Entry Barriers

Özlem Bedre-Defolie

European School of Management and Technology

July 6, 2017

Exclusive Customer Contacts (No Downstream Competition)

- A single incumbent producer, M, faces a single buyer, C, who is willing to buy one unit that costs c and brings a surplus of S.
- Suppose M faces a threat of entry by a more efficient E with cost $\hat{c}$ and E can generate a higher surplus $\hat{S} \geq S$.
  Timing:
  1. M offers C an exclusive contract at p.
  2. If the exclusive contract is accepted, C buys from M at p, otherwise E chooses whether to enter and compete with M.

- Without entry: M sets $p = S$ (exploits its monopoly position) and earns $S - c$, and C gets 0 surplus.
- If entry occurs: $p = c + \hat{S} - S$ (Bertrand Duopoly).
  - C's surplus will be $\hat{S} - p = S - c$
  - E's profit will be $p - \hat{c} = \hat{S} - S + c - \hat{c} = \Delta$
  - M will be out of the market.
- Hence C does not accept an exclusive contract of M at a price $p > c$.
- The exclusive contract cannot be profitable for M (Chicago School argument).

Exclusionary clauses as a rent-extraction device (Aghion and Bolton, 1987)

Penalty contract:

- If C buys from M, it pays p to M.
- If C buys from E, it must pay a penalty for breach d to M.
- To attract C, E now must offer $\hat{p}$ such that:

$$\hat{S} - \hat{p} - d \geq S - p$$

- or

$$\hat{p} \leq p + \hat{S} - S - d$$

- Penalty for breach is actually paid by E and plays a role of an entry fee.

- It's optimal for M to set d to reap E's technological advantage,
- E.g., $(p = c, d = \underbrace{\hat{S} - S + c - \hat{c}}_{\Delta})$ forces the entrant to offer a price $\hat{p} = \hat{c} \Rightarrow M$ could appropriate Δ, C gets $S - c$ and E gets zero.
- Hence, entry occurs whenever it is efficient and the entrant's technological advantage is captured by the incumbent.

If there is uncertainty on $\hat{c}$

- Suppose M and C sign a contract before uncertainty is resolved.
- Next $\hat{c}$ is realised and E decides whether to enter and pay $\varepsilon > 0$ to enter.
- Suppose, for example, $\hat{S} = S = 1, c = \frac{1}{2}, \hat{c} \sim U[0,1]$
  - Without exclusivity entry occurs whenever $\hat{c} < \frac{1}{2}$, so probability of entry is $\frac{1}{2}$.
  - If $\hat{c} > \frac{1}{2}$, E does not enter, M earns $S - c = \frac{1}{2}$ by setting $p = S$, and so C gets zero.
  - If $\hat{c} < \frac{1}{2}$, E enters and earns $c - \hat{c}$ by setting $\hat{p} = c$, and so C gets $S - c = \frac{1}{2}$ (M is out of the market).
  - M's expected profit = (prob. of no entry)(surplus)$= \frac{1}{2}\frac{1}{2} = \frac{1}{4}$
  - C's expected surplus = (prob. of entry)(surplus)$= \frac{1}{2}\frac{1}{2} = \frac{1}{4}$

- If M and C could levy a (non-contingent) entry fee f from E and share the proceeds as desired.
  - Entry would then occur when $\hat{c} + f \leq c$ thus with probability $\frac{1}{2} - f$.

	M	C	E	
No entry	$\frac{1}{2}$	0	0	$(\hat{c} > \frac{1}{2} - f)$
Entry	f	$\frac{1}{2}$	$\frac{1}{2} - f - \hat{c}$	$(\hat{c} < \frac{1}{2} - f)$

  - Since entry per se does not affect M and C's total surplus, M and C would maximize the expected revenue from the fee,

$$max(\frac{1}{2} - f)f \Rightarrow f^* = \frac{1}{4} \Rightarrow \text{extra gain} = \frac{1}{16}$$

