VERTICAL RESTRAINTS
Advanced Industrial Organization 1

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Outline

1. Introduction
2. Vertical Coordination
3. Inter-brand Competition
4. Exclusivity and Foreclosure
5. Conclusions
Tariffs

Non-linear tariffs

- Two-part tariffs \( T(q) = F + wq \)
- Quantity rebates

Royalties

Final cost of a good depends not only on the quantity bought, but also on:

- quantity actually sold;
- possibly on the turnover (maybe including that realized on the sale of other goods).
Limiting the parties’ rights

Resale Price Maintenance (RPM) and quotas
- Final price chosen by the producer
  - Variants: Price floor, price ceiling, recommended retail price, ...
- Quantity sold fixed by a manufacturer
  - Variants: minimal quantity, quotas (rationing).

Tie-in sales
- Fixed proportions (bundling)
- Full-line Forcing

Exclusivity Clauses
- Exclusive territories
- Exclusive or selective distribution
U.S. Competition Law

From the Sherman Act (1890) to Bush Sr.

- **Sherman Act (1890)**
  - Section 1: Restriction to competition
  - Section 2: Abuse of dominant position

- **Dr. Miles** (1911), resale price maintenance becomes *per se* illegal.

- Otherwise case-by-case analysis (*Standard Oil* (1911), *Colgate* (1919))

- **White Motors** (1963): “the legality of territorial and customer limitations should be determined only after a trial.”

- **Schwinn** (1967): all types of vertical restraints become *per se* illegal.

- Softening and back to case-by-case after *GTE Sylvania* (1977)

- Reagan and Bush Sr.: “laissez-faire” (Chicago School)
U.S. Competition Law

Recent Evolution

- More active enforcement
- "Rule of reason" (case-by-case analysis)
- Robert Pitofsky (FTC Chairman, 1996):
  "The Commission of the 1990s has tried to strike a middle ground between what many people believe was an excessively active enforcement in the 1960s and the minimalist enforcement of the 1980s. (...) The Commission investigates and is prepared to enforce the law against RPM agreements, some carefully selected non-price vertical restrictions (...)."
- Recent Cases: Toys R Us, Microsoft, LePage v. 3M, Orbitz, ...
European Competition Law

Multiple objectives

- More recent legal framework (Treaty of Rome (1957), implementation rules (1962, recently revised))
- Two objectives
  - Promote competition
  - Common Market
- Very strict against practices preventing or restricting parallel imports (Peugeot (2005), Nintendo (2003), Volkswagen (2001), Opel (2001), ...)
- Very formal and bureaucratic approach until the recent reforms
  - New rules towards agreements between firms (art.81) came into force in May 2004
  - Discussion about abuses of dominant position (art. 82)
European Competition Law

Main Features

- Resale Price Maintenance: black list
- More lenient approach for non-price restrictions
  - Exclusive territories can be used in franchise contracts (*Pronuptia* (1987))
  - But will be banned if it leads to restrictions of parallel imports (*Grundig - Consten* (1964, 1966))
- Individual or block (category) exemptions (insurance contracts, car distribution sector, ...)
  - The mode of distribution is an essential element
  - Franchise agreements $\neq$ exclusive or selective distribution
- Recent cases: *Michelin, Microsoft, The Coca-Cola Company*
Successive monopolies

Basic framework
- One producer selling through one retailer
- Constant marginal costs of production \((c \geq 0)\) and distribution \((\gamma = 0)\)
- Demand \(D(p) = 1 - p\)

The “game”
Formally, we look for the subgame perfect Nash equilibrium of the following game:
1. The producer sets the wholesale price \(w\)
2. The retailer sets the retail price \(p\)
Retail price as a function of $w$

**Which $p$ for any given $w$?**

\[
\max_p (p - w) D(p) \Leftrightarrow p = \hat{p}(w) = \frac{1 + w}{2}
\]

**Equilibrium wholesale price $\hat{w}$**

\[
\max_w (w - c) D(\hat{p}(w)) \Leftrightarrow w = \hat{w} = \frac{1 + c}{2}
\]

