Module 8: Exclusive Vertical Contracts - Introduction

Market Organization & Public Policy (Ec 731) · George Georgiadis

Definitions:

- A *vertical contract* is an agreement between two parties located at different stages of the production or distribution chain.
  - An *exclusionary contract* states that one party will deal only with the other party for some set of transactions.

Some examples:

1. *US vs. Dentsply (2001):* Dentsply, the dominant maker of artificial teeth, was accused of illegally excluding rival manufacturers through exclusive agreements with dental wholesalers.
2. *US vs. Microsoft (2001)*: Microsoft was accused of requiring manufacturers, internet service providers and software producers to exclude, at least partially, Netscape's web browser in favor of its own browser.
3. *US vs. Visa / Mastercard (2003):* Visa and Mastercard were sued for their agreements with banks that prohibited them from distributing rival credit cards incl. American Express and Discover.

Some history:

- During most of the 20^{th} century, US courts treated exclusive dealing harshly.
  - Justification: Might lead to exclusion of competitors and therefore monopolization.
- In the early 1950s, the Chicago school
  1. argued that the traditional concern was illogical: rational firms would not engage in this practice for anti-competitive reasons ; and

2. they suggested other efficiency-enhancing reasons why firms might want to write such contracts.

- This is the most controversial area of antitrust!

The "Chicago School" Model

- Three parties: A buyer (B), an incumbent seller (I), and a potential entrant (E).
- Initially, E is not in the market, so B can contract only with I.
- The buyer's demand is $D(p)$ when facing price p, where $D'(p) < 0$.
- The incumbent's p.u cost is c_I.
- The potential entrant must incur an entry cost of $f > 0$ to enter; then his p.u cost is $c_E < c_I$.
- *Timing:*

  1. I can offer B an exclusive contract along with a payment t in return for signing.
  2. B decides whether to accept the contract.
  3. After observing whether B has signed, E decides whether to enter.
  4. The firms that are in the market name prices B, who then chooses purchase quantities.

- *Assumptions:*

  – If E enters, then he wins B's business at $p = c_I - \epsilon$; *i.e.*, $c_I = \arg\max_{p \leq c_I} \{(p - c_E) D(p)\}$.

  – In the absence of an exclusive contract, E finds it optimal to enter ; *i.e.*, $f < (c_I - c_E) D(c_I)$.

- *Main issue:*

  – If t is large enough, I can induce B to sign an exclusive contract, and achieve the monopoly outcome.

  – But is it profitable for him to do so?

- Suppose that I offers an exclusive contract. Then:

  – I's profit is: $\pi_m = (p_m - c_I) D(p_m) - t$, where $p_m = \arg\max \{(p - c_I) D(p)\}$

- B's surplus is: $\int_{p_m}^{\infty} D(s)\,ds + t$

- Suppose that I does not offer an exclusive contract. Then:
  - I's profit is 0
  - B's surplus is: $\int_{c_I}^{\infty} D(s)\,ds$

- B will accept the exclusive contract only if

$$\begin{aligned}\int_{p_m}^{\infty} D(s)\,ds + t &\geq \int_{c_I}^{\infty} D(s)\,ds \\ \Longrightarrow t &\geq \int_{c_I}^{\infty} D(s)\,ds - \int_{p_m}^{\infty} D(s)\,ds = \int_{c_I}^{p_m} D(s)\,ds\end{aligned}$$

  - Is it profitable for I to offer $t = \int_{c_I}^{p_m} D(s)\,ds$; *i.e.*, is $\pi_m = (p_m - c_I)\,D(p_m) - \int_{c_I}^{p_m} D(s)\,ds > 0$?
  - No! (Show graphically!)
  - Difference is due to the deadweight loss of monopoly pricing.

- Therefore, not signing an exclusive contract, thereby allowing entry is optimal for I.

- End of story? No!
  - Researchers have shown how sensible alterations to this model can make exclusive contracts a profitable strategy for excluding rivals.

Partial Exclusion through Stipulated Damages: Aghion and Bolton (AER, 1987)

- Same model as before, with a twist: Exclusive contract specifies
  1. price p for the good
  2. damage payment d that B must pay to I if he buys from E instead.

- Two other modifications:
  - B has demand $D(p) = \begin{cases} 1 & \text{if } p \leq v \\ 0 & \text{otherwise} \end{cases}$.
  - Costs satisfy $f < c_I - c_E$

- Timing is as before:

1. I and B can agree to a contract with price and damage terms (p, d).
2. E decides whether to enter.
3. If E enters, he offers price p_E to B, who decides whether to buy from I or E; if E does not enter, then B buys from I (assuming $p < v$).