  - Entry would thus be restricted and would occur when $\hat{c} \leq \frac{1}{4}$

- M and C can achieve this outcome by a penalty contract

$$
\begin{aligned}
(p = \tfrac{3}{4}, d = \tfrac{1}{2}) \rightarrow \quad & C\text{'s surplus} = 1 - \tfrac{3}{4} = \tfrac{1}{4} \\
& E \text{ enters if } \hat{c} \leq p - d = \tfrac{1}{4} \\
& M\text{'s profits } = \tfrac{3}{4} - \tfrac{1}{2} = \tfrac{1}{4} \text{ (without entry)} \\
& \text{or } M\text{'s profits } = d = \tfrac{1}{2} \text{ (in case of entry)}
\end{aligned}
$$

$\therefore$ This contract replicates the optimal entry fee: entry is again restricted and M's expected surplus is increased by $\frac{1}{16}$.

Renegotiation

- Critical assumption of Aghion and Bolton (1987) is that M and C cannot renegotiate their contract after E has made an offer.
- Otherwise, M would forgive some of the penalty for breach so as to benefit from E's offer.
- Given this, E would enter whenever it is efficient: $\hat{c} < c$ (Spier and Whinston, 1995).
- M may still have an incentive to block entry by over-investing in improving its own technology.
  $\Rightarrow$ M forces E to concede a better deal.

The commitment value of a contract that can be renegotiated

Moral hazard in Spier and Whinston's model gives the contract some commitment power.

Idea: (Katz, 1991; Caillaud et al., 1995): Such a contract may still involve some commitment when the relationship is subject to agency problems.

Spier and Whinston (1995)

To see this, assume that M and E differ only in their costs ($\hat{S} = S$).

- Timing:
  1. M offers an exclusive contract at a price p, which C accepts or rejects.
  2. M decides whether to invest in its technology: investing I reduces M's cost from $c = \overline{c}$ to $c = \underline{c}$. M's investment decision and actual cost is publicly observed.
  3. E's cost, $\hat{c}$, is drawn from a distribution over $[0, S]$ and publicly observed. E then sets its $\hat{p}$.
  4. M and C can renegotiate their initial agreement (they bargain efficiently).
  5. C chooses its supplier.

Spier and Whinston (1995)-Ctd

Consider the subgame where C accepts an exclusive contract with $p \leq S$.

- In the continuation of the game
  - Either there is no renegotiation and C buys from M at p (this happens if $\hat{p} > c \Rightarrow$ no gain from renegotiation.)
  - Or there is renegotiation (this happens if $\hat{p} \leq c$)
- Anticipating this, E enters if $\hat{c} < c$ and sets $\hat{p} = c - \epsilon$ leading M and C to renegotiate.
- Entry occurs whenever it is efficient, given M's cost level c.

Spier and Whinston (1995)-Ctd

- Under an exclusive contract, M's ex-post profit is $\pi = p - c$ with or without renegotiation since C buys all at p without renegotiation and when renegotiation takes place E leaves almost no gain from it $\Rightarrow$ M gets $p - c$.
- M invests whenever $\bar{c} - \underline{c} > I$.
- However, M's investment is socially desirable only if

$$\underbrace{[1 - \hat{F}(\bar{c})].(\bar{c} - \underline{c}) + \int_{\underline{c}}^{\bar{c}} (\hat{c} - \underline{c}) d\hat{F}(\hat{c})}_{<\bar{c}-\underline{c}} > I$$

- So M over invests whenever $LHS < I < \bar{c} - \underline{c}$

Spier and Whinston (1995)-Intuition

- When the incumbent invests more, the entrant must lower its price in those states when it is the more efficient producer.
- Sunk investments in cost reduction thereby changes the entrant's behaviour in the continuation of the game, even if there is renegotiation.
- The buyer and seller benefit together from investment in cost reduction not only when the incumbent is the producer but also when the entrant is the producer.
- However, a social planner benefits from investment in cost reduction only when the incumbent is the producer.

Exclusivity and Competing Suppliers' Investment Incentives

Exclusive purchasing agreements might deter investments by competing upstream suppliers

- Stefanadis (1997): Two upstream firms compete in the R&D market to obtain a patent on a process innovation which decreases the marginal cost of supplying the input.
- An exclusive contract with a customer decreases the profitability of R&D for the upstream rival.
- In equilibrium, upstream firms lock in customers through exclusive contracts to decrease their rival's R&D expenditures in the subsequent innovation market.

