Behavioral Economics
Exercise 5 Behavioral Game Theory

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Question 1（a）Every type of seller chooses to disclose her own type $i = L, M, H$, and $p = v_i$.
If the seller disclosed her type, the buyer purchases iff $v_i \geq p$, otherwise purchase iff $\epsilon \geq p$.

When the type is concealed, rational buyer evaluates lemon by its expected value :

$$E(v) = v_L \cdot \hat{q}_L + v_M \cdot \hat{q}_M + (1 - \hat{q}_L - \hat{q}_M) > v_H = 1$$

where $\hat{q}_i$ denotes her belief about each q_i, and buy only if $E(v) \geq p$.
Then, type-H seller raise her profit by disclosing and set $p = 1$, and the buyer revises her belief : If the seller did not disclose her type, then $\hat{q}_H = 0$, and so

$$E(v) = v_L \cdot \hat{q}_L + v_M \cdot \hat{q}_M > v_M$$

Again, there is an incentive for type-M seller to disclose and set $p = v_M$, and finally, the buyer predicts $\hat{q}_L = 1$, and the expected value $E(v) = v_L = \epsilon$, which makes type-L seller to disclose and set $p = \epsilon$.

（b） When the buyer is fully cursed, she predicts the expected value if the private information was hidden is : $\hat{q}_i = q_i$ for each $i \in L, M, H$

$$E(v) = v_L \cdot q_L + v_M \cdot q_M + (1 - q_L - q_M) \equiv E$$

and purchase iff $E(v) > p$.
Note that when the type was disclosed, the buyer purchase iff $v_i > p$.

In Stage 1, then,

- Type-H seller : $v_H = 1 > E$
  She discloses her type and set $p = 1$.
- Type-L seller : $v_L = \epsilon < E$
  She conceal her private information and set $p = E$.
- Type-M seller : $v_M \in (\epsilon, 1)$
  Her strategy is conditional on the value of v_M.
  If $v_M \geq E$, then she disclose her type and set $p = v_M$.
  Otherwise, $v_M < E$, she conceal and set $p = E$.

（c）By the assumption, in this question, χ-cursed buyer's belief is:

$$\begin{cases} \hat{q}_L = 1 & \text{if "rational"} \\ \hat{q}_i = q_i & \text{if "cursed"} \end{cases}$$

Note that if $p > v_L = \epsilon$, then "rational" buyer revises her belief same as "cursed."
Suppose the seller is type-L. Then, there are some possible strategies as follows :

- disclose, and set $p = \epsilon$
  The seller's expected payoff is:

$$(1-\chi)\epsilon + \chi\epsilon = \epsilon$$

- conceal, and $p = \epsilon$

$$(1-\chi)\epsilon + \chi\epsilon = \epsilon$$

- conceal, and $p = E = v_L \cdot q_L + v_M \cdot q_M + (1 - q_L - q_M)$
  The "rational" buyer behave as if she is "cursed," since $p = E$ is off-path. Then ,the seller's expected payoff is :

$$(1-\chi)E + \chi E = E$$

  which yields the best response for the seller. This strategy, however, cannot be a perfect Bayesian Nash equilibrium, since the buyer's bilief is not consistent.
  Thus, there is no equilibrium strategies.

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