Analysis

- Suppose B and I have signed a contract with terms (p, d), and E has entered and offered price p_E.
  - B will purchase from E iff $p_E \leq p - d$. ($p - d$ is I's "effective price")
  - So E finds it profitable to sell to B iff $c_E \leq p - d$, in which case he will set $p_E = p - d$.
- What is the optimal contract that I will offer?
  - Largest possible aggregate surplus is: $v - c_E - f \;\; (> v - c_I)$
  - Consider a contract that sets (p, d) such that $p - d = c_E + f + \epsilon$.
  - Then E will enter, sell to B at $p_E = p - d$, and earn profit $\epsilon > 0$.
  - This contract maximizes aggregate surplus, and together B and I get all of it.
- *Main takeaway:* By setting the stipulated damage appropriately, B and I can extract all of the surplus that E brings to the market.
- So what? This is not inefficient; it merely affects how surplus is shared among the parties.
  - But if we incorporate uncertainty over E's marginal cost c_E, then inefficiency arises as well.
- Suppose that $v = 1$, $c_I = \frac{1}{2}$, $c_E \sim U[0, 1]$, and $f = 0$.
  - Efficiency calls for E to make the sale whenever $c_E < \frac{1}{2}$.
  - Achieved either by having no contract (which results in a Bertrand pricing game), or by having a contract with $p - d = \frac{1}{2}$.

- What is B and I's optimal contract? Letting $\Delta = p - d$, this involves solving

$$\begin{aligned} & \max_{\Delta} \quad \Pr\{c_E < \Delta\}(v - \Delta) + \Pr\{c_E \geq \Delta\}\left(v - \frac{1}{2}\right) \\ = & \max_{\Delta} \quad \left\{\Delta(v - \Delta) + (1 - \Delta)\left(v - \frac{1}{2}\right)\right\} \end{aligned}$$

  - $(v - \Delta)$ is B and I's joint payoff when E makes the sale.
  - $\left(v - \frac{1}{2}\right)$ is their joint payoff when I makes the sale.
  - $\Delta^* = \frac{1}{4}$, which results in less entry than is socially optimal.

- Intuitively, B and I together act like a monopsonist, using their contract to commit to a price (Δ) at which they are willing to buy from E. They trade off the probability of making a purchase against the price they must pay E for the good, and end up purchasing the good too infrequently.

Remarks:

1. This result depends on B and I's ability to commit to the terms of the contract. It could be undermined if they are able to renegotiate those terms once E enters.

   - *An example:* Spier and Whinston (RAND, 1995)
     - Suppose that once E makes his TIOLI offer, B and I are able to renegotiate their contract costlessly.
     - Assume that they will reach an efficient agreement given E's offer, buying from E if and only if $p_E \leq c_I$.
     - If E anticipates such renegotiation, he will always offer $p_E = c_I$ regardless of the contract that B and I have signed.
     - Thus none of E's profits will be extracted.

2. The Aghion and Bolton model is not a good model of the complete exclusion that occurs with exclusive contracts. Why?

   - The whole point of their stipulated damage contract is to extract some of E's profit.
   - But if E never enters, then there is no profit to extract.
   - Thus if we want to explain the use of exclusive contracts, then we need to look elsewhere.

Externalities Across Buyers: Rasmussen, Ramseyer, and Wiley (AER, 1991)

- Consider the Chicago school model except that:
  - There is more than one buyer ; and
  - E has scale economies (possibly due to an entry cost).
- What is the effect of these modifications?
  - Entry will occur only if a sufficient number of buyers have not signed exclusive contracts.
  - The contract signed by any one buyer can have a negative externality on all other buyers by reducing the likelihood of entry.
  - Thus, I may want to induce a subset of buyers to sign, and by doing so he can monopolize other buyers without paying them anything.
- Example with 3 buyers.
  - Each buyer has demand $D(\cdot)$,
  - I has p.u cost c_I, and
  - E has entry cost $f > 0$ and p.u cost $c_E < c_I$.
- Suppose that:
  - Monopoly profit per buyer is $\pi_m = 9$ and the deadweight loss from monopoly pricing is $x^* = 12$.
  - f is such that it takes two "free" buyers for E to be willing to enter; *i.e.*, $(c_I - c_E) D(c_I) < f < 2(c_I - c_E) D(c_I)$
- Need to decide on the bargaining process between the seller(s) and the buyers.
  - We consider 3 scenarios.

Scenario 1: *I* makes simultaneous public offers to the 3 buyers and cannot discriminate among them.

- I offers each buyer the same payment t to sign.
- For any $t \in (0, x^*)$, there are 2 possible equilibria:

1. None sign (if a buyer expects no-one to sign, he finds it optimal to not sign either)
2. All sign (if a buyer expects all others to sign, he finds it optimal to also sign)

- *Takeaway:* There is an equilibrium in which I gets every buyer to sign for free.

- This result is fragile, because it relies on the buyers failing to coordinate to what is for them a Pareto superior equilibrium.
  - But it becomes much more robust once I can discriminate across buyers.

