Bundling and Competition for Slots: On the Portfolio Effects of Bundling

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Motivation 1: Competition among portfolios

- Firms sell portfolios of distinct products and buyers want to build up their own portfolios
- Publishers of academic journals selling to Libraries
- Movie studios selling to Movie theaters or TV broadcasting companies
- Manufacturers (Nestle, Danone) selling to supermarkets

Motivation II: Slot (or shelf space) constraint

- **Slotting arrangements**, the payment by manufacturers for retail shelf space, have become increasingly important
- Recent antitrust litigation:
- R.J. Reynolds Tobacco Co. v. Philip Morris, Inc. (2002)
- American Booksellers Ass'n, Inc. v. Barnes & Noble (2001)
- FTC v. H.J. Heinz Co.(2000)
- Federal Trade Commission studies: FTC Report (2001) and FTC Study (2003)

Questions

- When firms compete to sell portfolios of distinct products to a buyer having a slot constraint,

1. How bundling and slotting contracts affect competition for slots and social welfare?

2. Implications on horizontal merger?

Answer to question 1

- Without bundling, equilibrium often does not exist

- With bundling,

1. Each firm has an incentive to bundle its products to soften competition

2. An efficient equilibrium always exists

3. Without slotting contracts, all equilibria are efficient for Digital products

4. With slotting contracts, inefficient equilibria exist even for Digital products

Société des Caves de Roquefort

- Conseil de la Concurrence (2004) fined Société des Caves de Roquefort for using selectivity or exclusivity contracts with supermarket chains.

- Its market share in the Roquefort cheese market was 70%

- But, through the contracts, it could occupy eight among all nine brands that Carrefour, a supermarket chain, carried.

Procter & Gamble

- "P&G has big plans for the shelves of tiny stores in emgering nations" (Wall Street Journal, July 17, 2007)

- 'Golden Store' arrangement: to be considered a golden store, retailers must agree to carry 40 or so P&G items – displayed together

Slots in Movie theator

- Cahiers du Cinema: 12 Propositions for the movie industry (April, 2007)

"5. To limit the number of copies per movie. Certain movies launched with 600, 800 or 1000 copies make illusory all efficient cultural policy. By saturating screens, …, these movies impose on other movies a small access to the remaining screens. …"

Block booking

- Two supreme court decisions: per se illegal

- U.S, v. Paramount Pictures (1948)

- U.S. v. Loew's (1962)

- Reaffirmed in court of appeal: MCA Television Ltd. V. Public Interest Corp. (1999)

Leverage theory

- According to the Court, "A distributor can use the market power granted by the copyright in a "desirable" film to force exhibitors to license a second "undesirable" film."

- Chicago school: A firm has no incentive to use bundling for the purpose of foreclosing a rival

Exclusive dealing

- In Standard Fashion Company v. Magrane-Houston Company (1922), the Court struck down the exclusive dealing contract

- Chicago school argument (Bork 1978): "An exclusive dealing contract offers no advantage for the purpose of foreclosing a rival"

Roadmap

1. Leverage theory: Chicago school criticism and Whinston's resurrection of the theory

2. Illustration of the key intuition: example

3. Main results

4. Portfolio effects and horizontal merger: will be skipped

5. Literature review

6. Policy implications

Chicago School Criticism of Leverage Theory

- Two firms (A,B) and two products (1,2)
- A is the monopolist of product 1
- A and B compete in product 2
- One buyer with unit demand for each product
- The same cost for every product: c
- Buyer's utility: $u_A^1 > c$, $u_A^2 > c$, $u_B^2 > c$
- Assumptions: $u_A^1 + u_A^2 > u_B^2$, $c > u_B^2 - u_A^2$

Chicago School Criticism of Leverage Theory

- When $(u_A^1, u_A^2) = (4,3)$, $u_B^2 = 4$, $c=2$
- Without bundling:
  - A sells only product 1 at price equal to 4
  - A's profit: 4-2=2
- With (pure) bundling:
  - A sells the bundle at price of 5
  - A's profit: 5-4=1
- A has no incentive to use bundling for the purpose of monopolizing product 2

Whinston's resurrection of the Leverage Theory

- **Modifications**
- (i) B needs to incur a fixed cost to produce
- (ii) There are two periods: if B does not produce at t=1, A is monopoly in both markets at t=2

- **Key results**
- (i) Bundling allows A to be aggressive and to foreclose B
- (ii) This requires A's pre-commitment to bundling.

Our contribution: resurrection of chicago school's arguments

- Chicago Criticism provides a weak argument for laissez-faire

- Firms have no strict incentive to practice bundling

- Social planner has no strict incentive to favor bundling: actually, prohibiting bundling has no social cost!!!

- We provide a strong argument for laissez-faire

- Bundling is credible since it softens competition

- Under bundling, allocation of slots is always efficient (for digital products)

- Under bundling, no foreclosure

Illustration with a simple example

- Two firms (A, B)
- A has two products with $(u_A^1, u_A^2) = (4,3)$
- B has one product with $u_B^1 = 2$
- Cost of production is zero
- One buyer with two slots and unit demand
- Independent values
- Efficiency requires A's products to occupy the slots

No equilibrium without bundling

- **Simultaneous pricing game**

- **Tie-breaking: when the buyer is indifferent, the buyer maximizes the sum of the gross values**

- **No equilibrium in which B sells its product**

- A can deviate by undercutting B's product's price

No equilibrium without bundling

- No equilibrium in which A sells both products

- Conditional on that A sells both products, the best A can do is to charge $p_A^1 = 2$, $p_A^2 = 1$, realizing a profit of 3

- But if A sells only the best product, it can charge $p_A^1 = 4$

Bundling

- Consider pure bundling: A sells a bundle of both products

- The equilibrium with $P_A = 5$ and $P_B = 0$ exists and is efficient.

