

Management Science II / Industrial Organization

Özlem Bedre-Defolie

European School of Management and Technology

June 8, 2017

Topics

- Vertical Restraints and Coordination
 - Intra-brand Coordination
 - Inter-brand Coordination
- Vertical Foreclosure
- Horizontal Foreclosure
- Entry Barriers
- Competing for Exclusivity
- Two-sided markets (Platform markets)

Evaluation

- Class participation (10%): Ready to discuss required readings
- Referee Report (50%): A list of papers will be provided
- Presentation (40%): 15 min for each student during the last two sessions
 - Critical assesment of the paper chosen for the referee report OR
 - A research idea that you plan to develop in your thesis

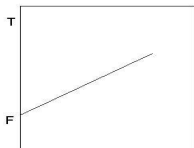
Özlem Bedre-Defolie, ESMT

- BA in Economics and BS in Mathematics, Bogazici University, Istanbul
- PhD in Economics, Toulouse School of Economics
- Post-Doctoral Research Fellow, Ecole Polytechnique, Paris, 2009-2010
- Associate Professor since April 2017, Assistant Professor 2010-2017
- Research interests: Applied Micro Economic Theory, Industrial Organization,
 - Economics of platforms
 - Multiproduct firm pricing and variety decisions
 - Longterm contracts and entry
 - Estimation of demands for debit/credit cards
 - Contracts between vertically related firms and bargaining theory

Vertical Restraints

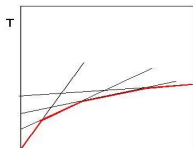
1. Payment schemes

- Non-linear tariffs:



Two-part tariff q

necessary cond:
observe the identity
of the retailer who
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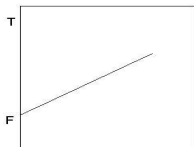
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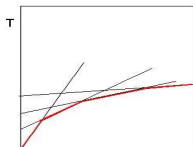
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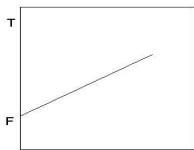
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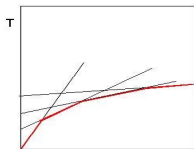
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- Royalties depend on actual quantity sold by each retailer.
 - They may depend on the retailer's revenue or on the sales of other goods by the retailers.

Vertical Restraints

2. Limiting the parties' rights

- Retail Price Maintenance (RPM): The retail price is set by the supplier. Other forms are
 - max retail price (price ceiling)
 - min retail price (price floor)
 - non-binding recommended retail price
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- If $D(p)$ is known and depends only on p :
 - quantity forcing \simeq price ceiling
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 - Exclusive territories: The manufacturer commits itself not to allow any other distributor to serve the customer in this territory.

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- other vertical restraints are under the rule of reason.
→ pro- & anti-competitive effects should be evaluated case by case.

Anti-trust policy for vertical restraints- US

Major Cases

- Toys 'R' Us (1996): imposed on its main suppliers that exclusive or clearance products had to be offered first to Toys 'R' Us. Even if Toys 'R' Us' market share was only 20%, its boycott had been found sufficiently effective to force manufactures stop selling their products to warehouse clubs.
- Microsoft (2001): The plaintiffs alleged that Microsoft abused monopoly power in the operating system market by bundling its web browser (Internet Explorer) software with Microsoft Windows operating system, since this restricted the market for competing web browsers (Netscape).

Anti-trust policy for vertical restraints- EU

Articles 101 & 102 of “Competition Law,” European Court of Justice is the enforcing body. European Competition Commission’s aim is to achieve a single market.

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- **102:** Abuse of dominant position

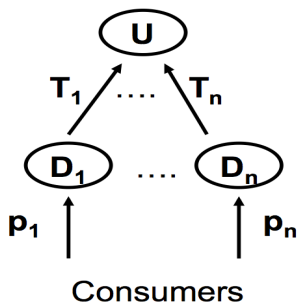
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Major Cases

- Michelin II (2001): The EC found that Michelin abused its dominant position by imposing various types of rebates, including quantity discounts, service bonus, progress bonus and special conditions for "Club des Amis Michelin," on its dealers. Michelin was imposed a fine of 19.76 million Euros. Michelin appealed the decision, but in 2003 the court upheld the EC's decision in its entirety. For the first time, the use of quantity discounts was rejected.
- Microsoft (2004): The EC found Microsoft guilty of abusing its dominant position via tying Windows operating system to Windows Media Player (and punished by a fine of 497 million Euros). The argument was that Microsoft leveraged its dominant position from the operating system market to the complementary segment where it faces competition.