**Therefore**

- $\hat{w} = \frac{1+c}{2}$, $\hat{p} = \frac{3+c}{4}$, $D = \frac{1-c}{4}$
- $\Pi_P = \frac{(1-c)^2}{8}$, $\Pi_D = \frac{(1-c)^2}{16}$, $S = \frac{(1-c)^2}{32}$, $\hat{W} = \frac{7(1-c)^2}{32}$
Comparing with the integrated structure

**Maximizing the integrated structure’s profit**

\[
\max_p (p - c) D(p) \iff p = p^m = \frac{1 + c}{2}
\]

**Comparison**

- \( p^m < \hat{p} \)
- \( \Pi_I = \frac{(1-c)^2}{4} > \Pi_P + \Pi_D = \frac{3(1-c)^2}{16} \)
- \( W_I > \hat{W} \)

**General result**

Vertical integration eliminates the double marginalization problem.
Vertical relationships and double marginalization

**Idea:**
If they are externalities (+ or -), «coordination» is necessary

**Vertical integration:**
Looked at more favorably by competition authorities than vertical restraints.

**Some ambiguous results:**
- Short term benefit (lower prices)
- Long term barriers to entry?
- Foreclosure, predation?
Using vertical restraints to solve the double marginalization problem

Type of restraints

- Franchise contract (or two-part tariff)
- Resale price maintenance
- Quotas
Franchising contract

Two-part tariff

- \( T(q) = F + wq \)
- Leads to the maximization of the joint profit

The producer offers the tariff

- Low wholesale price \( w = c \) and maximal fixed fee \( F = \Pi^m \)
- \( \Pi_P = \Pi^m, \Pi_D = 0 \)

The retailer offers the tariff

- Low wholesale price \( w = c \) but minimal fixed fee \( F = 0 \)
- \( \Pi_P = 0, \Pi_D = \Pi^m \)
Resale price maintenance

The producer chooses $w$ and $p$

- Then $w = p = p^m$
- And we thus have $\Pi_P = \Pi^m$, $\Pi_D = 0$

In reality we often observe

- Price floors: $p \geq \underline{p}$, but would not solve the problem here
- However a price ceiling (or maximum RPM, $p \leq \bar{p} = p^m$) would work.
- Minimal quantities $(q \geq \underline{p} = q^m)$ would also solve the problem
Vertical restraints as solutions to the double marginalization problem

**Vertical restraints**
- Allow perfect coordination within the vertical structure (without integration)
- Increase profit and consumer surplus (and thus total welfare)
- Different types of restraints lead to the same result

**Limitation**
- Demand and/or cost uncertainty
- Better informed retailers (e.g. local demand conditions)
- Competition between identical retailers
Services offered by the retailer

**Services**
- Information or advice to consumers...
- Reducing waiting time at the check-out, delivery, ...
- After-sales services, hotline, ...

**Adapting the basic framework**
- The retailer exerts an effort $s$ ...
- ... that increases the demand $D(p, s)$
- Effort is costly: $\phi(s)$ per unit (of effort)
Linear tariff vs. Two-part tariff

Pricing and effort decisions

\[
\max_{p,s} (p - w - \phi(s)) D(p, s) \implies \begin{cases} 
(p - w - \phi(s)) \frac{\partial D}{\partial p} + D(p, s) = 0 \\
(p - w - \phi(s)) \frac{\partial D}{\partial s} = \phi'(s)D(p, s) 
\end{cases}
\]

Linear tariff

- The producer chooses \( \hat{w} > c \)
- The vertical structure’s profit is therefore not maximized

Two-part tariff

- If \( w = c \), the retailer chooses the retail price and the level of effort that maximize the joint profit.
- The fixed fee can then be used to share that profit.
Other types of vertical restraints

How is it possible to replicate vertical integration?

