

Exercise 2: RPM to eliminate free-riding

Assumptions

- ▶ P offers a good produced at a unit cost c to two competing retailers $i = \{1, 2\}$ who compete à la Bertrand.
- ▶ Demand for the good is linear $D(p, s) = v + s - p$.
- ▶ Total effort service is the sum of the retailer's effort $s_1 + s_2 = s$
- ▶ Cost of effort is $c(s_i) = s_i^2$

Questions

1. What are the choices (p^M, s_i^M) of a fully vertically integrated structure?
2. P and the two retailers are separated. What happens if P offers a simple uniform unit wholesale price contract w ?
3. P offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.

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1. The integrated structure maximizes the profit

$$\text{Max}_{p, s_1, s_2} (p - c)(v + s_1 + s_2 - p) - s_1^2 - s_2^2$$

with respect to p , s_1 and s_2 . We obtain $p^M = v$, $s_1^M = s_2^M = \frac{v-c}{2}$

2. Bertrand competition $p = w$, $s_1 = s_2 = 0$ and, so $s = 0$ and $w = \frac{v+c}{2}$. A shop refrains from providing services that are not appropriate. This leads to a suboptimal level of effort and a suboptimal global demand.
3. RPM + two-part tariff can reach the first best! The retailer 1 chooses its effort level s_1 to maximize:

$$\text{Max}_{s_1} (p - w) \frac{(v + s_1 + s_2)}{2} - s_1^2$$

We obtain $s_i^* = \frac{p-w}{4}$. P controls everything and therefore chooses $p = p^M$ and sets $(p^M - w)$ such that $s_i^* = s_i^M$ which implies $w^* = -v + 2c < c$ and $F_i = (p^M - w^*) \frac{(v+s_1^M+s_2^M)}{2} - s_i^M$.

- ▶ $w < c$, $p = p^M$ and F to get back the industry profit
- ▶ $s_1 = s_2 = s^M$.