Hence conditional on no report, the furnace is good with probability $0.2/0.7 = 2/7$, and is bad with probability $1 - \frac{2}{7} = \frac{5}{7}$. The buyer is willing to pay (no social benefit is available)

$$200 * \frac{2}{7} + 180 * \frac{5}{7} = \frac{1300}{7} = 185.71,$$

when no report is available. If the seller who finds a bad furnace discloses it, he will get \$186 instead. This is better than hiding the information and getting \$185.71. Therefore, the seller finds it optimal to disclose a bad furnace. This is again inconsistent with the buyer belief that the seller always hides a bad furnace. We conclude that there is no equilibrium in which the seller who finds a bad furnace always hides the information.

3. (a) Under regime (2) of mandatory disclosure, acquiring information, the seller gets \$206 with probability 0.5, and \$186 with probability 0.5. On average he gets \$196. If he acquires no information, he gets \$190 (no social value provided). The value of information is \$6.

(b) A high cost seller do not acquire information, but a low cost seller does.

(c) Under regime (2), the equilibrium outcome is an efficient outcome.