Customers' Coordination Failure

- Aghion and Bolton (1987): When E's expected profit depends on the market size, M can play customers against each other to deter entry of a more efficient competitor.
- Idea: When a buyer accepts M's exclusive deal it exerts a negative externality on other buyers: ED of M with a buyer makes entry less likely and thereby raises the price paid by the other buyers.
- This relies on commitment to conditional contracts (conditional on how many customers accept exclusivity offers).

Scale economies and users' coordination failure

Rasmusen, Ramseyer and Wiley (1991) and Segal and Whinston (2000):
This insight is robust in the presence of scale economies.

- Suppose there are 10 customers and entry is viable only if E can sign up at least 8 customers. M can block entry by "bribing" 3 customers into exclusive arrangements, by sharing the rents it gets from exploiting its monopoly power against 7 customers.
- This is a successful strategy if monopoly rents are higher than the benefits that the targeted customer can hope to derive together from free entry.

Scale economies and users' coordination failure-Ctd

- Even if this condition does not hold, M can still deter entry by relying on poor coordination among the customers.
- Idea: While customers are better off if all reject exclusivity, they fail to coordinate and accept exclusivity if they anticipate that the others will do $\rightarrow$ M may then not need to bribe any customer.
- Illustration: If there is only 1 customer, this buyer will reject the exclusive contract since the upstream firm is ready to pay at most Π whereas the buyer is needed to be compensated by $x^* = \Pi + \text{DWL}$.

Illustration without price discrimination

Suppose that there are 10 customers and entry is viable only if E can sign up at least 8 customers.

- M offers an exclusive contract bribing x to each user.
- A buyer accepts the exclusivity if
  - $x > 0$ and at least 3 others accept OR
  - $x > x^*$
- A buyer rejects the exclusivity if $x < x^*$ and less than 2 accepts.
- There exists two equilibria: 1. All reject, 2. All accept $x < \Pi$
- Remark: Rasmussen et al. claimed unique equilibrium where all accept.

Illustration with price discrimination

- Segal and Whinston (2000): Suppose that the incumbent offers

$$\begin{array}{ll} x^* + \epsilon \text{ to } D_1, D_2, D_3 \Rightarrow & 3 \text{ accept your offer (Dominant strategy).} \\ & \downarrow \\ U \text{ earns } 10\Pi - 3x^* & \text{entry is blocked in (unique) equilibrium} \end{array}$$

- If U makes sequential offers to the buyers

$$\begin{array}{cccccccc} \downarrow \epsilon & \downarrow \epsilon & & \downarrow \epsilon & \downarrow x^* & \downarrow x^* & \downarrow x^* \\ D_1 & D_2 & \ldots & D_7 & D_8 & D_9 & D_{10} \end{array}$$

  - the incumbent can buy the last 3 by paying x^*
  - knowing this, the 7th accepts with ϵ,...., the 1st accepts with ϵ.
  - Hence U blocks entry at no cost.

Bernheim and Whinston (1998)

- An incumbent, M, and a potential entrant, E, compete to supply two customers, C_1 and C_2.
- Each supply contract can be conditional on exclusivity.
- Contracts are private, but M and E observe exclusivity of them
- Timing:
  1. M and E simultaneously offer a contract to C_1. C_1 accepts or rejects each offer. If C_1 buys a positive quantity from E, E enters and incurs f.
  2. M and E offer conditional contracts to C_2 and C_2 chooses its suppliers.

Bernheim and Whinston (1998)- Ctd

Notation and Assumptions:

- Let S_i be surplus that C_i can generate from dealing both M and E.
- Let S_i^E be surplus that C_i can generate from dealing only E.
- Let S_i^M be surplus that C_i can generate from dealing only M.
- Assume M and E offer partial (imperfect) substitutes.

$$S_i^M + S_i^E > S_i (> S_i^M, S_i^E > 0)$$

- Assume E's entry is socially efficient:

$$S_1 + S_2 - f > S_1^M + S_2^M$$

- Entry is not profitable if C_2 is the only customer. A sufficient condition for this is

$$S_2 - S_2^M < f$$

Bernheim and Whinston (1998)- Ctd

Stage 2:

- If E entered, no exclusivity in equilibrium and each supplier gets its contribution to the total surplus

$$\Pi_M = S_2 - S_2^E, \Pi_E = S_2 - S_2^M$$

- If E did not enter, M is monopoly and gets S_2^M.