- RPM does not suffice since the retailer chooses the optimal level of effort only when \( w = c \)
- Monitoring (imposing) the level of effort cannot work with linear tariffs only
- However setting the quantity to be sold generates the “monopoly” profit.
Quantity forcing

The producer
- forces the retailer to sell at least: \( q^m = D(p^m, s^m) \)
- sets a wholesale price equals to: \( w^m = p^m - \phi(s^m) \)

The retailer
\[
\max (p - p^m + \phi(s^m) - \phi(s)) D(p, s) \quad \text{s.t.} \quad D(p, s) \geq q^m
\]
\[
\Leftrightarrow \max (p - \phi(s)) \quad \text{s.t.} \quad D(p, s) = q^m
\]
\[
\Leftrightarrow D(p, s) = q^m \quad \text{and} \quad \phi'(s) \frac{\partial D}{\partial p} + \frac{\partial D}{\partial s} = 0
\]
- Chooses the retail price and effort level that would be chosen by a vertically integrated structure: \( p = p^m \) et \( s = s^m \)
Welfare effect

Consumer surplus

- This time the impact on consumer surplus is ambiguous.
- The vertically integrated structure takes into account the effect of a change in price or service level on the marginal consumer.
- But the consumer surplus depends on the average effect of a change in price and retail services.
- In general, marginal $\neq$ average, when consumers are heterogenous.

Conclusion

Eliminating double marginalization increases profit but does not necessarily increase total welfare.
Intra-brand competition

**Competition alone does not suffice**
- Intra-brand competition eliminates the retail margin
- But the effort levels are not optimal (from the point of view of the vertical structure)

**Solutions**
- RPM (here minimum RPM - price floors - suffices) leads to joint profit maximization
- But two-part tariffs don’t.
  - They could however be combined with territorial exclusivity
The “free-rider” problem

“Free-Riding”
- Example: pre-purchase consumer information / advice
- Problem: A customer might come to get some advice and then go and buy from a cheaper rival
- Consequences: without “guarantee”, retailers are not willing to offer pre-purchase advice to consumers (prisoner’s dilemma). Joint-profit is not maximized.

Solutions
- Vertical restraints are thus needed to restore vertical coordination
- Exclusive territories or RPM can be used as they eliminate intra-brand competition (and thus the free-riding problem)
- Combined with two-part tariffs to solve the double marginalization problem

Producteur 1
Coût $c$

Distributeur 1
Coût $\gamma$

Consommateurs
Fonctions de demande: $q_1 = D_1(p_1, p_2)$ et $q_2 = D_2(p_1, p_2)$

Producteur 2
Coût $c$

Distributeur 2
Coût $\gamma$

$p_1$

$p_2$

$w_1$

$w_2$
Rey and Stiglitz (1995)

Strategic Use of Vertical Restraints

- Interactions between vertical structures
- Use of restraints as a commitment device to appear less aggressive (e.g. reducing competitive pressure)
- Assigning exclusive territories
  - Eliminates intra-brand competition
  - But also reduces inter-brand competition

Impact of intra-brand competition

- The strong competition between retailers eliminates retail margins
- Retail price = wholesale price + retailing cost
- Intra-brand competition: equivalent to a situation where the two producers sell directly to consumers
In the absence of any kind of restraint

\[
\frac{p_i - c - \gamma}{p_i} = \frac{1}{\varepsilon_{ii}(p_1, p_2)}, \text{ where } \varepsilon_{ii}(p_1, p_2) = -\frac{p_i}{D_i} \frac{\partial D_i}{\partial p_i}
\]

Exclusive territories

- Producer 1 assigns exclusive territories to its retailers
- Retailers selling product 2 still compete, therefore \( p_2 = w_2 + \gamma \).
- Retailers selling product 1 thus sell at \( p_1' (p_2; w_1) \) such that:

\[
\frac{p_1' (p_2; w_1) - w_1 - \gamma}{p_1' (p_2; w_1)} = \frac{1}{\varepsilon_{11} (p_1' (p_2; w_1), p_2)}
\]
Rey and Stiglitz (1995)

**Competition between producers**

- The demand faced (perceived) by producer 2 is now:
  \[
  D_2^r (w_1, w_2) = D_2 (p_1^r (w_2 + \gamma; w_1), w_2 + \gamma)
  \]

