

Exercise 1

Assumptions

- ▶ A durable monopoly, M, with a production cost c .
- ▶ Two consumers who live two periods $t = \{1; 2\}$. Two consumers who buy either 0 or 1 unit and C1 has a valuation 1 and C2 $c < v_I < 1$.
- ▶ δ is the discount factor.
- ▶ M sets p_1 in $t = 1$ and p_2 in $t = 2$.

Questions

1. Determine the price equilibrium p and profit Π if M only sells in $t = 1$.
2. Determine the two period equilibrium (p_1, p_2) and profit $\Pi_{1,2}$ of M.
3. Compare the two profits when $c < v_I < \frac{1}{2}(1 + \frac{c}{1+\delta})$. What happens if $v_I > \frac{1}{2}(1 + c)$?

Solution-Exercise 1

1. If M sells only to C1, $p = 1 + \delta$ and its profit is $\Pi = 1 + \delta - c$.
If M sells to C1 and C2 $p = v_I(1 + \delta)$ and its profit is $\Pi = 2(v_I(1 + \delta) - c)$. The first option is chosen if $c < v_I < \frac{1}{2}(1 + \frac{c}{1+\delta})$.
2. M wishes to serve the C1 in $t = 1$ and C2 in $t = 2$. To make sure C1 buys in $t = 1$: $1 + \delta - p_1 > \delta(1 - p_2) \Rightarrow$

$$p_1 < 1 + \delta p_2 \quad (1)$$

Now, p_2 depends on the behavior of C1 in $t = 1$. If C1 has not purchased the good in $t = 1$,

- If $v_I < \frac{1}{2}(1 + c)$, M sets $p_2 = 1$. Therefore, given (1) M can set $p_1 = 1 + \delta$ and sells to C1 and $p_2 = v_I$ and obtains $\Pi_{1,2} = 1 + \delta - c + \delta(v_I - c)$.
 - If $v_I > \frac{1}{2}(1 + c)$, M sets $p_2 = v_I$. Thus, given (1), $p_1 = 1 + \delta v_I$ and $p_2 = v_I$ and obtains $\Pi_{1,2} = 1 + \delta v_I - c + \delta(v_I - c)$.
3. If $c < v_I < \frac{1}{2}(1 + \frac{c}{1+\delta})$,
 $\Pi = 1 + \delta - c < \Pi_{1,2} = 1 + \delta - c + \delta(v_I - c)$. Intertemporal discrimination is profitable! The reverse is true when $v_I > \frac{1}{2}(1 + c)$!