Stage 1:

- If C_1 deals with E, the joint surplus of M, E and C_1 is

$$\hat{S} \equiv S_1 + S_2 - S_2^E + S_2 - S_2^M - f < S_1 + S_2 - f$$

where the latter inequality is due to the substitutability between M and E.

Bernheim and Whinston (1998)- Ctd

- If the substitutability between M and E is sufficiently high, i.e., $S_2^E + S_2^M - S_2$ is very high, we have

$$\hat{S} = S_1 + S_2 - S_2^E + S_2 - S_2^M - f < S_1^M + S_2^M$$

- So C_1 deals exclusively with M, so as to make M the monopoly supplier of C_2.
- In this case, exclusive dealing prevails even if entry is efficient, that is even if $S_1 + S_2 - f > S_1^M + S_2^M$

Bernheim and Whinston (1998)- Ctd

- Idea: Taking into account M's monopoly profit on C_2, M and C_1 can together generate more profits by excluding E, even if they could extract all of E's contribution to their joint surplus.
- Hence, exclusive dealing is an anti-competitive device against E and C_2.
- NOTE: The argument relies on some form of coordination failure between C_1 and C_2. If C_1 and C_2 could side-contract, C_2 would be willing to compensate C_1 for opting for non-exclusive relationship with M.

Potential defences for exclusionary behaviors

- Enhance innovators' benefit from R&D efforts and thus foster their incentives to innovate.
  - The logic behind the patent system: If the patent licensee anticipates that the licensor would flood the market ex post, the licensee would be willing to pay less for the licensor $\Rightarrow$ decrease in long-term incentives to invest in R&D.
  - When the bottleneck results from innovation but not from economies of scale or scope.
- If competition in downstream or adjacent markets leads to excessive entry and duplication of fixed costs (business stealing effect) $\rightarrow$ A new entrant does not account for the loss of the incumbent firms (a part of the value generated by the others) (Salop (1978), Mankiw and Whinston (1986)).

Potential defences for exclusionary behaviors- Ctd

- Free-riding of downstream units on the upsteam firm's marketing expenses (Chemla, 2003).
- Integration may improve vertical coordination. E.g., monitoring benefits of VI.
- Costly expansion of capacity or the costs incurred in order to provide access.
- Fear of being associated with inferior downstream partners who might hurt the firm's reputation.

Motivation: Long-term contracts, breakup fees, MFNs

- Breakup fees, or early termination fees (ETFs), are widely used in service provision contracts: wireless telephone, cable and satellite TV, business data carriage.
- ETFs apply when switching to another provider, but do not apply when switching a plan within the same provider, i.e., Most-Favored-Nation clauses (MFNs) are offered by providers.
- Policy makers are concerned that breakup fees hurt consumers:
  - By increasing costs of switching providers:
    - The EC 2013 proposal: "the right to terminate any (telecom) contract after 6 months without penalty with a one-month notice period; reimbursement due only for residual value of subsidised equipment/promotions, if any."
    - The EC recommended national regulators to impose a cap on ETFs of internet service provision contracts.
  - By deterring entry of more efficient providers: The FCC is investigating the four major network providers over ETFs of their long-term contracts for high speed data carriage in a $25 billion market, where customers are health care providers, schools, small and medium enterprises.

Long-term contracts and breakup fees

- Very little is known about the implications in markets with non-pivotal buyers: Consumer markets, B2B markets where a buyer's purchase is insignificant for a seller's revenue.
- In particular when the firms are asymmetric in market power: an incumbent network provider and a new network builder as an entrant.
- Breakup fees generate switching costs endogenously, so might weaken competition or foreclose an efficient entrant.
- Profitability of breakup fees? The incumbent would need to compensate consumers for
  - expected loss from not purchasing from the cheaper entrant,
  - expected costs of switching to the more efficient entrant.