Incentive to bundle

- Assume that A wants to sell both products
- Without bundling:

  each product of A faces competition from B's product
- With bundling:

- Competition between individual products becomes competition between portfolios

- The best alternative portfolio is composed of only B's product

- Firm A charges for the value added by recomposing the portfolio with A's products: it is as if A's first product competes with B's product but A's second product does not face any competition

- Bundling softens competition from rival products

Strong argument for laissez-faire

- Firms have an incentive to practice bundling
- Social planner prefers bundling

Model

- There are n firms
- Each firm i has n_i number of products
- One buyer with k number of slots
- Unit demand
- Products of independent values
- cost of production: $c \geq 0$
- u_i^j : Buyer's gross value from firm i's j-th best product
- $u_i^1 \geq u_i^2 \geq \dots \geq u_i^{n_i} \geq 0$
- W.l.o.g, $n_i \geq k$
- u^j: buyer's gross value from the j-th best product among all products
- Assume $u^k > \max\{c, u^{k+1}\}$

Contracts

- **Menu of bundles**: Charge a price for every subset of a portfolio $\left\{ P_i(B_i) \right\}_{B_i \subseteq \mathbf{B}_i}$

- **Independent pricing plus a fixed fee:**

  $(F_i, p_{i1}, p_{i2}, \ldots, p_{ik})$

  - **Independnt pricing**: $F_i = 0$

  - **Pure bundling**: $p_{i1} = p_{i2} \ldots = p_{ik} = 0$

  - **Technology-renting**: $p_{i1} = p_{i2} \ldots = p_{ik} = c$

- **Slotting contracts**: menu of bundles plus the obligation to make each product purchased occupy a slot

  - **Exclusive dealing**: pure bundle of k products with slotting contracts

Incentive to bundle

- Lemma 1: For any profile of rivals' strategies, a firm can find a best response in technology renting strategies.

- Lemma 1 together the previous example shows

- Prop1: Each firm has at least a weak (sometimes a strict) incentive to practice bundling

An efficient equilibrium: for any c

- Prop 2: An efficient technology-renting equilibrium always exists

- Each firm offers a bundle of all its products and charges $p_{i1} = p_{i2} \ldots = p_{in_i} = c$ (i.e. rents its technology at the cost)

$$F_i = \left(U - ck \right) - \left(U_{-i} - c \#_{-i} \right)$$

where $\#_{-i}$ is the $\#$ of products generating U_{-i}

- Remark: Our technology-renting equilibrium generalizes the marginal cost pricing result in the literature on competition with non-linear pricing

Without slotting contracts: Unique allocation of slots for small c

- For c small (i.e. $c < u^k - u^{k+1}$)

    - Prop 3: all equilibria are efficient (regardless of the level of industry concentration)

Without slotting contracts: Unique allocation of slots for any c

- For c> u^k - u^{k+1}, pure bundling can generate inefficient equilibria
- Prop 4: For any c, if marginal prices cannot be smaller than the cost, all equilibria are efficient

Remark: In the practice of competition policy regarding predation, the prices set by a dominant firm are presumed to be abusive if they are below costs.

$$P_i(B_i \bigcup \{ij\}) - P_i(B_i) \geq c$$

$$\text{for any } ij \in \mathrm{B}_i, B_i \subset \mathrm{B}_i, ij \notin \mathrm{B}_i$$

Inefficient equilibrium under slotting contracts

- Two firms, three products, three slots, c=0

$$\left(u_A^1, u_A^2, u_A^3\right) = \left(10, 8, 6\right)$$
$$\left(u_B^1, u_B^2, u_B^3\right) = \left(9, 7, 1\right)$$

- Efficiency requires firm A to sell its two best products and firm B to sell its best product
- Inefficient equilibrium exists: Bertrand competition between two pure bundles leads to $P_A = 7$ and $P_B = 0$

Slotting contracts

- Corollary 3: regardless of using slotting contracts or not

- The technology-renting equilibrium exists

Equilibrium selection

- In the case of duopoly, all other equilibria are *Pareto dominated* by the technology-renting equilibrium in terms of sellers' profits (Bernheim-Whinston 1998, O'Brien-Shaffer 1997)

- But if there are more than two firms, there can be an inefficient equilibrium that is pareto undominated by the technology-renting equilibrium.

Literatture review: bundling

- Most of the papers on bundling study bundling of two goods in the context of second-degree price discrimination : Schmalensee (1984), McAfee et al (1989), Whinston (1990), Salinger (1995), Armstrong (1996), and Nalebuff (2004)

- Two issues: rent extraction of a monopolist or entry deterrence of an incumbent

- Internet and bundling a large number of (information) good: Armstrong (1999) and Bakos and Brynjolfsson (1999, 2000)

Comparison with Jeon-Menicucci (JEEA,2006)

JEEA

- Setting: almost the same

- Budget constraint

- Bundling always reduces social welfare

This paper

- Setting: almost the same

- Slot constraint

- Bundling increases social welfare

Literature review: common agency and exclusive dealing

- Bernheim-Whinston (1985, 1998) and O'Brien-Schaffer (1997, 2005): competition in non-linear tariff between two single-product firms leads to joint profit maximization

- Bernheim-Whinston (1998) and O'Brien-Schaffer (1997): inefficient equilibria based on exclusive dealing are pareto dominated

- Our novelty:

  - competition among portfolios under slot constraint

  - Digital vs. physical good

  - Focus on the unique allocation of slots

Policy implications:

- In the case of Digital products,

  - Pure bundling or block booking is socially desirable: Chicago school is right

  - Slotting contracts or exclusive dealings are not desirable: Chicago school is wrong