Vertical Coordination

Consider the relationship between an upstream firm U and n downstream firms, D_i :



Each party has two objectives:

- Max the value generated from their relationship(s).
- Max their share over the value generated from their relationship(s).
- **Tools:** Contracts: (T_1, \dots, T_n) and final prices: (p_1, \dots, p_n) .

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→ "Vertical restraints" can be used as means to coordinate & restore the efficiency of the vertical structure.

PART I: Intra-Brand Coordination

Topics

- Double marginalization problem
- Retail services and vertical coordination

Double marginalization

- **Cournot (1838)**: When the goods are complements, the prices are lower with a monopoly than a duopoly.

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 - Two goods: $p_1, p_2, D_1(p_1, p_2), \partial D_1/\partial p_2 < 0, \partial D_2/\partial p_1 < 0$

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 - Monopoly:

$$\max_{p_1, p_2} \Pi^M = (p_1 - c_1)D_1(p_1, p_2) + (p_2 - c_2)D_2(p_1, p_2)$$

$$FOC_{p_1}^M : D_1 + (p_1 - c_1)\partial D_1/\partial p_1 + (p_2 - c_2)\partial D_2/\partial p_1 = 0$$

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- The simultaneous solution to $FOC_{p_1}^M$ & $FOC_{p_2}^M$ gives the equilibrium prices: (p_1^M, p_2^M)

Double marginalization

- Duopoly: Firm 1's problem is

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Double marginalization

Compare (p_1^D, p_2^D) vs (p_1^M, p_2^M) :

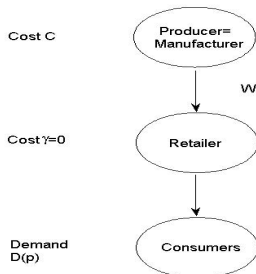
$$\left. \frac{\partial \Pi^M}{\partial p_1} \right|_{p_1=p_1^D, p_2=p_2^D} = (p_2^D - c_2) \partial D_2(p_1^D, p_2^D) / \partial p_1 < 0$$

$$\Rightarrow p_1^M < p_1^D$$

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Double marginalization in the vertical Industry



Benchmark:

$$\Pi_M + \Pi_R = (p - c)D(p)$$

$$p^M(c) = \operatorname{argmax}_p (p - c)D(p)$$

$$p^M(c) : D(p^M) + (p^M - c)D'(p^M) = 0$$

$$\Rightarrow \frac{p^M - c}{p^M} = \frac{1}{\varepsilon(p^M)}$$

$$\varepsilon(p^M) \equiv -\frac{D'(p^M)p^M}{D(p^M)}$$

Competition

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- Claim: if $w > c$, $p^M(w) > p^M(c)$.

Proof: by revealed preference argument



$$(p^M(w) - w) \underbrace{D(p^M(w))}_{q^M(w)} \geq (p^M(c) - w)q^M(c) \quad (1)$$

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- (1)+(2) yields:

$$\underbrace{(c - w)}_{-} \quad \underbrace{(q^M(w) - q^M(c))}_{\Rightarrow \text{we must have } q^M(w) \leq q^M(c)} \geq 0$$

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- $$q^M(w) \leq q^M(c) \Leftrightarrow p^M(w) \geq p^M(c)$$

Stage 1: M sets w by

$$\max_w (w - c)D(p^M(w))$$

$$\Rightarrow w > c$$

$$\therefore p^M(w) \geq p^M(c)$$

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- $\Rightarrow w = c, F = \Pi^M(c)$

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- \cong price ceiling: $p \leq p^M(c)$
- \cong min quota: $q \geq q^M(c) = D(p^M(c))$
- Perfect competition between retailers (intra-brand competition): M sets $w = p^M(w)$

Double marginalization problem and vertical restraints

Conclusions:

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- Different types of vertical restraints (RPM, quotas, non-linear tariff are substitutes for a better efficiency)
- Remark: This equivalence vanishes when market conditions like demand and/ or distribution costs are uncertain and the retailer is risk averse.

Vertical restraints and uncertainty: Rey and Tirole (1986)

- **Benchmark** One M offers the same two-part tariff (2pt) contract to differentiated Rs. The common uncertainty (on demand or retail cost) is not observed by M, but observed by the Rs after supply contracts are signed. The Rs are risk averse.