- The elasticity of the perceived demand with respect to (w.r.t.) \( w_2 \) thus writes as:
  \[
  \varepsilon_{22}^r (w_1, w_2) = \varepsilon_{22} (p_1^r (p_2; w_1), p_2) + \lambda_{12} \varepsilon_{21} (p_1^r (p_2; w_1), p_2)
  \]
  where
  - \( \lambda_{12} \) is the elasticity of the best response function \( p_1^r (p_2; w_1) \) w.r.t. \( p_2 \)
  - \( \varepsilon_{21} \) is the elasticity of substitution of demand \( D_2 \) w.r.t. \( p_1 \)
(Reasonable) Assumptions

- Products are imperfect substitutes so that $\varepsilon_{21} < 0$
- An increase in $w_2$ (and thus in $p_2$) reduces the competitive pressure on product 1, thus $\lambda_{12} > 0$

Conclusions

- $\varepsilon_{22}^r < \varepsilon_{22}$
- Producer 2 is thus less aggressive
- Making producer 1 less aggressive too

$\Rightarrow$ Wholesale prices and thus retail prices are higher in equilibrium
Rey and Stiglitz (1995)

Some Remarks

- Requires retailers to have some freedom (to set prices)
  - Resale price maintenance would have the same effect as intra-brand competition

- Commitment must be credible
  - Non-linear tariffs should be expected to have a more limited impact than territorial restrictions (*observability*)

- Not linked to the fact that producers make the offers
  - Slotting allowances (see Shaffer (*Rand Journal of Economics*, 1991))
Informal arguments against RPM

- U.S. Supreme Court (*Business Electronics*, 1988): "There was support for the proposition that vertical price restraints reduce intra-brand competition because they facilitate cartelization."

- Mathewson and Winter (*Review of Industrial Organization*, 1998): "If wholesale prices are not easily observed by each cartel member, cartel stability would suffer because members would have difficulty distinguishing changes in retail prices that were caused by cost changes from cheating the cartel. Resale price maintenance can enhance the cartel stability by eliminating retail price variation."
In the absence of RPM

- Retail prices reflect wholesale prices but also shocks on (local) demand or retailing costs
- More difficult to identify deviations from the collusive path and thus to sustain a collusive outcome

Resale Price Maintenance

- Uniform retail prices
- Deviations are now easily detected and thus collusion is facilitated
- Not necessarily optimal since prices do not adjust following a local shock
- Overall ambiguous effect on consumer (and thus total) surplus, although more likely to be negative
Rey and Vergé (Journal of Industrial Economics, forthcoming)

Consommateurs
Fonctions de demande: \( i \neq h = A, B \) et \( j \neq k = 1, 2 \):
\[ q_{ij} = D_{ij}(p_{ij}, p_{hj}, p_{ik}, p_{hk}) \]
Retail prices chosen by the (common) retailer:

\[
\left( p_i^M (w_A, w_B) \right)_{i=A,B} = \arg \max_{(p_A,p_B)} \sum_{i=A,B} (p_i - w_i - \gamma) D_i (p_A, p_B)
\]

Denote by \( \pi_{A+B}^M (w_A, w_B) \) the corresponding profit, and by \( q_A^M (w_A, w_B) \) and \( q_B^M (w_A, w_B) \) the quantities sold.

Selling the two products the retailer thus earns:

\[
\pi^R (A, B) = \pi_{A+B}^M (w_A, w_B) - F_A - F_B
\]

By selling product \( i \) only, it obtains:

\[
\pi^R (i) = \pi_i^M (w_i) - F_i, \text{ où: } \pi_i^M (w_i) = \max_{p_i} [(p_i - w_i - \gamma) D_i (p_i, \emptyset)]
\]
Equilibrium

The maximal fixed fee the retailer is ready to pay to sell product \( A \) is thus:

\[
\pi^R(A, B) = \pi^R(B) \iff F_A = \pi_{A+B}(w_A, w_B) - \pi^M_B(w_B)
\]

In equilibrium, we must thus have:

\[
w^*_A = \arg \max_w \left[ \left( p^M_A(w, w^*_B) - c - \gamma \right) q^M_A(w, w^*_B) + \left(p^M_B(w, w^*_B) - c - \gamma \right) q^M_B(w, w^*_B) - \pi^M_B(w^*_B) - F^*_B \right]
\]
One Common Retailer

Equilibrium

- The rent left to the retailer cannot be directly affected by a producer.
- Therefore the best a manufacturer can do is to set its wholesale price so as to maximize the industry profit (taking the retailers’ decisions into account).
- If \( w^*_B = c \), it is optimal for retailer \( A \) to generate the monopoly prices setting \( w^*_A = c \).

