ECO 650: Firms' Strategies and Markets Vertical Contracts and Integration (I)

Claire Chambolle



<ロ> <回> <回> < 回> < 回> < 回> < 回> < 回< のへの

- Retailers are intermediate between producers and consumers
 - Consumers are mainly price takers
 - But producers and retailers sign contracts (or bargain)

◆□▶◆□▶◆三▶◆三▶ 三日= のへで

- ▶ Retailers are intermediate between producers and consumers
 - Consumers are mainly price takers
 - But producers and retailers sign contracts (or bargain)
- Most common contracts
 - The simplest contract is a unit price

◆□▶◆□▶◆三▶◆三▶ 三日= のへで

- Retailers are intermediate between producers and consumers
 - Consumers are mainly price takers
 - But producers and retailers sign contracts (or bargain)
- Most common contracts
 - The simplest contract is a unit price
 - Any additional clause is called "vertical restraint" (These clauses can add up.)

◆□▶◆□▶◆三▶◆三▶ 三日= のへで

- Retailers are intermediate between producers and consumers
 - Consumers are mainly price takers
 - But producers and retailers sign contracts (or bargain)
- Most common contracts
 - The simplest contract is a unit price
 - Any additional clause is called "vertical restraint" (These clauses can add up.)
 - Two-part tariff: (franchise fee)

◆□▶ ◆□▶ ◆三▶ ◆三▶ 三回日 のへで

- Retailers are intermediate between producers and consumers
 - Consumers are mainly price takers
 - But producers and retailers sign contracts (or bargain)
- Most common contracts
 - The simplest contract is a unit price
 - Any additional clause is called "vertical restraint" (These clauses can add up.)
 - Two-part tariff: (franchise fee)
 - Slotting allowances (introduction fees, pay-to-stay fees,...)

◆□▶ ◆□▶ ◆三▶ ◆三▶ 三回日 のへで

- Retailers are intermediate between producers and consumers
 - Consumers are mainly price takers
 - But producers and retailers sign contracts (or bargain)
- Most common contracts
 - The simplest contract is a unit price
 - Any additional clause is called "vertical restraint" (These clauses can add up.)
 - Two-part tariff: (franchise fee)
 - Slotting allowances (introduction fees, pay-to-stay fees,...)
 - Resale price maintenance (RPM), price-floor, price-ceiling.

◆□▶ ◆□▶ ◆三▶ ◆三▶ 三回日 のへで

- Retailers are intermediate between producers and consumers
 - Consumers are mainly price takers
 - But producers and retailers sign contracts (or bargain)
- Most common contracts
 - The simplest contract is a unit price
 - Any additional clause is called "vertical restraint" (These clauses can add up.)
 - Two-part tariff: (franchise fee)
 - Slotting allowances (introduction fees, pay-to-stay fees,...)
 - Resale price maintenance (RPM), price-floor, price-ceiling.
 - Exclusivity clauses (exclusive territories, single branding, selective distribution,...), Tying / bundling clause, Royalties,...

◆□▶ ◆□▶ ◆三▶ ◆三▶ 三回日 のへで

Vertical integration and raising rival's costs.

Assumptions: P and R are successives monopolies. P produces a good at a unit cost c. R can resell this good to consumers. P(q) is consumer's inverse demand.

イロト イロト イヨト イヨト ヨヨ わくで

Assumptions: P and R are successives monopolies. P produces a good at a unit cost c. R can resell this good to consumers. P(q) is consumer's inverse demand.

Stage 1: P sets a wholesale unit price w.

▲□▶▲□▶▲□▶▲□▶ 三日 のへで

Assumptions: P and R are successives monopolies. P produces a good at a unit cost c. R can resell this good to consumers. P(q) is consumer's inverse demand.

- Stage 1: P sets a wholesale unit price w.
- Stage 2: R orders a quantity q and then resells it at price P(q) to consumer.

イロト イポト イヨト イヨト ヨヨ わくや

Assumptions: P and R are successives monopolies. P produces a good at a unit cost c. R can resell this good to consumers. P(q) is consumer's inverse demand.

- Stage 1: P sets a wholesale unit price w.
- Stage 2: R orders a quantity q and then resells it at price P(q) to consumer.

In stage 2, R maximizes its profit with respect to q:

$$\pi_R(q) = (P(q) - w)q$$

FOC $P(q) + qP'(q) = w = ilde w(q)$

In stage 1, P maximizes its profit with respect to q:

 $\pi_P(q) = (ilde w(q) - c)q$ FOC ilde w(q) + q ilde w'(q) = cwith P(q) + qP'(q) = ilde w(q)

In stage 1, P maximizes its profit with respect to q:

$$\pi_P(q) = (ilde w(q) - c)q$$

FOC $ilde w(q) + q ilde w'(q) = c$
with $P(q) + qP'(q) = ilde w(q)$

Deriving $\tilde{w}(q)$ and simplifying the FOC :

$$P(q) + qP'(q) + q(2P'(q) + qP''(q)) = c$$

$$P(q) + qP'(q) + q \underbrace{P'(q)(2 + \Gamma(q))}_{<0} = c$$

• $\Gamma(q) = \frac{qP''(q)}{P'(q)}$ is such that $0 > \Gamma(q) > -2$, SOC of a monopoly.

(ロ)

In stage 1, P maximizes its profit with respect to q:

$$\pi_P(q) = (ilde w(q) - c)q$$

FOC $ilde w(q) + q ilde w'(q) = c$
with $P(q) + qP'(q) = ilde w(q)$

Deriving $\tilde{w}(q)$ and simplifying the FOC :

$$P(q) + qP'(q) + q(2P'(q) + qP''(q)) = c$$

$$P(q) + qP'(q) + q \underbrace{P'(q)(2 + \Gamma(q))}_{<0} = c$$

• $\Gamma(q) = \frac{qP''(q)}{P'(q)}$ is such that $0 > \Gamma(q) > -2$, SOC of a monopoly.

► Comparing this FOC with the FOC of a vertically integrated firm, we obtain $\tilde{q} < q^M \Rightarrow \tilde{P} > p^M$

In stage 1, P maximizes its profit with respect to q:

$$\pi_P(q) = (ilde w(q) - c)q$$

FOC $ilde w(q) + q ilde w'(q) = c$
with $P(q) + qP'(q) = ilde w(q)$

Deriving $\tilde{w}(q)$ and simplifying the FOC :

$$P(q) + qP'(q) + q(2P'(q) + qP''(q)) = c$$

$$P(q) + qP'(q) + q \underbrace{P'(q)(2 + \Gamma(q))}_{<0} = c$$

• $\Gamma(q) = \frac{qP''(q)}{P'(q)}$ is such that $0 > \Gamma(q) > -2$, SOC of a monopoly.

- ► Comparing this FOC with the FOC of a vertically integrated firm, we obtain $\tilde{q} < q^M \Rightarrow \tilde{P} > p^M$
- Successive monopolies do worse than a single monopoly!

< □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □

In stage 1, P maximizes its profit with respect to q:

$$\pi_P(q) = (ilde w(q) - c)q$$

FOC $ilde w(q) + q ilde w'(q) = c$
with $P(q) + qP'(q) = ilde w(q)$

Deriving $\tilde{w}(q)$ and simplifying the FOC :

$$P(q) + qP'(q) + q(2P'(q) + qP''(q)) = c$$

$$P(q) + qP'(q) + q \underbrace{P'(q)(2 + \Gamma(q))}_{<0} = c$$

• $\Gamma(q) = \frac{qP''(q)}{P'(q)}$ is such that $0 > \Gamma(q) > -2$, SOC of a monopoly.