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 - The upstream margin is set above zero to provide some insurance to risk averse retailers.

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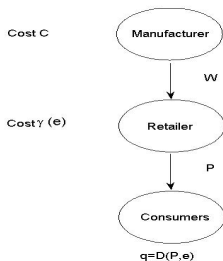
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 - ETs allow Rs to respond to cost uncertainty by adopting their price, but cannot avoid substantial profit fluctuations.
 - Retail competition has good risk insurance properties.
 - RPM transfers all risk to the retailers, since the retailers' price is fixed at p^{RPM} and so does not react to the cost uncertainty.

Retail Services and Vertical Coordination



Benchmark:

$$\max_{p,e}(\Pi_M + \Pi_R) \sim \max_{p,e}(p - c - \gamma(e))D(p, e)$$

2 "targets":

$$p^M(c) : \frac{p - c - \gamma(e)}{p} = \frac{1}{\varepsilon(p, e)}$$

$$e^M(c) : (p - c - \gamma(e)) \frac{\partial D(p, e)}{\partial e} \\ = \gamma'(e) D(p, e)$$

Competition game & linear prices

Setup:

- 1 M sets w
- 2 R sets p & e

Assumption: $\partial_e D > 0$, $\gamma'(e) > 0$

Solution:

2. Given w , R sets p and e by $\max_{p,e} [p - w - \gamma(e)]D(p, e)$

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 - Therefore $p^M(w) > p^M(c)$ and $e^M(w) < e^M(c)$ [Double-marginalization]

Vertical Coordination Failure

- Main reason: When R chooses p & e , it does not take into account the effects of p & e on the manufacturer's profit, $(w - c)D(p, e)$. Since M has one tool (w) to control two targets that affect the joint profit (p (or q) & e) as well as the allocation of this profit, it cannot induce the vertically integrated levels for both targets.

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 - 2 RPM (or price ceiling) alone is not sufficient to control the efficiency level. But RPM together with a min. level of retail service requirement would restore the efficiency. M could then use w to share the profits.

Over-provision of Retail Services

Spence (1975): Suppose that the firms are vertically integrated. Compare the privately optimal price ($p^M(c)$) and effort ($e^M(c)$) with the socially optimal price ($p^S(c)$) and effort ($e^S(c)$).

$$p^S(c) \ \& \ e^S(c) : \max_{p,e} \left[\int_p^\infty D(x, e) dx + [p - (c + \gamma(e))] D(p, e) \right]$$

$$\begin{aligned} FOC_p : \quad & -D(p, e) + (p - c - \gamma(e)) \partial_p D(p, e) + D(p, e) = 0 \\ \Rightarrow \quad & p = c + \gamma(e) \end{aligned}$$

$$FOC_e : \quad \int_p^\infty \partial_e D(x, e) dx + (p - c - \gamma(e)) \partial_e D - \gamma' D(p, e) = 0$$

Over-provision of Retail Services

Conclusion

$p^S(c)$ & $e^S(c)$ are different from $p^M(c)$ & $e^M(c)$ since the vertically integrated firms care about the marginal consumer and neglect the effects of p & e on the infra-marginal consumers, whereas the social planner takes into account the surplus of the infra-marginal consumers.

Can Intra-brand Competition Solve the Problem?

- Intra-brand competition induces R to choose the optimal efficiency level (compatible with non-negative profit) $\Rightarrow R$ cares about the average consumer.

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- However, e^M is optimal by taking care of the marginal consumer.
- Conclusion: Intra-brand competition cannot ensure that the privately optimal contracts induce the socially optimal prices and effort level. It is in general ambiguous whether privately optimal outcome differs from the socially optimal outcome [Caillaud & Rey (1987), Comanor(1985)].

Solutions for vertical coordination when there is intra-brand competition

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- (\bar{p}, \underline{e}) ; (\bar{p}, \underline{q}) , $(\underline{e}, \underline{q})$ would also work.
- Two-part tariff + Exclusive territories: Exclusive territories remove intra-brand competition. Two-part tariff $T(q) = cq + f$ makes R the residual claimant of all industry profits.

Retail Services and Vertical Coordination

No general conclusion

- If there is free-riding, vertical integration will generate higher effort.