Bedre-Defolie and Biglaiser, 2017

- Research question: Under what conditions breakup fees used by an incumbent provider could be anti-competitive?
- Main Finding: The incumbent inefficiently forecloses the entrant when the entrant's efficiency advantage is not too high.
- Policy implications: Rule-of-reason approach towards breakup fees.
  - Banning breakup fees do not matter when the entrant is very efficient.
  - The ban improves welfare for intermediate values of the entrant's efficiency advantage.
  - The ban is welfare reducing when the efficiency difference between the firms is low.

Model

- Incumbent (I) and Entrant (E) offer differentiated products.
- Mass 1 of consumers are willing to buy one unit in each period.
- The unit value of consuming I's good is v and E's good is $v - s$.
- Assume s is uniformly distributed over $[0, \theta]$ and consumers learn their s at the beginning of period 2 (when E comes).
- I is less efficient than E: $c_I > c_E$. Let $\Delta c = c_I - c_E$ denote E's efficiency advantage.
- Efficient outcome: All consumers buy from I in period 1 and types $s \leq \Delta c$ switch to the entrant in period 2.

Timing

1. I offers a two-period (LT) contract and consumers decide whether to sign it or not. $LT = \{p_{I1}, p_{I2}, d\}$ where
   - p_{I1} is price for buying one unit today,
   - p_{I2} is price for buying an additional unit tomorrow,
   - d is breakup fee in case a buyer who signed LT does not buy from I tomorrow.
2. Consumers learn their s. I offers p_{I2}^{spot} and E offers p_E.
   - The consumers who signed LT decide whether
     - to buy a unit from I at the lowest of p_{I2} and p_{I2}^{spot} (MFN), or
     - to buy a unit from E at p_E and pay d to I, or
     - buy nothing and pay d to I.
   - The consumers who did not sign LT decide whether
     - to buy a unit from I at p_{I2}^{spot} or
     - to buy a unit from E at p_E or
     - buy nothing.

Main Result

In the unique equilibrium all consumers sign I's LT contract

- If $\Delta c > 2\theta$, all consumers efficiently buy from E in period 2.
- If $\Delta c \leq 2\theta$, I inefficiently forecloses the more efficient entrant using a sufficiently high breakup fee.

The entry deterrence mechanism

- To sign consumers into a LT contract with a high breakup fee, the incumbent has to compensate them for not having the option of purchasing from the more efficient entrant in the future (Chicago School argument).
- Profitability of foreclosure decreases in consumers' expected surplus from not signing the LT contract.
- By setting very high breakup fees, the incumbent makes consumers believe that the entrant will only compete for unsigned consumers, for which the incumbent will not want to compete since then it would have to give the lower prices also to its signed consumers (due to MFNs).
- When the entrant is not very efficient, the incumbent finds it profitable to block the entry.
- When the entrant is very efficient, the entrant serves the entire market and breakup fees do not affect the equilibrium.

Critical factors for the foreclosure result

- Breakup fees: Without breakup fees, period 1 has no effect on period 2.
  - Unlike Aghion and Bolton (1987), they cannot be used as a tool to shift rent from the entrant.
  - They are used to manipulate consumers' beliefs about the second period prices.
- MFNs: Enable the incumbent to commit not to undercut itself in the future (like price matching guarantees used by durable good monopolist, Butz, 1990).
- Non-pivotal buyers: If there was one buyer instead of mass 1 of buyers, the buyer's outside option to signing the LT contract would be exogenous.
- Entrant market power: With competitive entrants, the buyer's outside option would again be exogenous and the equilibrium would be efficient.
- Robust to: allowing I to renegotiate the LT contract in period 2 (different from Aghion and Bolton, 1987).

Conclusions

- Research question: Can long-term contracts with breakup fees induce an inefficient allocation of consumers and possibly foreclose efficient entry in markets with non-pivotal buyers?
- Bedre-Defolie and Biglaiser: If the entrant's efficiency advantage is not very large, the incumbent forecloses the efficient entrant by using breakup fees.
  - Rule-of-reason approach towards breakup fees; banning breakup fees could damage welfare.
  - If entrants are competitive or the entrant's efficiency advantage is very large, breakup fees do not matter