- ► Comparing this FOC with the FOC of a vertically integrated firm, we obtain $\tilde{q} < q^M \Rightarrow \tilde{P} > p^M$
- Successive monopolies do worse than a single monopoly!
- ▶ If R makes the contract offer w = c, no problem $\mathbb{R} \to \mathbb{R} = \mathbb{R} \oplus \mathbb{R}$

Stage 1: P sets a two-part tariff contract (w, F) in which w is the unit wholesale price and F the franchise fee.

Stage 1: P sets a two-part tariff contract (w, F) in which w is the unit wholesale price and F the franchise fee.

Stage 2 (almost unchanged), R maximizes its profit with respect to q:

$$\pi_{R}(q) = (P(q) - w)q - F \Rightarrow P(q) + qP'(q) = \widetilde{w}(q)$$

In Stage 1, P maximizes its profit with respect to q:

$$\pi_P(q)=(ilde w(q)-c)q+F$$

u.c. $\pi_R(q)=(P(q)- ilde w(q))q-F\geq 0$
with $P(q)+qP'(q)= ilde w(q)$

イロト イポト イヨト イヨト ヨヨ わくや

Stage 1: P sets a two-part tariff contract (w, F) in which w is the unit wholesale price and F the franchise fee.

Stage 2 (almost unchanged), R maximizes its profit with respect to q:

$$\pi_{\mathsf{R}}(q) = (\mathsf{P}(q) - w)q - \mathsf{F} \Rightarrow \mathsf{P}(q) + q\mathsf{P}'(q) = \widetilde{w}(q)$$

In Stage 1, P maximizes its profit with respect to q:

$$\pi_P(q)=(ilde w(q)-c)q+F$$

u.c. $\pi_R(q)=(P(q)- ilde w(q))q-F\geq 0$
with $P(q)+qP'(q)= ilde w(q)$

Binding the constraint, P now maximizes its profit with respect to q:

$$\pi_P(q) = (P(q) - c)q$$

◆□ > ◆□ > ◆三 > ◆三 > 三日 のへで

Stage 1: P sets a two-part tariff contract (w, F) in which w is the unit wholesale price and F the franchise fee.

Stage 2 (almost unchanged), R maximizes its profit with respect to q:

$$\pi_{\mathsf{R}}(q) = (\mathsf{P}(q) - w)q - \mathsf{F} \Rightarrow \mathsf{P}(q) + q\mathsf{P}'(q) = \widetilde{w}(q)$$

In Stage 1, P maximizes its profit with respect to q:

$$\pi_P(q)=(ilde w(q)-c)q+F$$

u.c. $\pi_R(q)=(P(q)- ilde w(q))q-F\geq 0$
with $P(q)+qP'(q)= ilde w(q)$

Binding the constraint, P now maximizes its profit with respect to q:

$$\pi_P(q) = (P(q) - c)q$$

▶ P sets $q = q^M$ and $\tilde{w}(q^M) = c$. The double-margin problem is solved.

◆□▶◆□▶◆目▶◆目▶ 目目 のへで

Stage 1: P sets a two-part tariff contract (w, F) in which w is the unit wholesale price and F the franchise fee.

Stage 2 (almost unchanged), R maximizes its profit with respect to q:

$$\pi_{\mathsf{R}}(q) = (\mathsf{P}(q) - w)q - \mathsf{F} \Rightarrow \mathsf{P}(q) + q\mathsf{P}'(q) = \widetilde{w}(q)$$

In Stage 1, P maximizes its profit with respect to q:

$$\pi_P(q)=(ilde w(q)-c)q+F$$

u.c. $\pi_R(q)=(P(q)- ilde w(q))q-F\geq 0$
with $P(q)+qP'(q)= ilde w(q)$

Binding the constraint, P now maximizes its profit with respect to q:

$$\pi_P(q) = (P(q) - c)q$$

- ▶ P sets $q = q^M$ and $\tilde{w}(q^M) = c$. The double-margin problem is solved.
- ► $F = (P(q^M) c)q^M > 0$ is a franchise. If R makes the contract offer, it sets (w, F) = (c, 0).

Stage 1: P sets a RPM contract (w, P) in which w is the unit wholesale price and P the resale price.

◆□▶◆□▶◆三▶◆三▶ 三日= のへで

Stage 1: P sets a RPM contract (w, P) in which w is the unit wholesale price and P the resale price.

The quantity is directly controlled by P through P(q)

◆□▶ ◆□▶ ◆三▶ ◆三▶ 三回日 のへで

Stage 1: P sets a RPM contract (w, P) in which w is the unit wholesale price and P the resale price.

The quantity is directly controlled by P through P(q)P(q) is such that q maximizes (P(q) - c)q, i.e. $P(q^M)$ and sets $w = P(q^M)$.

Stage 1: P sets a RPM contract (w, P) in which w is the unit wholesale price and P the resale price.

The quantity is directly controlled by P through P(q)P(q) is such that q maximizes (P(q) - c)q, i.e. $P(q^M)$ and sets $w = P(q^M)$.

 A RPM is as efficient as two-part tariff to correct the double marginalization.

<ロ> <0</p>

Exercise 1

Two retailers compete in Cournot $P(Q) = a - q_1 - q_2$. The good is produced by a monopolist M at a cost $C(Q) = \frac{3Q^2}{2}$. Distribution costs are normalized to zero. The law forbids M to discriminate among its retailers.

◆□▶◆□▶◆三▶◆三▶ 三日= のへで

Exercise 1

Two retailers compete in Cournot $P(Q) = a - q_1 - q_2$. The good is produced by a monopolist M at a cost $C(Q) = \frac{3Q^2}{2}$. Distribution costs are normalized to zero. The law forbids M to discriminate among its retailers.

- 1. Let w be the wholesale unit price set by M. Write the retailers' profits.
- 2. Determine the wholesale price w^M that maximises the profit of M.
- 3. *M* offers a contract (w, F) with *F* a franchise fee. The contract must be the same for each retailer.
 - 3.1 w being set, what is the level F(w) chosen by M?
 - 3.2 Determine w^* and F^* chosen by M.
 - 3.3 Compare with the profit of the vertically integrated structure.

<ロ> <回> <回> < 回> < 回> < 回> < 回> < 回< のへの

1. Let w be the wholesale unit price set by M. Write the retailers' profits.

◆□▶◆□▶◆三▶◆三▶ 三日= のへで

- 1. Let w be the wholesale unit price set by M. Write the retailers' profits.
 - Cournot profits are $\pi_1 = \pi_2 = \frac{(a-w)^2}{9}$, with $Q^*(w) = q_1^* + q_2^* = \frac{2(a-w)}{3}$.

・ロト・日本・ヨト・ヨト 三日 のくで

- 1. Let w be the wholesale unit price set by M. Write the retailers' profits.
 - Cournot profits are $\pi_1 = \pi_2 = \frac{(a-w)^2}{9}$, with $Q^*(w) = q_1^* + q_2^* = \frac{2(a-w)}{3}$.
- 2. Determine the wholesale price w^M that maximises the profit of M.

◆□▶●□▶●□▶●□▶●□= のへで

- 1. Let w be the wholesale unit price set by M. Write the retailers' profits.
 - Cournot profits are $\pi_1 = \pi_2 = \frac{(a-w)^2}{9}$, with $Q^*(w) = q_1^* + q_2^* = \frac{2(a-w)}{3}$.

