Competition Policy - Spring 2005

Vertical Restraints

Antonio Cabrales & Massimo Motta

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Summary

- Introduction ⇒
- Types of vertical restraints ⇒
- Intra-brand competition: The problem of double marginalization ⇒ ⇒
- Intra-brand competition: Horizontal externality ⇒ ⇒
- Other reasons for vertical restraints ⇒
- The commitment problem ⇒ ⇒

Vertical restraints (or agreements): clauses to control for the externalities arising between firms operating at successive stages of an industry.

Plan

1. Different types of vertical restraints.

2. Intra-brand competition:

   (a) Double marginalization.

   (b) Horizontal externalities.

3. Inter-brand competition.

4. Welfare effects of vertical restraints.
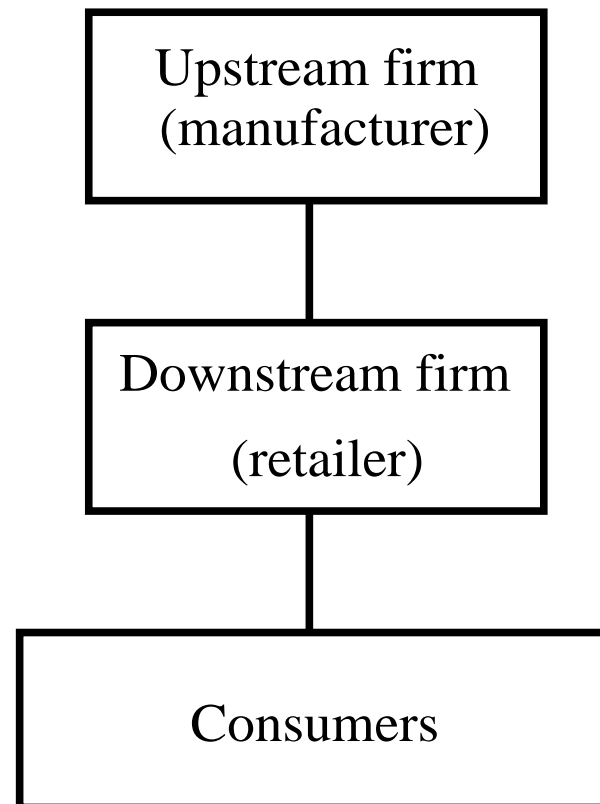
5. Exclusive dealing and vertical foreclosure.

Different vertical restraints are used (according to observability, absence of arbitrage etc.):

1. Non-linear pricing:

    (a) Franchise fee (FF) contracts.

    (b) Quantity discounts.

2. Resale price maintenance (RPM).

3. Quantity fixing.

4. Exclusivity clauses:

    (a) Exclusive territories (ET).

    (b) Exclusive dealing (ED).

    (c) Selective distribution.

- First proposed by Spengler (1950) (but even Cournot 1838 had something like this).

- Consumer demand $q = a - p$, marginal cost of *upstream firm* c, $c < a$.

- Marginal cost of *downstream firm* w, the wholesale price.

Linear pricing

- *Upstream firm* sets w, and after observing it, *downstream firm* sets p.

- Solution to last stage

$$\max_{p} \Pi_D = (p - w)(a - p)$$

Thus:

$$p = \frac{a + w}{2}; q = \frac{a - w}{2}; \Pi_D = \frac{(a - w)^2}{4}$$

- Anticipating this, solution to first stage:

$$\max_{w} \Pi_U = (w - c)\frac{a - w}{2}$$

Thus:

$$w = \frac{a + c}{2}$$

- This implies that overall:

$$p^{sep} = \frac{3a + c}{4}; \Pi_U^{sep} = \frac{(a - c)^2}{8}; \Pi_D^{sep} = \frac{(a - c)^2}{16}$$

$$\Pi_U^{sep} + \Pi_D^{sep} \equiv PS^{sep} = \frac{3(a - c)^2}{16}$$

Merger - Vertical Integration

$$\max_p \Pi_{VI} = (p - c)(a - p)$$

$$p^{VI} = \frac{a + c}{2}; q^{VI} = \frac{a - c}{2}; PS^{VI} = \frac{(a - c)^2}{4}$$

Comparison

- $p^{sep} > p^{VI}$ (since $\frac{3a+c}{4} > \frac{a+c}{2}$, when $a > c$). So $CS^{sep} < CS^{VI}$.