Equilibrium with a common agent

Unique equilibrium (wholesale prices) \( w^*_A = w^*_B = c \), leading to monopoly prices and (industry) profit.
Rey and Vergé (forthcoming)

\[ q_{ij} = D_{ij}(p_{ij}, p_{hj}, p_{ik}, p_{hk}) \]

Producteur A
- Coût \( c \)
- \( (w_{A1}, F_{A1}) \)

Producteur B
- Coût \( c \)
- \( (w_{B1}, F_{B1}) \)

Distributeur 1
- Coût \( \gamma \)
- \( (p_{A1}, p_{B1}) \)

Distributeur 2
- Coût \( \gamma \)
- \( (p_{A2}, p_{B2}) \)

Consommateurs
Fonctions de demande: \( i \neq h = A, B \) et \( j \neq k = 1, 2 \):

\[ q_{ij} = D_{ij}(p_{ij}, p_{hj}, p_{ik}, p_{hk}) \]
Timing

1. Producers offer two-part tariffs \((w_{ij}, F_{ij})\) and when possible, impose the retail price \(p_{ij}\).

2. Retailers (simultaneously) accept or reject the offers.

3. Two possibilities:
   - All offers have been accepted: retailers compete in prices on the final market.
   - One of the offers has been rejected: all profits are equal to 0.

Remark

Results extend to more realistic framework as long as the following conditions are met:

- Retailers do not have market power
- A producer cannot exclude the rival from one of the markets
Retail Equilibrium

Each retailer \( j = 1, 2 \) chooses the retail prices \( p_{Aj} \) and \( p_{Bj} \) that maximize its profit:

\[
\pi_j = (p_{Aj} - w_{Aj} - \gamma) D_{Aj}(p) + (p_{Bj} - w_{Bj} - \gamma) D_{Bj}(p) - F_{Aj} - F_{Bj}.
\]

For any vector of wholesale prices \( w \), we denote by

\[
p^r(w) = (p^r_{A1}(w), p^r_{B1}(w), p^r_{A2}(w), p^r_{B2}(w))
\]

the equilibrium retail prices and by \( D^r_{ij}(w) = D_{ij}(p^r(w)) \) the corresponding quantities.
In the absence of RPM

Producer’s maximization program

Each producer $i$ maximizes its profit (under constraints):

$$\max_{w_{i1}, w_{i2}, F_i} (w_{i1} - c)D_{i1}^f(w) + F_i + (w_{i2} - c)D_{i2}^f(w) + F_i,$$

subject to:

$$\left( p_{i1}^f(w) - w_{i1} - \gamma \right)D_{i1}^f(w) - F_i + \left( p_{j1}^f(w) - w_{j1} - \gamma \right)D_{j1}^f(w) - F_j \geq 0$$

$$\left( p_{i2}^f(w) - w_{i2} - \gamma \right)D_{i2}^f(w) - F_i + \left( p_{j2}^f(w) - w_{j2} - \gamma \right)D_{j2}^f(w) - F_j \geq 0$$

In equilibrium the constraint are necessarily binding and the program rewrites as:

$$\max \prod_{w_{i1}, w_{i2}} (p_{ij}^f(w) - c - \gamma) D_{ij}^f(w) + (p_{hj}^f(w) - w_{hj} - \gamma) D_{hj}^f(w).$$
In the absence of RPM

**Competitive Equilibrium**

In any equilibrium without resale price maintenance, retail prices are below their monopoly level.