2. Determine the wholesale price w^M that maximises the profit of M.

• The profit of *M* is:
$$wQ^*(w) - C(Q^*(w))$$
. Soit $\frac{2w(a-w)}{3} - \frac{3}{2}(\frac{2(a-w)}{3})^2 = \frac{2}{3}(a-w)(2w-a)$

イロト イポト イヨト イヨト ヨヨ わくや

- 1. Let *w* be the wholesale unit price set by *M*. Write the retailers' profits.
 - Cournot profits are $\pi_1 = \pi_2 = \frac{(a-w)^2}{9}$, with $Q^*(w) = q_1^* + q_2^* = \frac{2(a-w)}{3}$.

2. Determine the wholesale price w^M that maximises the profit of M.

The profit of M is:
$$wQ^*(w) - C(Q^*(w))$$
. Soit
$$\frac{2w(a-w)}{3} - \frac{3}{2}(\frac{2(a-w)}{3})^2 = \frac{2}{3}(a-w)(2w-a)$$

$$\max_w \frac{2}{3}(a-w)(2w-a) \Rightarrow 3a-4w = 0, \text{ thus } w^M = \frac{3a}{4}.$$

$$q_1^* = q_2^* = \frac{a}{12}, \ \Pi_1 = \Pi_2 = \frac{a^2}{144}, \ \Pi^M = \frac{a^2}{12} \text{ and } \ \Pi' = \frac{7a^2}{72}.$$

Introduction Contracts Vertical Integration and raising Rival's costs

Slotting allowances Resale Price Maintenance

3. Franchise contract

3.1 w being set, what is the level F(w) chosen by M?

Introduction Contracts Vertical Integration and raising Rival's costs

Slotting allowances Resale Price Maintenance

3. Franchise contract

3.1 w being set, what is the level F(w) chosen by M?

- For a given w, a retailer expects a profit $\frac{(a-w)^2}{9}$ and thus M sets $F_i(w) = \frac{(a-w)^2}{9}$. for i = 1, 2.
- 3.2 Determine w^* and F^* chosen by M.

◆□ > ◆□ > ◆三 > ∢三 > ④ = ● ● ●

Introduction Contracts Vertical Integration and raising Rival's costs

Slotting allowances Resale Price Maintenance

3. Franchise contract

3.1 w being set, what is the level F(w) chosen by M?

- For a given w, a retailer expects a profit $\frac{(a-w)^2}{9}$ and thus M sets $F_i(w) = \frac{(a-w)^2}{9}$. for i = 1, 2.
- 3.2 Determine w^* and F^* chosen by M.
 - The profit of *M* is: $wQ^* - C(Q^*) + 2F = \frac{2}{3}(a-w)(2w-a) + \frac{2}{9}(a-w)^2 = \frac{2}{9}(a-w)(5w-2a)$

・ロト・周ト・ミト・ミト 三日 のくで
Slotting allowances Resale Price Maintenance

3. Franchise contract

3.1 w being set, what is the level F(w) chosen by M?

- ► For a given *w*, a retailer expects a profit $\frac{(a-w)^2}{9}$ and thus *M* sets $F_i(w) = \frac{(a-w)^2}{9}$. for i = 1, 2.
- 3.2 Determine w^* and F^* chosen by M.
 - The profit of *M* is: $wQ^* - C(Q^*) + 2F = \frac{2}{3}(a-w)(2w-a) + \frac{2}{9}(a-w)^2 = \frac{2}{9}(a-w)(5w-2a)$
 - $\max_{w} \frac{2}{9}(a-w)(5w-2a) \Rightarrow 7a-10w = 0$, thus so $w = \hat{w} = \frac{7a}{10} < w^*$.
 - $\hat{q}_1 = \hat{q}_2 = \frac{a}{10}, \hat{F}_1 = \hat{F}_2 = \frac{a^2}{100}, \hat{\Pi}_1 = \hat{\Pi}_2 = 0, \hat{\Pi}^M = \frac{a^2}{10} > \Pi^M.$

・ロト・周ト・ヨト・ヨト 単目 のくで

9/47

Slotting allowances Resale Price Maintenance

3. Franchise contract

3.1 w being set, what is the level F(w) chosen by M?

- ► For a given *w*, a retailer expects a profit $\frac{(a-w)^2}{9}$ and thus *M* sets $F_i(w) = \frac{(a-w)^2}{9}$. for i = 1, 2.
- 3.2 Determine w^* and F^* chosen by M.
 - The profit of *M* is: $wQ^* - C(Q^*) + 2F = \frac{2}{3}(a-w)(2w-a) + \frac{2}{9}(a-w)^2 = \frac{2}{9}(a-w)(5w-2a)$

•
$$\max_{w} \frac{2}{9}(a-w)(5w-2a) \Rightarrow 7a-10w = 0$$
, thus so
 $w = \hat{w} = \frac{7a}{10} < w^{*}$.

- $\hat{q}_1 = \hat{q}_2 = \frac{a}{10}, \hat{F}_1 = \hat{F}_2 = \frac{a^2}{100}, \hat{\Pi}_1 = \hat{\Pi}_2 = 0, \hat{\Pi}^M = \frac{a^2}{10} > \Pi^M.$
- 3.3 Compare with the profit of the vertically integrated structure.

◆□▶ ◆母▶ ◆目▶ ◆日▶ 目目 のへの

Slotting allowances Resale Price Maintenance

3. Franchise contract

3.1 w being set, what is the level F(w) chosen by M?

- ► For a given *w*, a retailer expects a profit $\frac{(a-w)^2}{9}$ and thus *M* sets $F_i(w) = \frac{(a-w)^2}{9}$. for i = 1, 2.
- 3.2 Determine w^* and F^* chosen by M.
 - The profit of *M* is: $wQ^* - C(Q^*) + 2F = \frac{2}{3}(a-w)(2w-a) + \frac{2}{9}(a-w)^2 = \frac{2}{9}(a-w)(5w-2a)$

$$\max_{w} \frac{2}{9}(a-w)(5w-2a) \Rightarrow 7a-10w = 0, \text{ thus so}$$
$$w = \hat{w} = \frac{7a}{10} < w^*.$$

$$\hat{q}_1 = \hat{q}_2 = \frac{a}{10}, \hat{F}_1 = \hat{F}_2 = \frac{a^2}{100}, \hat{\Pi}_1 = \hat{\Pi}_2 = 0, \hat{\Pi}^M = \frac{a^2}{10} > \Pi^M.$$

3.3 Compare with the profit of the vertically integrated structure.

F = the profit of a retailer = $P(Q)q_i - wq_i$, the profit of M is thus wQ - C(Q) + P(Q)Q - wQ = P(Q)Q - C(Q).

9/47

Slotting allowances Resale Price Maintenance

3. Franchise contract

3.1 w being set, what is the level F(w) chosen by M?

- ► For a given *w*, a retailer expects a profit $\frac{(a-w)^2}{9}$ and thus *M* sets $F_i(w) = \frac{(a-w)^2}{9}$. for i = 1, 2.
- 3.2 Determine w^* and F^* chosen by M.
 - The profit of *M* is: $wQ^* - C(Q^*) + 2F = \frac{2}{3}(a-w)(2w-a) + \frac{2}{9}(a-w)^2 = \frac{2}{9}(a-w)(5w-2a)$

•
$$\max_{w} \frac{2}{9}(a-w)(5w-2a) \Rightarrow 7a-10w = 0$$
, thus so $w = \hat{w} = \frac{7a}{10} < w^*$.