Scenario 2: *I* can make simultaneous but distinct public offers to the buyers.

- In this game, in equilibrium, I will always exclude E. How / Why?
- If I offers $t = x^* + \epsilon$ to 2 of the 3 buyers, they will accept regardless of what they think others will do.
- This way, E does not enter, and I earns monopoly profits from all 3 buyers.
- I's payoff is: $3 \times 9 - 2 \times 12 = 3 > 0$

Scenario 3: *I* approaches the buyers sequentially.

- If buyer 1 rejects I's offer, then I will find it worthwhile to induce buyers 2 and 3 to sign.
- So buyer 1, recognizing that if he doesn't sign, others will, he is willing to sign for free.
- Once buyer 1 has done so, buyer 2 finds himself in a similar situation. So he also accepts to sign for free.
- Therefore, I can exclude E for free.

- More generally, I's ability to approach buyers sequentially reduces the cost of successful exclusion.
- As the # of symmetric buyers $\rightarrow \infty$, ea. buyer becomes a very small part of aggregate demand, and I is certain to be able to exclude for free (Segal and Whinston, AER, 2000).

Remarks

1. Critical factor here is the presence of scale economies.

   - Similar effects can arise if there are demand-side economies of scale arising from network externalities.

2. Buyers are symmetric in this model.

   - With asymmetrically sized buyers, large buyers, who are pivotal to whether profitable exclusion can occur, would be made better offers than small buyers.

3. Entry is a one-time possibility in this model.

   - In practice, it is likely to be a continuing concern. To continue exclusion, an incumbent needs to ensure that the # of free buyers is low at every point in time.
   - This can be accomplished by staggering the expiration dates of contracts if they are of limited duration.

4. The demand that each buyer faces does not depend on the demand faced by other buyers.

   - What if buyers are not final customers, but are firms that compete with one another?
   - Competition among buyers has two opposing effects on the likelihood of profitable exclusion:
     (i) It can reduce the # of free buyers that E needs for entry to be profitable.
     (ii) It changes the loss that a buyer anticipates from foregoing competition.
   - *An example:*
     - Suppose there are $n \geq 2$ identical retails who have 0 marginal cost except for input acquisition costs
     - Let $D(\cdot)$ be the *aggregate* demand function.
     - If E does not enter, then I sets the input price to it's monopoly level (i.e., $p_m = \arg\max_p \{(p - c_I) D(p)\}$), and all retailers earn 0 profit.
     - If E enters and ≥ 2 retailers are free, then E will sell to all free retailers at $p_R = \arg\max_{p \leq c_I} \{(p - c_E) D(p)\}$. These retailers will make all of the sales in the market, but will earn 0 profit. (Captive retailers will be priced out of the market.)

  - If E enters and 1 retailer is free, this retailer may make a positive profit.
    * True if $p_R < c_I$. Denote the retailer's profit by $\pi_R^* > 0$.
  - Now consider the outcome of exclusive contracting at the start of the game:

  (a) If $p_R < c_I$ and $\pi_R^* > f$, then I needs to pay π_R^* to every retailer to exclude E. This will not be profitable for I if the number of retailers N is larger enough.
    - In this case, competition among buyers makes exclusion harder.

  (b) Otherwise, retailers make 0 profit no matter what, and I can sign each of them for free.
    - In this case, competition among buyers makes exclusion easier.

5. What if it is possible to sign exclusive contracts containing damage terms?
   - I can (i) exclude E using exclusive contracts, or (ii) allow E to enter but use damages to extract his profit.
   - Each can emerge as the most profitable choice. (Segal and Whinston, AER, 2000)

6. Can fixed-quantity contracts (which specify a definite future trade and a given price) substitute for exclusive contracts as an exclusionary device?
   - Relevant if a firm prohibited from using exclusive contracts can simply start using quantity contracts to accomplish the same end.
   - In the previous model, I could equivalently sign buyers to long term quantity contracts. These would exclude E, but would involve no deadweight loss from monopoly pricing.
     - Achievable by making a TIOLI offer to buy the competitive market output at a price that extracts all of E's surplus.
   - Not always the case. Consider the following model:
     - Both I and E have marginal cost c, but I's product is worth v to each of the N buyers in the market, while E's product is worth $v + \Delta$.
     - If $N(\Delta - c) > f$, then quantity contracts will not deter E's entry, since each consumer would be willing to pay Δ for a unit of E's product even if he has committed to buy from I.
     - In contrast, exclusive contracts would prevent buyers from doing this.

7. How does successful exclusion affect welfare?

- In this model, E's entry is efficient since $f < 3(c_I - c_E)$. So exclusion reduces aggregate surplus.
- More generally, this is not a robust result.
  - In oligopolistic markets, firms may have inefficiently strong incentives to enter, because part of their profit represents "business stealing" from existing firms (Mankiw and Whinston, RAND, 1986).

References

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