- For producers, using a comment agent is a way to eliminate inter-brand competition.
- However, in order to limit competitive pressures (from intra-brand competition), a producer (say A) should set wholesale prices above marginal cost.
- But in that case, the producer B does not internalize the retail margin earned on producer A's products and are thus too aggressive.
- This leads to relatively competitive prices.
Resale Price Maintenance

Multiple Equilibria

- A producer’s profit no longer depends on its wholesale prices
- But its rival’s profit do
- Therefore wholesale prices affect the equilibrium retail prices and we usually have co-existence of multiple equilibria

There exists an equilibrium with monopoly prices

This equilibrium is such that the producers:
1. Set retail prices at their monopoly level
2. Set wholesale prices equal to their marginal costs (i.e. $w_{ij} = c$)
3. Use the fixed fees ($F_{ij}$) to recover the monopoly profits
Equilibrium with Monopoly Prices

Producer’s program

- Suppose that producer B adopts this strategy. Producer A’s profit thus writes as: (with \( p = (p_{A1}, p_{B1}^M, p_{A2}, p_{B2}^M) \))

\[
\Pi_A = \sum_{j=1,2} \left( (p_{Aj} - c - \gamma) D_{Aj}(p) + (p_{Bj}^M - c - \gamma) D_{B1}(p) - F_{Bj} \right).
\]

- This profit is equal to that of the vertically and horizontally integrated structure (up to a constant)

- It is thus optimal for the producer to set its retail prices at their monopoly level

- This equilibrium is the only one robust to the introduction of an (retailer) effort variable
Interlocking Relationships and Monopoly Prices

Empirical Evidence

- See Bonnet, Dubois and Simioni (mimeo, 2005) and Bonnet and Dubois (*Rand Journal of Economics*, forthcoming)

- Bottled water in France

- Individual consumption data, 1998-2001

- Methodology à la Berry, Levinson and Pakes (*Econometrica*, 1995)
  - *Multinomial Nested Logit Demand*

- Test several specifications of the competition game

- **Best-fit: Two-part Tariffs with RPM**
Interlocking Relationships and Monopoly Prices
Recent French Antitrust Cases

**Brown Goods (December 2005)**
- Philips (€16m), Sony (€16m) and Panasonic (€2.4m) fined by the French competition authorities
- “Recommended” retail prices to distributors and refusal to sell to distributors cutting prices

**Perfumes (December 2005)**
- L’Oréal, Chanel, Dior, Kenzo, Guerlain, Givenchy, ...
- Mariannaud, Séphora, ...
- Total fines: €45.4 million
Slotting Allowances

- A producer selling through multiple (two) retailers
- Retailers have all the bargaining power (make offers)
- **Three-part tariffs**: Slotting allowances, conditional fixed fee and unit wholesale price
- Slotting allowances are used by the “biggest” retailer to exclude its rival

Miklós-Thal, Rey and Vergé (*Journal of the European Economic Association*, forthcoming)
- Similar model but with contingent contracts (an exclusivity offer and an non-exclusive offer)
- Slotting allowances are eliminate intra-brand competition but the product is sold by the two retailers
No simple conclusion

- What matters is not the type of restraints but the context in which it is used
- Improving vertical coordination cannot be the essential argument to defend a particular restraint
- Interactions between vertical structures (inter-brand competition) are the most important feature

Theoretical Conclusions

No *per se* rule but case-by-case analysis
Competition Policy and Vertical Restraints

Intra- and inter-brand competition

- Market structure—and more specifically the extent of inter-brand competition from other producers and distributors—is a crucial factor in the analysis of the effects of vertical restraints.
- Vertical restraints are unlikely to harm economic efficiency when inter-brand competition is fierce.

Conclusion

Competition authorities should focus on:

- The extent of inter-brand competition
- The role of alternative distribution systems (e.g. hard discount versus more conventional channels)
- Rather than on intra-brand competition
Final Remarks

- Vertical restraints (especially price restraints) might have anti-competitive effects even though there is strong inter-brand competition.
  - Beware of intricate relationships (i.e. when producers use common retailers)

- Effects based policies (i.e. coherent decisions based on the welfare impact of a practice) rather than strict rules based on the type of restraint