•
$$\hat{q}_1 = \hat{q}_2 = \frac{a}{10}, \hat{F}_1 = \hat{F}_2 = \frac{a^2}{100}, \hat{\Pi}_1 = \hat{\Pi}_2 = 0, \hat{\Pi}^M = \frac{a^2}{10} > \Pi^M.$$

3.3 Compare with the profit of the vertically integrated structure.

F = the profit of a retailer = $P(Q)q_i - wq_i$, the profit of M is thus wQ - C(Q) + P(Q)Q - wQ = P(Q)Q - C(Q).

► With franchises, *M* obtains the profit of the integrated structure $\hat{\Pi}^M = \hat{\Pi}^I = \frac{a^2}{10} > \Pi^I = \frac{7a^2}{72}.$

To better coordinate (pricing, provision of service,...) and thus improve the joint profit of the vertical structure

- To better coordinate (pricing, provision of service,...) and thus improve the joint profit of the vertical structure
- However, some contracts may have anti-competitive effects

10/47

- To better coordinate (pricing, provision of service,...) and thus improve the joint profit of the vertical structure
- However, some contracts may have anti-competitive effects
 - Exclusionary effects on the upstream and/or the downstream market (Barriers to entry, foreclosure...);

- To better coordinate (pricing, provision of service,...) and thus improve the joint profit of the vertical structure
- However, some contracts may have anti-competitive effects
 - Exclusionary effects on the upstream and/or the downstream market (Barriers to entry, foreclosure...);
 - Softening of competition upstream and/or downstream;

◆□▶ ◆□▶ ◆ ■▶ ◆ ■▶ ● ■■ の ♥ 10/47

- To better coordinate (pricing, provision of service,...) and thus improve the joint profit of the vertical structure
- However, some contracts may have anti-competitive effects
 - Exclusionary effects on the upstream and/or the downstream market (Barriers to entry, foreclosure...);
 - Softening of competition upstream and/or downstream;

Pros and Cons of 2 vertical restraints

- Slotting allowances
 - Foros, Kind and Sand (2009)
 - Shaffer (1991)

◆□▶ ◆□▶ ◆ ■▶ ◆ ■▶ ● ■■ の ♥ 10/47

- To better coordinate (pricing, provision of service,...) and thus improve the joint profit of the vertical structure
- However, some contracts may have anti-competitive effects
 - Exclusionary effects on the upstream and/or the downstream market (Barriers to entry, foreclosure...);
 - Softening of competition upstream and/or downstream;

Pros and Cons of 2 vertical restraints

- Slotting allowances
 - Foros, Kind and Sand (2009)
 - Shaffer (1991)
- Resale price Maintenance
 - MacAfee and Schwartz (1994)

◆□▶ ◆□▶ ◆ □▶ ◆ □▶ 三日日 の Q @ 10/47

Slotting allowances

- Up-front payment from producer to retailer to allow for the listing of a new product.
- Slotting fees in the US (FTC Report, 2003):
 - ► Frequency: 50% to 90% of all new grocery products.
 - Amount: Important compared to the total cost of launching a new product BUT varies a lot from one producer to another.

Why using slotting fees?

- Efficiency in allocating scarce shelf space
 - Screening device.
 - Sharing of risk and compensation for extra cost associated to a new product launching.
 - Better coordination in the chain on the producer's promotion of the new product, Foros et al (2009).
- Slotting fees relax downstream competition Shaffer,1991

Slotting Fees and incentives to advertise

Foros, Kind & Sand (2009)

Assumptions

- P chooses an advertising service in quantity s that improves final demand D(p, s).
- The cost of advertising $\varphi(s)$ is increasing in s.

The game:

- 1. P (or R) offers a two-part tariff contract (w, F). R (or P) accepts or rejects the contract.
- 2. Simultaneously, P chooses s and R chooses p.

Program of a vertically integrated firm : FOC :

$$(p-c)\frac{\partial D(p,s)}{\partial p} + D(p,s) = 0$$
$$(p-c)\frac{\partial D(p,s)}{\partial s} - \frac{\partial \varphi(s)}{\partial s} = 0$$

The solution is (p^M, s^M) .

In stage 2, retailer's and producer's FOCs are :

$$(p - w)\frac{\partial D(p, s)}{\partial p} + D(p, s) = 0$$

$$(w - c)\frac{\partial D(p, s)}{\partial s} - \frac{\partial \varphi(s)}{\partial s} = 0$$

 $\Rightarrow (p(w), s(w))$ In stage 1, (w^*, F^*) is such that :

$$\max_w(p(w)-c)D(p(w),s(w))-arphi(s(w))\Rightarrow w^*>c$$

Franchise fee vs Slotting Fee

- If P makes the offer, R pays a franchise fee F^{*} = (p^{*} − w^{*})D(p^{*}, s^{*}) > 0;
- ► If R makes the offer, P pays a slotting fee $F^* = -(w^* c)D(p^*, s^*) + \varphi(s^*) < 0.$

Double distortion $p^M > w^* > c$ implies: 1) Double margin $p^* > p^M$; 2) Underprovision of service $0 < s_{\pm}^* < s_{\pm}^M$. To restore efficiency R or P offers a three-part tariff (w, F, θ) with θ a revenue sharing rule (royalty).

$$(\theta p - w) \frac{\partial D(p, s)}{\partial p} + \theta D(p, s) = 0$$

$$((1 - \theta)p + w - c) \frac{\partial D(p, s)}{\partial s} - \frac{\partial \varphi(s)}{\partial s} = 0$$

In stage 1, $(\hat{w}, \hat{F}, \hat{\theta})$ is such that $\hat{w} = \theta c$: Then it is immediate that for any $\theta > 0$ $p = p^M$ and, when $\hat{\theta} \to \epsilon$, $s \to s^M$.

Franchise fee vs Slotting Fee

- ▶ If P makes the offer, R pays a franchise fee: $\hat{F} \rightarrow (\hat{\theta}p^M - \hat{w})D(p^M, s^M) > 0$ (close to 0);
- ► If R makes the offer, P pays a slotting fee: $\hat{F} \rightarrow -((1 - \hat{\theta})p^M + \hat{w} - c)D(p^M, s^M) + \varphi(s^M) < 0.$

Efficiency is restored!

PROs of Slotting Fees

- When R is powerful, a slotting fee enables the retailer to make the producer the residual claimant ⇔ similar to a franchise when the producer is powerful.
- The producer then chooses the wolesale price and the level of service that maximizes the industry profit

◆□▶ ◆□▶ ◆ ■▶ ◆ ■ ▶ ● ■ ■ の ♥ ● 15/47

PROs of Slotting Fees

- When R is powerful, a slotting fee enables the retailer to make the producer the residual claimant ⇔ similar to a franchise when the producer is powerful.
- The producer then chooses the wolesale price and the level of service that maximizes the industry profit
- The producer tranfers its whole profit to the retailer through the slotting fee payment.

CONs of Slotting Fees

The next paper present a potential anticompetitive effect.

◆□▶ ◆□▶ ◆ ■▶ ◆ ■ ▶ ● ■ ■ の ♥ ● 15/47

Slotting allowances: Anti-competitive effect

Shaffer (1991)

- Upstream perfect competition (unit production cost: c)
- Imperfect downstream competition



Small producers vs big retailers

Assumptions

- ▶ $\partial_{p_i} D_i < 0$ and $\partial_{p_j} D_i > 0$ and $|\partial_{p_i} D_i| > \partial_{p_j} D_i$: Products at each store are imperfect substitutes.
- Let $p = (p_1, p_2)$ define the vector of retail prices.
- ▶ Let *w_i* be the unit wholesale price and *F_i* the fixed fee specified in the contract with retailer i's supplier.
- Let $\pi_i(p, F_i) = (p_i w_i)D_i(p) F_i$ denote retailer i's profit.
 - ► If $\Delta = \partial_{p_i}^2 \pi_i \partial_{p_j}^2 \pi_j \partial_{p_i} \partial_{p_j} \pi_i \partial_{p_j} \partial_{p_i} \pi_j$, we need $\Delta > \partial_{p_j} D_i \partial_{p_j} \partial_{p_i} \pi_j$ to ensure that there exists a unique Nash equilibrium and that each retailer's equilibrium profit, absent fixed fee, decreases in its wholesale price.
 - ► $\partial_{p_i}^2 \pi_i < 0$ and $\partial_{p_i} \partial_{p_j} \pi_i > 0$: a firm's marginal profit increases with its rival price \Rightarrow Bertrand reaction functions slope upward.