- $PS^{sep} < PS^{VI}$ (since $\frac{3(a-c)^2}{16} < \frac{(a-c)^2}{4}$).

- Total welfare increases with VI.

Vertical restraints

If a vertical merger is not feasible (or very *transaction*-costly).

- *Resale price maintenance (RPM):*

  - Imposing $p = p^{VI} = \frac{a+c}{2}$ maximizes PS.

  - Then the firms bargain over w to distribute surplus PS (with $w \in [c, p^{VI}]$).

  - Identical outcome is achieved with forcing $p \leq \overline{p} = p^{VI}$ (and again w determines surplus PS division).

- *Quantity fixing (QF)* (mirror image)*:*

  - Imposing $q = q^{VI} = \frac{a-c}{2}$ maximizes PS.

  - Then the firms bargain over w to distribute surplus PS (with $w \in [c, p^{VI}]$).

  - Identical outcome is achieved with forcing $q \leq \overline{q} = q^{VI}$ (w determines surplus PS division).

- *Franchise fee (FF):*

  - Nonlinear pricing. Downstream firm is charged: $F + wq$, with $w = c$.

  - Then downstream maximizes:
  $$\max_p \Pi_D^{ff} = (p - c)(a - p) - F$$

  - So that
  $$p^{ff} = \frac{a + c}{2}; q^{ff} = \frac{a - c}{2}$$
  and
  $$\Pi_D^{FF} = \frac{(a - c)^2}{4} - F; \Pi_U^{ff} = F$$
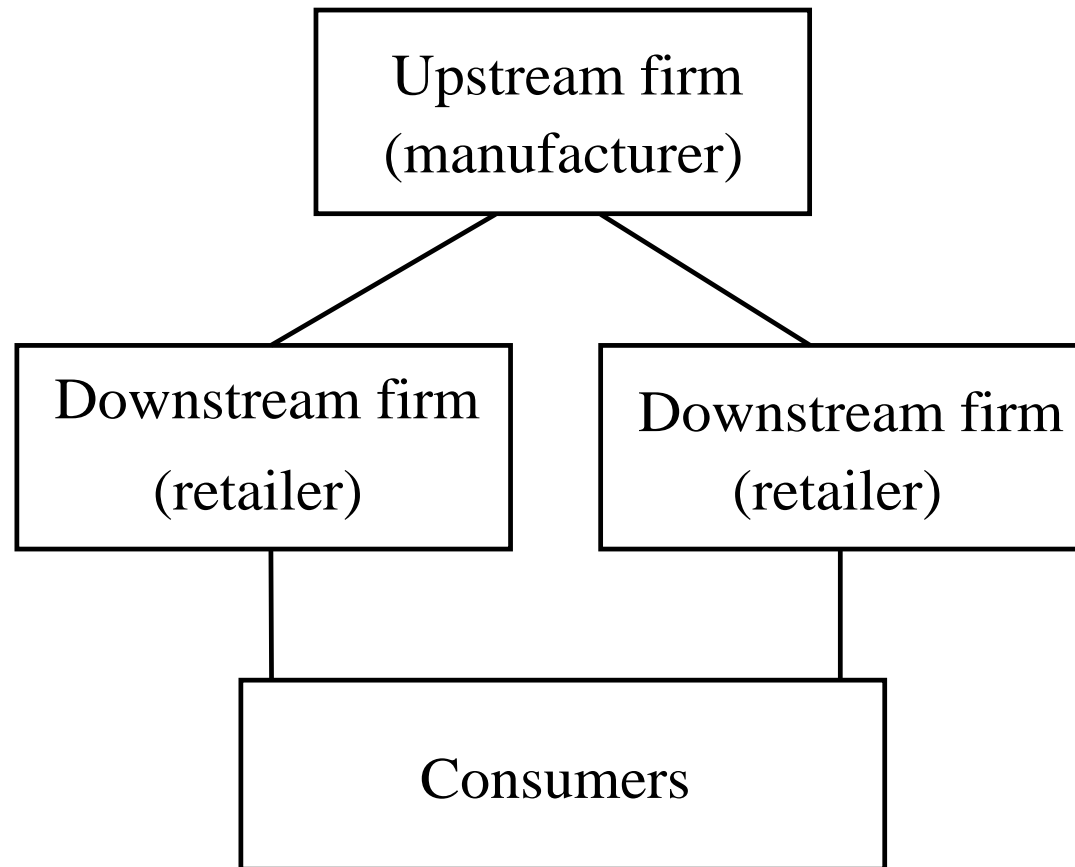
  - Then bargaining is done over F.