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No general conclusion

- If there is free-riding, vertical integration will generate higher effort.
- If there is free-riding, exclusive territories enable the retailers to internalize the benefits of their effort on service provision (Mathewson and Winter, 1994)

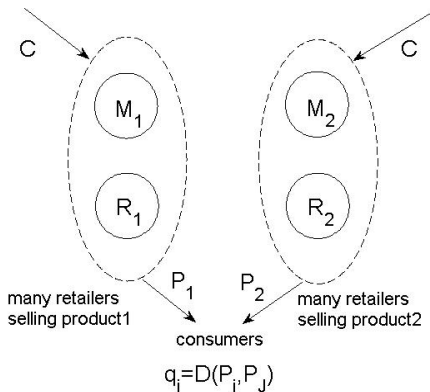
PART II: Vertical Restraints & Inter-brand Coordination

Topics:

- Competition dampening
- Collusion

Competition Dampening

Rey and Stiglitz (1988, 1995):



Benchmark

Many retailers compete within each (vertical) chain (Perfect intra-brand competition)

Competition game

- 1) M_1 and M_2 set w_1 and w_2
- 2) R_1 and R_2 set p_1 and p_2

Solution

- 2) Perfect retail competition $\Rightarrow p_i = w_i$
- 1) M_1 's problem is

$$\begin{aligned} & \max_{w_1} (w_1 - c)D(w_1, w_2^e) \\ \Leftrightarrow & \max_{p_1} (p_1 - c)D(p_1, p_2^e) \Rightarrow \frac{p_1^e - c}{p_1^e} = \frac{1}{\varepsilon_1(p_1^e, p_2^e)} \end{aligned}$$

Everything is as if manufacturers compete against each other directly.

Suppose M_1 uses ET with a franchise fee, F

- Stage 2: R_2 sets $p_2 = w_2$

$$R_1's \text{ problem: } \max_{p_1} (p_1 - w_1) D(p_1, p_2^e)$$

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- In equilibrium $p_2^e = w_2$ and $p_1^e = \hat{p}_1(w_1, w_2)$
- So p_1^e is increasing in w_2 (by strategic complementarity).

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$$\begin{aligned} & \max_{w_1} (\hat{p}_1(w_1, w_2^e) - c) \cdot D(\hat{p}_1(w_1, w_2^e), w_2^e) \\ & \Rightarrow \max_{p_1} (p_1 - c)D(p_1, p_2^e) \end{aligned}$$

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$$\begin{aligned} M_2 : & \max_{w_2} (w_2 - c)D(w_2, \hat{p}_1(w_1, w_2)) \\ & \max_{p_2} (p_2 - c)D(p_2, \hat{p}_1(w_1, p_2)) \end{aligned}$$

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- We have $\varepsilon_{22}^{ET} = \varepsilon_{22} - \varepsilon_{21}\lambda_{12}$
- Conclusion: The perceived demand elasticity of product 2 by M2 is smaller when M1 assigns ET (and F) than the case without them. Hence, assigning ET with F increases the final prices by dampening inter-brand competition together with intra-brand competition.

Exclusive territories dampen inter-brand competition

IDEA: By assigning ET , M_1 can pre-commit not to compete fiercely against M_2 and thereby lower M_2 's perceived elasticity of demand which in turn leads to higher wholesale prices and so higher retail prices than the case without ET .

Remarks:

- 1 If prices are strategic substitutes, delegation gives each manufacturer lower profits than a vertically integrated structure, but in the prisoner's dilemma equilibrium both manufacturers choose to delegate their sales to independent retailers. (Motta, 2004 pp. 356 - 358).
- 2 Two-part tariffs can also be used strategically to increase retail price by delegation (Bonanno and Vickers, 1988, JIE).
BUT rivals can observe *ET* arrangements more easily than the type of contract signed by one producer with its retailers.
- 3 RPM would not work, as it delegates price decision to manufacturers.

Collusion

- Vertical price restraints can reduce inter-brand competition by facilitating cartelization (Business Electronics Case)
- Mathewson and Winter (1998, RIO): When retailing costs vary over time, it is difficult for each cartel member to identify whether another member deviates if wholesale prices are not easily observable. RPM can then help them to stabilize cartel by eliminating retail price variation.

Collusion-Ctd

This argument is formalized by Jullien and Rey (2007):

- RPM makes price cuts easier to detect and so facilitates collusion. The inefficiency costs of RPM: price rigidity (retail price cannot respond to changes in demand conditions or retailing costs.).

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- When there is retail cost uncertainty, equilibrium prices are both higher (on average) and more rigid when firms use RPM.
- When there is demand uncertainty, RPM can only reduce welfare when goods are sufficiently differentiated.