<ロ><同><同><目><同><目><目><同><目><17/47

The Game

3-stage game

- 1. Producers simultaneously announce the terms of their sales contracts (w_i, F_i)
- 2. Retailers then choose which producer to buy from.
- 3. Retailers compete in price.

All information is common knowledge!

The retailer is legally prohibited from accepting slotting allowances but then not stocking producer's good!

・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・

No slotting allowances: $F_i = 0$

• The first order conditions in stage 3 for i = 1, 2 are:

$$\partial_{p_i}\pi_i = (p_i - w_i)\partial_{p_i}D_i + D_i = 0$$

- lt defines a unique equilibrium in prices $(p_1^*(w_1, w_2), p_2^*(w_1, w_2))$
- In the first two-stages, to obtain shelf space at store i, a producer

Chooses the contract maximizing the retailer's profit:

$$\max_{w_i}(p_i^*-w_i)D_i(p_i^*,p_j^*)$$

Under its participation constraint:

$$(w_i - c)D_i(p_i^*, p_j^*) \ge 0$$

$$-D_i + \frac{\partial p_i^*}{\partial w_i} \underbrace{((p_i^* - w_i)\partial_{p_i}D_i + D_i)}_{=0} + (p_i - w_i) \underbrace{\partial_{p_j}D_i}_{<|\partial_{p_i}D_i|} \underbrace{\frac{\partial p_j^*}{\partial w_i}}_{$$

Equilibrium:

In equilibrium, all suppliers offer $w_i = c$ and retail prices are <ロ> < □> < □> < 三> < 三> < 三> 三□ = のへで 19/47 $p_1^*(c,c) = p_2^*(c,c) = p^b$. 19/47

Slotting allowances

- There is no restriction on the sign of fixed fees.
- Exactly as in the previous case, the FOCs in stage 3 for i = 1, 2 are:

$$\partial_{p_i}\pi_i = (p_i - w_i)\partial_{p_i}D_i + D_i = 0$$

- ▶ It defines a unique equilibrium in prices $(p_1^*(w_1, w_2), p_2^*(w_1, w_2))$
- ▶ In the first two-stages, to obtain shelf space at store *i*, a producer.
 - Chooses the contract maximizing retailer's profit:

$$\max_{w_i,F_i}(p_i^*-w_i)D_i(p_i^*,p_j^*)-F_i$$

Under its participation constraint:

$$(w_i-c)D_i(p_i^*,p_j^*)+F_i\geq 0$$

20/47

Slotting allowance: $F_i < 0$

- ▶ Binding the participation constraint F_i = −(w_i − c)D_i(p^{*}_i, p^{*}_j) and replacing in the maximization program: max(p^{*}_i − c)D_i(p^{*}_i, p^{*}_j)
- The FOC rewrites as:

 $[(\boldsymbol{p}_i^*-\boldsymbol{c})\partial_{\boldsymbol{p}_i}D_i(\boldsymbol{p}_i^*,\boldsymbol{p}_j^*)+D_i(\boldsymbol{p}_i^*,\boldsymbol{p}_j^*)]\frac{\partial \boldsymbol{p}_i^*}{\partial w_i}+(\boldsymbol{p}_i^*-\boldsymbol{c})\partial_{\boldsymbol{p}_j}D_i(\boldsymbol{p}_i^*,\boldsymbol{p}_j^*)\frac{\partial \boldsymbol{p}_j^*}{\partial w_i}=0$

and thus (using retailer's FOC) simplifies as:

$$[(w_i - c)\partial_{p_i}D_i(p_i^*, p_j^*)]\frac{\partial p_i^*}{\partial w_i} + (p_i^* - c)\partial_{p_j}D_i(p_i^*, p_j^*)\frac{\partial p_j^*}{\partial w_i} = 0$$

▶ By assumption ∂_{pi}D_i < 0 and ∂_{pj}D_i > 0: products are imperfect substitutes.

► By totally differentiating stage-3 retailer FOC, we have $\frac{\partial p_i^*}{\partial w_i} = \frac{\partial_{p_i} D_i \partial_{p_j}^2 \pi_j}{\Delta} > 0 \text{ and } \frac{\partial p_j^*}{\partial w_i} = -\frac{\partial_{p_i} D_i \partial_{p_j} \partial_{p_i} \pi_j}{\Delta} > 0$

Result

The equilibrium supplier contract is $w_i = w^S > c$ and $F_i = F^S < 0$ and the resulting retail prices are $p_i^*(w^S, w^S) = p^S \ge p_{*}^b$.

Insights

Shaffer (1991)

- By committing to w_i > c, retailer i gives retailer j an incentive to raise its price ⇒ profitable for i
- The lost revenue from each sale is returned ex ante through the slotting allowance: F_i < 0</p>
- Retailer *j* has similar incentives and thus both commit to $w^S > c$.
- Producers have no profit. Retail prices and profit are higher when producers can use slotting allowances to obtain shelf space.
- This result depends critically on contracts observability.
- Slotting allowances are legal and widespread. Here, Shaffer shows that even perfectly competitive producers can use them to relax retail competition to the detriment of consumers.

<ロ><同><同><目><日><日><日><日><日><日><日><日><日><10</td>

Resale Price Maintenance

- Legislation: prohibited in EU, and also in the US until the Leegin case (2007)
 - Leather products of high quality : sales service important
 - Since 2007, the US apply a rule of reason.
- In France (Lang Law 1981) or Spain since 1974, Germany since 2002 and Italy since 2005 Lang Law !
- RPM Pros
 - Solves double marginalization;
 - Enhances the level of service provided to consumers (correct the free-riding).
- RPM Cons
 - RPM destroys retail competition.
 - Reduces upstream competition.

<□ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □

Resale Price Maintenance



- With **public** contracts, a RPM is not necessary to restore p^M
 - Bertrand competition restores the efficient outcome w = p: Zero margin downstream, no double marginalization (w = p^M)
 - Imperfect / Cournot competition- a simple two-part tariff restore p^M (see Exercice 1).
- ► With retail services: A RPM eliminates horizontal externality (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.

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.

< □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □

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 $s_1 + s_2 = s$

◆□▶ ◆□▶ ◆ ■▶ ◆ ■ ▶ ● ■ ■ の ♥ 05/47

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 $c(s_i) = s_i^2$

◆□▶ ◆□▶ ◆ 三▶ ◆ 三▶ 三日 * の Q @ 25/47

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?

< □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □

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?

< □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □

1. What are the choices (p^M, s_i^M) of a fully vertically integrated structure?

- 1. What are the choices (p^M, s_i^M) of a fully vertically integrated structure?
 - The integrated structure maximizes the profit

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

with respect to p, s_1 and s_2 .

- 1. What are the choices (p^M, s_i^M) of a fully vertically integrated structure?
 - The integrated structure maximizes the profit

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

with respect to p, s_1 and s_2 .