Risk aversion (Rey-Tirole - AER 1986):

- Risk neutral manufacturer (upstream), risk averse retailer (downstream).

- Under demand uncertainty: $\pi_{RPM}^U > \pi_{FF}^U$ and $SW_{RPM} > SW_{FF}$.

- Under cost uncertainty: $\pi_{FF}^U > \pi_{RPM}^U$ and $SW_{FF} > SW_{RPM}$.

- First proposed by Telser (1960):.

- Good shopkeepers/advertising help to sell the brand, but not at that store.

- Free riding by other stores.

- Model

  - Perceived quality: $u = \bar{u} + e$, where $e = e_1 + e_2$.

  - Costs: $C(q, e_i) = wq + \mu e_i^2/2$, with $\mu > 1$

  - Demand: $q = (v + e) - p$ (competition in prices avoids double marginalization).

Separation

- Equilibrium (downstream):

$$p_1 = p_2 = w; \text{ and } e_1 = e_2 = 0.$$

- Equilibrium (upstream): Anticipating $p = w$

$$\max_w \Pi_U^{sep} = (w - c)(v - w)$$

Thus $w = \frac{w+c}{2}$.

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$$PS^{sep} = \Pi_U^{sep} = \frac{(v - c)^2}{4}; CS^{sep} = \frac{(v - c)^2}{8}; W^{sep} = \frac{3(v - c)^2}{8}$$

Vertical integration

- Maximization:

$$\max_{p,e_1,e_2} \Pi^{VI} = (p-c)(v+e_1+e_2-p) - \mu\frac{e_1^2}{2} - \mu\frac{e_2^2}{2}$$

- Solving:

$$\begin{cases} \frac{\partial \Pi^{VI}}{\partial e_i} = p - c - \mu e_i = 0 \\ \frac{\partial \Pi^{VI}}{\partial p} = v + e_1 + e_2 - 2p + c = 0 \end{cases}$$

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- Equilibrium:

$$e_1 = e_2 = e^{VI} = \frac{v-c}{2(\mu-1)} ; p^{VI} = \frac{\mu(v+c)-2c}{2(\mu-1)} ; q^{VI} = \frac{\mu(v-c)}{4(\mu-1)}$$

$$PS^{VI} = \Pi^{VI} = \frac{\mu(v-c)^2}{4(\mu-1)} ; CS^{VI} = \frac{\mu^2(v-c)^2}{8(\mu-1)^2} ; W^{VI} = \frac{\mu(3\mu-2)(v-c)^2}{8(\mu-1)^2}$$

Welfare comparison

$$W^{sep} < W^{VI} \text{ since } \frac{3(v-c)^2}{8} < \frac{\mu(3\mu-2)(v-c)^2}{8(\mu-1)^2}$$

Vertical restraints. If a vertical merger is not feasible (or very *transaction*-costly).

- *Exclusive territories and franchise fee:*

  - Non-linear contract $T = wq + F$, with $w = c$.

  - Maximization (if perceived level of quality is still $e = e_1 + e_2$):

  $$\max_{p, e_i} \Pi^{ET} = (p_i - c)\frac{(v + e_1 + e_2 - p_i)}{2} - \mu\frac{e_i^2}{2} - F$$

  - Solving: $\begin{cases} \frac{\partial \Pi^{ET}}{\partial e_i} = \frac{p_i - c}{2} - \mu e_i = 0 \\ \frac{\partial \Pi^{ET}}{\partial p_i} = v + e_1 + e_2 - 2p_i + c = 0 \end{cases}$

  - For any e_i price p_i is as in first best. Effort is *not* **first best**, but it is *closer*.

  - Retailer maximization if perceived quality is $e = e_i$:

  $$\max_{p, e_i} \Pi^{ET} = (p_i - c)\frac{(v + e_i - p_i)}{2} - \mu\frac{e_i^2}{2} - F$$

  - Solving: $\begin{cases} \frac{\partial \Pi^{ET}}{\partial e_i} = \frac{p_i - c}{2} - \mu e_i = 0 \\ \frac{\partial \Pi^{ET}}{\partial p_i} = v + e_i - 2p_i + c = 0 \end{cases}$

  - Still not **first best**, as fixed/convex cost of quality spread over smaller market.