• We obtain
$$p^M = v$$
, $s_1^M = s_2^M = \frac{v-c}{2}$

- 1. What are the choices (p^M, s_i^M) of a fully vertically integrated structure?
 - The integrated structure maximizes the profit

$$\underset{p,s_{1},s_{2}}{Max(p-c)(v+s_{1}+s_{2}-p)-s_{1}^{2}-s_{2}^{2}}$$

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. P and the two retailers are separated. What happens if P offers a simple uniform unit wholesale price contract w?

- 1. What are the choices (p^M, s_i^M) of a fully vertically integrated structure?
 - The integrated structure maximizes the profit

$$\underset{p,s_{1},s_{2}}{Max(p-c)(v+s_{1}+s_{2}-p)-s_{1}^{2}-s_{2}^{2}}$$

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. P and the two retailers are separated. What happens if P offers a simple uniform unit wholesale price contract w?
 - Bertrand competition p = w, s₁ = s₂ = 0 and, so s = 0 and w = p = \frac{v+c}{2}. A shop refrains from providing services that are not appropriable.
Exercise 2: RPM to eliminate free-riding

- 1. What are the choices (p^M, s_i^M) of a fully vertically integrated structure?
 - The integrated structure maximizes the profit

$$\underset{p,s_{1},s_{2}}{Max(p-c)(v+s_{1}+s_{2}-p)-s_{1}^{2}-s_{2}^{2}}$$

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. P and the two retailers are separated. What happens if P offers a simple uniform unit wholesale price contract w?
 - Bertrand competition p = w, s₁ = s₂ = 0 and, so s = 0 and w = p = \frac{v+c}{2}. A shop refrains from providing services that are not appropriable.
 - This leads to a suboptimal level of effort and a suboptimal global demand.

< □ > < □ > < □ > < Ξ > < Ξ > Ξ = の Q · 26/47

Introduction Contracts Vertical Integration and raising Rival's costs

3 *P* offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.

- 3 *P* offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.
 - RPM + two-part tariff can reach the first best!

- 3 *P* offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.
 - RPM + two-part tariff can reach the first best!
 - ▶ The retailer 1 chooses its effort level *s*₁ to maximize:

$$M_{s_1}(p-w)rac{(v+s_1+s_2-p)}{2}-s_1^2$$

<□ > < @ > < E > < E > E| = のへで 27/47

- 3 *P* offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.
 - RPM + two-part tariff can reach the first best!
 - ▶ The retailer 1 chooses its effort level *s*₁ to maximize:

$$M_{s_1}(p-w) rac{(v+s_1+s_2-p)}{2} - s_1^2$$

$$\frac{v-w}{4} = s_i^M = \frac{v-c}{2}$$

- 3 *P* offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.
 - RPM + two-part tariff can reach the first best!
 - ▶ The retailer 1 chooses its effort level *s*₁ to maximize:

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

$$\frac{v-w}{4} = s_i^M = \frac{v-c}{2}$$

Therefore,
$$w^* = 2c - v < c$$
 and
 $F_i = (p^M - w^*) \frac{(v + s_1^M + s_2^M - p^M)}{2} - (s_i^M)^2 = \frac{3}{4}(v - c)^2.$

- 3 *P* offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.
 - RPM + two-part tariff can reach the first best!
 - ▶ The retailer 1 chooses its effort level *s*₁ to maximize:

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

$$\frac{v-w}{4} = s_i^M = \frac{v-c}{2}$$

Therefore,
$$w^* = 2c - v < c$$
 and
 $F_i = (p^M - w^*) \frac{(v+s_1^M + s_2^M - p^M)}{2} - (s_i^M)^2 = \frac{3}{4}(v-c)^2$.
 $w = -v + 2c < c, \ p = p^M = \frac{v+c}{2}$ and $F_i = \frac{3}{4}(v-c)^2$ to get back
the industry profit, $\Pi^M = \frac{(v-c)^2}{2}$.

- 3 *P* offers a contract (w, F, p) i.e. a contract with two-part tariff and resale price maintenance.
 - RPM + two-part tariff can reach the first best!
 - ▶ The retailer 1 chooses its effort level *s*₁ to maximize:

$$M_{s_1}(p-w) rac{(v+s_1+s_2-p)}{2} - s_1^2$$

$$\frac{v-w}{4} = s_i^M = \frac{v-c}{2}$$

Therefore, $w^* = 2c - v < c$ and $F_i = (p^M - w^*) \frac{(v+s_1^M + s_2^M - p^M)}{2} - (s_i^M)^2 = \frac{3}{4}(v-c)^2$. $w = -v + 2c < c, p = p^M = \frac{v+c}{2}$ and $F_i = \frac{3}{4}(v-c)^2$ to get back the industry profit, $\Pi^M = \frac{(v-c)^2}{2}$. $s_1 = s_2 = s^M \Rightarrow$ horizontal externality solved!.

Mc Afee and Schwartz (1994)

Assumptions

- ▶ *P* sells a product to two Cournot-competing retailers i = 1, 2 each selling a quantity q_i . The equilibrium price is $P(q_1 + q_2)$.
- Similar with imperfect price competition.

Mc Afee and Schwartz (1994)

Assumptions

- ▶ *P* sells a product to two Cournot-competing retailers i = 1, 2 each selling a quantity q_i . The equilibrium price is $P(q_1 + q_2)$.
- Similar with imperfect price competition.

3 stage game

- 1. *P* offers **public** contracts (F_i, w_i) to each retailer *i*.
- 2. If *i* accepts the contract, F_i is paid. Acceptance and reject decisions are observed by all.
- 3. Each *i* chooses q_i .

Mc Afee and Schwartz (1994)

Assumptions

- ▶ *P* sells a product to two Cournot-competing retailers i = 1, 2 each selling a quantity q_i . The equilibrium price is $P(q_1 + q_2)$.
- Similar with imperfect price competition.

3 stage game

- 1. *P* offers **public** contracts (F_i, w_i) to each retailer *i*.
- 2. If *i* accepts the contract, F_i is paid. Acceptance and reject decisions are observed by all.
- 3. Each *i* chooses q_i .

Public contracts

• P sets
$$w^* > c$$
, $q^* = q_i(w^*, w^*) = \frac{q^M}{2}$, $\Pi^P = \Pi^M$ and $F_i = \frac{\Pi^M}{2}$.

Mc Afee and Schwartz (1994)

Assumptions

- ▶ *P* sells a product to two Cournot-competing retailers i = 1, 2 each selling a quantity q_i . The equilibrium price is $P(q_1 + q_2)$.
- Similar with imperfect price competition.

3 stage game

- 1. *P* offers **public** contracts (F_i, w_i) to each retailer *i*.
- 2. If *i* accepts the contract, F_i is paid. Acceptance and reject decisions are observed by all.
- 3. Each *i* chooses q_i .

Public contracts

• P sets
$$w^* > c$$
, $q^* = q_i(w^*, w^*) = \frac{q^M}{2}$, $\Pi^P = \Pi^M$ and $F_i = \frac{\Pi^M}{2}$.

Public contract

Public contracts

Solution of each stage.

Stage 3: If i = 1, 2 accepted their contracts, each i sets q_i to maximise (P(q_i, q_j) − w_i)q_i which gives q_i(w_i, w_j).

<□ > < □ > < □ > < Ξ > < Ξ > Ξ = りへで 29/47

Public contracts

Solution of each stage.

- Stage 3: If i = 1, 2 accepted their contracts, each i sets q_i to maximise (P(q_i, q_j) − w_i)q_i which gives q_i(w_i, w_j).
- Stage 2: Let $P(w_i, w_j) = P(q_i(w_i, w_j), q_j(w_i, w_j))$; Each *i* accepts the contract (w_i, F_i) iff $(P(w_i, w_j)) w_i)q_i(w_i, w_j) F_i \ge 0$

・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・

Public contracts

Solution of each stage.

- Stage 3: If i = 1, 2 accepted their contracts, each i sets q_i to maximise (P(q_i, q_j) − w_i)q_i which gives q_i(w_i, w_j).
- Stage 2: Let $P(w_i, w_j) = P(q_i(w_i, w_j), q_j(w_i, w_j))$; Each *i* accepts the contract (w_i, F_i) iff $(P(w_i, w_j)) w_i)q_i(w_i, w_j) F_i \ge 0$
- Stage 1: P chooses w₁ = w₂ = w* to maximize: (P(w_i, w_j) - c)(q_i(w_i, w_j) + q_j(w_j, w_i)), i.e. w* is set at the level such that each firm produces half of the monopoly quantity and the manufacturer obtains the monopoly profit.

< □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > <

Consider now that in stage 1, P offers **secret** contracts (w_i, F_i) to each retailer *i*.

Consider now that in stage 1, P offers **secret** contracts (w_i, F_i) to each retailer *i*.

Secret contracts

With secret two-part tariffs offers, the monopoly outcome may no longer be supported in equilibrium.

Consider now that in stage 1, P offers **secret** contracts (w_i, F_i) to each retailer *i*.

Secret contracts

With secret two-part tariffs offers, the monopoly outcome may no longer be supported in equilibrium.

The equilibrium depends on the retailer's beliefs about its rival's contract.

Consider now that in stage 1, P offers **secret** contracts (w_i, F_i) to each retailer *i*.

Secret contracts

With secret two-part tariffs offers, the monopoly outcome may no longer be supported in equilibrium.

The equilibrium depends on the retailer's beliefs about its rival's contract.

Under symmetric beliefs, each retailer believes that the other receives the same offer as it receives; The monopoly outcome is sustained.

Consider now that in stage 1, P offers **secret** contracts (w_i, F_i) to each retailer *i*.

Secret contracts

With secret two-part tariffs offers, the monopoly outcome may no longer be supported in equilibrium.

The equilibrium depends on the retailer's beliefs about its rival's contract.

- Under symmetric beliefs, each retailer believes that the other receives the same offer as it receives; The monopoly outcome is sustained.
- Under passive beliefs, a retailer that receives an unexpected offer does not revise its belief about the offer made to its rival. Under passive beliefs, a contract must be pairwise-proof!

Secret Contracts and Passive Beliefs

Assumptions

- ▶ *P* sells a product to two Cournot-competing retailers i = 1, 2 each selling a quantity q_i . The equilibrium price is $P(q_1 + q_2)$.
- Similar with imperfect price competition.

・<一部・< E>< E> E| = のQで 31/47

Secret Contracts and Passive Beliefs

Assumptions

- ▶ *P* sells a product to two Cournot-competing retailers i = 1, 2 each selling a quantity q_i . The equilibrium price is $P(q_1 + q_2)$.
- Similar with imperfect price competition.

3-stage game

- 1. *P* offers **secret** contracts (F_i, w_i) to each retailer *i*.
- 2. If *i* accepts the contract, *F_i* is paid. Acceptance and reject decisions are not observed.
- 3. Accepting firms *i* chooses q_i .

There is another variant with *interim observability*.

Secret Contracts Solution of each stage

Stage 3: If i = 1, 2 accepted their contracts, each i only sees its w_i and not the w_j of its rival. i has an anticipation â_j and sets q_i to maximise (P(q_i, â_j) − w_i)q_i which gives q_i(w_i, â_j) for i = 1, 2.

◆□▶ ◆□▶ ◆三▶ ◆三▶ 三回日 のへの

Secret Contracts Solution of each stage

- Stage 3: If i = 1, 2 accepted their contracts, each i only sees its w_i and not the w_j of its rival. i has an anticipation â_j and sets q_i to maximise (P(q_i, â_j) − w_i)q_i which gives q_i(w_i, â_j) for i = 1, 2.
- Stage 2: Let P(w_i, ĝ_j) = P(q_i(w_i, ĝ_j), ĝ_j); Each *i* accepts the contract (w_i, F_i) offered by P in stage 1 iff (P(w_i, ĝ_j) w_i)q_i(w_i, ĝ_j) F_i ≥ 0.

・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・
 ・

Secret Contracts Solution of each stage

- Stage 3: If *i* = 1, 2 accepted their contracts, each *i* only sees its *w_i* and not the *w_j* of its rival. *i* has an anticipation *q̂_j* and sets *q_i* to maximise (*P*(*q_i*, *q̂_i*) − *w_i*)*q_i* which gives *q_i*(*w_i*, *q̂_i*) for *i* = 1, 2.
- Stage 2: Let P(w_i, ĝ_j) = P(q_i(w_i, ĝ_j), ĝ_j); Each *i* accepts the contract (w_i, F_i) offered by P in stage 1 iff (P(w_i, ĝ_j) w_i)q_i(w_i, ĝ_j) F_i ≥ 0.
- Stage 1: P sets

$$F_i = (P(w_i, \hat{q}_j) - w_i)q_i(w_i, \hat{q}_j)$$

and chooses w_i to maximize:

$$(P(w_i, \hat{q}_j) - c)q_i(w_i, \hat{q}_j) + \underbrace{(P(w_j, \hat{q}_i) - c)q_j(w_j, \hat{q}_i)}_{(w_j, \hat{q}_j)}$$

independent of wi

i.e. the joint profit of the pair P - i. $w_i^* = c$ and q_i^* is the Cournot quantity! Proof

- With secret contracts, opportunism prevents P from realizing the monopoly profit.
- Industry-wide Resale Price Maintenance may prevent opportunism and restore Monopoly profit!
- ▶ If *P* offers each retailer *i* an industry-wide RPM p^M and a wholesale price w_i with $F_i = (p^M w_i)\frac{q^M}{2}$. Each retailer is protected against any deviation from the rival. Cire

RPM

Industry-wide Resale Price Maintenance \Rightarrow destroys downstream competition and restores the monopoly profit to the detriment of consumers (higher prices).

Vertical Integration and raising Rival's costs

- May improve the coordination issues within the vertical chain which can raise both the profit of the industry and consumer surplus;
- Partial vertical integration of a monopolist with a retailer may fail to solve the free riding on service and also have anticompetitive effects when contracts are secret (restore the monopoly power).
- Partial vertical integration may also trigger raising rival's cost strategy
 - Anti-competitive effects for the downstream rival
 - It may be detrimental to consumers.