- *Resale price maintenance and franchise fee:*

  - Forcing price to $p = p^{VI}$, and non-linear contract, (w, F).

  - Maximization (if perceived level of quality is still $e = e_1 + e_2$):

  $$\max_{e_i} \Pi^{RPM} = (p^{VI} - w)\frac{(v + e_1 + e_2 - p^{VI})}{2} - \mu\frac{e_i^2}{2} - F.$$

  - Solving: $\frac{\partial \Pi^{ET}}{\partial e_i} = \frac{p^{VI} - w}{2} - \mu e_i = 0.$ $e_i = \frac{p^{VI} - w}{2\mu} = e^{VI} = \frac{v - c}{2(\mu - 1)}.$

  - Thus, we must have $w < c$ as otherwise we cannot have e^{VI} (each retailer takes into account its effect into its own profit):

  $$w^{RPM} = \frac{3\mu c - 2c - \mu v}{2(\mu - 1)} < c; F = \frac{\Pi^{VI}}{2 + (c - w)q^{VI}}.$$

- *Resale price maintenance and quantity forcing:*

  - Forcing price to $p = p^{VI}$, and $q \geq q^{VI}$.

  - Maximization (if perceived level of quality is still $e = e_1 + e_2$):

$$\max_{e_i} \Pi^{QF} = (p^{VI} - w)\frac{(v + e_1 + e_2 - p^{VI})}{2} - \mu\frac{e_i^2}{2} - F$$

$$\text{subject to} \quad : \quad \frac{(v + e_1 + e_2 - p^{VI})}{2} \geq q^{VI}$$

  - Solving is simply choosing:

$$e_i = \frac{2q^{VI} + p^{VI} - v}{2} = e^{VI}.$$

  - This contract already achieves efficiency. Rent allocation with w (zero profits under no bargaining power for retailer):

$$(p^{VI} - \widehat{w})\frac{(v + 2e^{VI} - p^{VI})}{2} - \mu\frac{(e^{VI})^2}{2} = 0$$

  - Thus:

$$\widehat{w} = \frac{v + c}{2}.$$

Vertical integration can reduce welfare

- Example with two types of consumers, different willingness to pay for quality, no price discrimination.

- Vertical integration: oversupply of quality, *distortion* used to extract some rents from high quality types.

- Vertical integration between *competing integrated firms* does not harm welfare.

More general treatment:

1. Downstream firms compete in quantities: double marginalization $\to$ Prices too high.

2. Free-riding in services $\to$ Quality too low.

3. Free-riding in prices $\to$ Prices too low (from point of view of competitors).

4. Effect number 1 is stronger than number 3.

Endogenous number of retailers

- Under vertical integration fewer outlets than under free entry (since free entrants do not take into account externality on others).

- Welfare may go up or down:

  - Socially excessive entry is possible under free entry.

  - Socially too high prices (double marginalization).

  - Socially reduced variability under vertical integration.

- Quality certification:

  - A good is "better" for being supplied in a certain retailer.

  - This certification is costly.

  - It would imply efficiency for *RPM* or *ET*.

- Exclusive contracts (exclusive dealing *ED*): it may be necessary if more than one producer benefits from investments of retailer.

- Long-term contracts with *ET* or *ED* may be necessary for avoing hold-up effect for specific investment.

- An upstream firm has negotiated an optimal wholesale price w with retailers.

- It can then renegotiate to give one of them an advantage and get extra rents.

- This limits market power and is generally *good for welfare.*

- Problem *does not* exist with *monopolist retailer.*
  - Competition for consumers thus better than for retailers.

- Anticipating commitment problem: vertical restraints and vertical mergers.

Vertical mergers

- By merging with one retailer - less incentive to renege.

- May lead to only one retailer or several if there are inferior substitutes.

Vertical restraints

- Exclusive territories:

  - Usual problem with monopoly pricing.

  - With competing upstream firm - worse than under vertical merger.

- Resale price maintenance: in Europe still legally enforceable for books and pharmaceuticals.

- Most-favored nation and Anti-discrimination laws:

  - In Europe enforceable - "transparent pricing."

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