(ロ)、(同)、(E)、(E)、(E)、(C)、(34/47)



Vertical separation

- Bertrand Competition upstream implies : w1=w2=0.
- At the downstream level, imperfect price competition p1*=p2*>0



Partial Vertical Integration

- U1-D1 integrated
- If U1-D1competes à la Bertrand on the upstream market with U2 w1=w2=0.
- At the downstream level, imperfect price competition p1*=p2*>0
- No strategic effect of vertical integration

<ロ><同><同><日><日><日><日><日><日><日><日><日><日><10</td>



Partial Vertical Integration

- U1-D1 integrated
- If U1-D1 stops serving D2. U2 sets the monopoly price: w2= W^M
- At the downstream level, asymmetric imperfect price competition 0<p1<p2
- $\pi_1(0, w^M) > \pi_1(0, 0) > \pi_2(w^M, 0)$

<ロ><同><同><日><日><日><日><日><日><日><日><日><日><10</td>



Backward Vertical Integration

- U2-D2 are now better off integrating
- $\pi_{U2}(w^M) + \pi_2(w^M, 0) < 0 + \pi_2(0,0)$
- Each downstream firm supplies internally
- At the downstream level, asymmetric imperfect price competition p1*=p2*

•
$$\pi_1(0,0) = \pi_2(0,0)$$

- ► If U1 D1 competes with U2 a la Bertrand, vertical integration is useless.
- ► If U1 D1 stops entirely competing, then U2 and D2 integrate backward and vertical integration is useless!
- ► OSS show that there is an intermediate solution. The *w* set by U1 D1 directly controls the price that the downstream rival pays, and the programme of the integrated firm becomes:

$$Max_w \pi_1(0, w)$$

u.c
$$\pi_{U2}(w) + \pi_2(w,0) \ge \pi_2(0,0)$$

The solution is such that the constraint is just binding:

$$\pi_{U2}(w) + \pi_2(w,0) = \pi_2(0,0) \Rightarrow \bar{w}$$

We show that there exists $\bar{w} > 0$ such that $\pi_{U2}(\bar{w}) + \pi_2(\bar{w}, 0) > \pi_2(0, 0)$

$$\frac{\partial \pi_{U2}^*(w)}{\partial w}|_{w=0} = D_2(p_1^*, p_2^*) + \underbrace{w \frac{\partial D_2^*(w)}{\partial w}}_{0}$$

$$\frac{\partial \pi_2^*(w)}{\partial w}|_{w=0} = -D_2(p_1^*, p_2^*) + \underbrace{\frac{\partial \pi_2^*}{\partial p_1} \frac{\partial p_1^*}{\partial w}}_{>0} + \underbrace{\frac{\partial \pi_2^*}{\partial p_2} \frac{\partial p_2^*}{\partial w}}_{0}$$



▶ 토I= ∽ Q @ 40/47

Limits of this analysis

Sensitive to the unit price contract assumption;

► The commitment issue!

<□> < □> < □> < □> < □> < □> < □> < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ >

References

- Foros, O, H.J. Kind, and J. Y. Sand, (2009). "Slotting Allowances and Manufacturers' Retail Sales Effort" *Southern Economic Journal*, 76(1), 266-282.
- McAfee R. and M. Schwartz, (1994). "Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity, and Uniformity", *American Economic Review*, 84, 1,210-230.
- Motta, M.(2004). "Competition Policy: Theory and Practice", Cambridge University Press.
- Ordover, J., G. Saloner and S. Salop, (1990). "Equilibrium Vertical Foreclosure", *The American Economic Review*, 80, 1, pp. 127-142.
- Shaffer, G. (1991). "Slotting Allowances and Retail Price Maintenance: A Comparison of Facilitating Practices," *RAND Journal of Economics*, 22 (1), 120-35.

Proof: Slotting allowances

Shaffer (1991)

back

$$(p_i - w_i)\partial_{p_i}D_i(p_i, p_j) + D_i(p_i, p_j) = 0$$
 (1)

$$(p_j - w_j)\partial_{p_j}D_j(p_i, p_j) + D_j(p_i, p_j) = 0$$
⁽²⁾

By applying implicit function theorem to stage-3 retailer FOC, we have:

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{-\partial_{p_{i}} D_{i}(p_{i}, p_{j}) + \partial_{p_{i}} \partial_{p_{j}} \pi_{i}(p_{i}, p_{j}) \frac{\partial p_{j}}{\partial w_{i}}}{\partial_{p_{i}}^{2} \pi_{i}(p_{i}, p_{j})} \qquad (3)$$

$$\frac{\partial p_{j}}{\partial w_{i}} = -\frac{-\partial_{p_{j}} \partial_{p_{i}} \pi_{j}(p_{i}, p_{j}) \frac{\partial p_{i}}{\partial w_{i}}}{\partial_{p_{j}}^{2} \pi_{j}(p_{i}, p_{j})} \qquad (4)$$

replacing (4) in (3), we obtain:

$$\frac{\partial p_{i}}{\partial w_{i}} = \frac{\partial_{p_{i}} D_{i}(p_{i}, p_{j}) \partial_{p_{j}}^{2} \pi_{j}(p_{i}, p_{j})}{\Delta} > 0$$

$$\frac{\partial p_{j}}{\partial w_{i}} = -\frac{\partial_{p_{i}} D_{i}(p_{i}, p_{j}) \partial_{p_{j}} \partial_{p_{i}} \pi_{j}(p_{i}, p_{j})}{\Delta} > 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{\partial_{p_{i}} D_{i}(p_{i}, p_{j}) \partial_{p_{j}} \partial_{p_{i}} \pi_{j}(p_{i}, p_{j})}{\Delta} > 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{\partial_{p_{i}} D_{i}(p_{i}, p_{j}) \partial_{p_{j}} \partial_{p_{i}} \pi_{j}(p_{i}, p_{j})}{\Delta} = 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{\partial_{p_{i}} D_{i}(p_{i}, p_{j}) \partial_{p_{j}} \partial_{p_{i}} \pi_{j}(p_{i}, p_{j})}{\Delta} = 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{\partial_{p_{i}} D_{i}(p_{i}, p_{j}) \partial_{p_{j}} \partial_{p_{i}} \pi_{j}(p_{i}, p_{j})}{\Delta} = 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{\partial_{p_{i}} D_{i}(p_{i}, p_{j}) \partial_{p_{j}} \partial_{p_{i}} \pi_{j}(p_{i}, p_{j})}{\Delta} = 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{\partial p_{i}}{\partial w_{i}} = 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = -\frac{\partial p_{i}}{\partial w_{i}} = 0$$

$$\frac{\partial p_{i}}{\partial w_{i}} = 0$$
Lang Law



Main Objectives:

- All consumers have equal access to books- a unique price other the whole national territory (no local monopoly)
- It preserves the density of bookstores and the quality of services, as small book stores can fight in service against large store.
- This enables bookstore to offer "selective books" and not only best sellers.

Main critics: "I fail to see how a regime that keeps book prices higher than they need to be promotes culture" said Mario Monti in 2000 (European Commissionner for Competition)

back

In stage 3 q_i is such that $\frac{\partial P(q_i,\hat{q}_j)}{\partial q_i}q_i + (P(q_i,\hat{q}_j) - w_i) = 0$ (FOC of the retailer). In stage 1, w_i is such that it maximizes $(P(w_i,\hat{q}_j) - c)q_i(w_i,\hat{q}_j)$ which rewrites as:

$$(\underbrace{\frac{\partial P(q_i, \hat{q}_j)}{\partial q_i}q_i + (P(q_i, \hat{q}_j) - w_i)}_{=0} + (w_i - c))\frac{\partial q_i}{\partial w_i} = 0.$$

Using the FOC of the retailer, we obtain that: $w_i = c$.

"The pressure of competition begins at the retail level. When retailers are very competitive, they make demands on their wholesalers and brokers for price relief, such as quantity trade discounts. The wholesalers and brokers, in an effort to protect their retail customers, plead with the manufacturer for a lower price. The manufacturer, in turn, strives to improve his efficiency to lower costs and thereby reduce his price."

"If the retail price is fixed, all prices down the line of distribution are stable and everyone is happy, except the consumer."

O'Brien and Shaffer (1992), "Vertical Control with Bilateral Contracts", The RAND Journal of Economics , Autumn, 1992, Vol. 23, No. 3, pp. 299-308.