Module 9: Competition for Exclusive Contracts

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

- So far, we have assumed that only I can get buyers to sign exclusive agreements.
- In practice, there are often a number of competitors trying to secure exclusive agreements.

- In the models we will study, there are two kinds of contracting externalities:
  - Externalities on parties who are not involved in the contracting process (a-la Aghion and Bolton, 1987)
  - Externalities among parties involved in the contracting process that arise from the fact that contracts are bilateral.
    - If parties could write multilateral contracts, then (assuming complete and symmetric information) these contracts would be efficient.
- Models that combine 3 key ideas:
  1. There are some "outside" parties who are not part of the contracting process, but would benefit from competition among the parties who are involved in the contracting process.
  2. The joint payoff of the parties involved in the contracting process is enhanced if they can restrict the level of competition enjoyed by those outside parties.
  3. Without an ability to write a multilateral contract, contracting externalities among the parties involved in the contracting process may prevent them from achieving this joint payoff-maximizing outcome using simple sales contracts. When this happens, exclusive contracts may emerge as a second best way to achieve this objective.

Competing for Exclusive Contracts

Model (Hart and Tirole, 1990)

- One upstream manufacturer of a good (M) with marginal cost c_M.
- Two retailers (R_A and R_B) sell the good to consumers with marginal cost c_R, and outside option 0.

Market Outcome without Exclusive Agreements

- *Timing:*
    1. M makes simultaneous private offers to each retailer R_j of the form (x_j, t_j), where x_j is the quantity offered and t_j is the payment required.
    2. The retailers simultaneously decide whether to accept M's offer.
    3. Retail Cournot competition occurs.
- *Note:* We could instead have the retailers make offers to M (*bidding game*).
- Payoffs:
    - M earns $\pi_M = t_A + t_B - c_M (x_A + x_B)$
    - Retailer j earns $\pi_j = [p_j (x_A, x_B) - c_R] x_j - t_j$
- Two special cases:
    1. *Case 1:* The two retailers sell their products in distinct markets, so $p_j (x_A, x_B) = P_j (x_j)$.
    2. *Case 2:* The two retailers serve the same market and are undifferentiated, so $p_j (x_A, x_B) = P (x_A + x_B)$.

Social Optimum:

- Total profit $= \sum_j [p_j (x_A, x_B) - (c_R + c_M)] x_j$. Denote the maximized joint profit by

$$\Pi^{**} = \sum_j [p_j (x_A^{**}, x_B^{**}) - (c_R + c_M)] x_j^{**}$$

- Also let $x_j^e = \arg\max \{[p_j(x_j, 0) - (c_R + c_M)]\, x_j\}$ denote the joint profit-maximizing sales level for ea. product if it is the only one being sold. Results in profit

$$\Pi_j^e = \left[p_j\left(x_j^e, 0\right) - (c_R + c_M)\right] x_j^e\,,$$

  and note that $\Pi_j^e \le \Pi^{**}$.

Main Question: **Will the contracting process lead the parties to achieve the joint monopoly profit Π^{**}?**

- Since there is a single upstream monopolist, one might guess that the answer is *yes*.
- It turns that contracting externalities combined with private offers will lead to the opposite conclusion.
- Basic Idea:
  - With private offers, the manufacturer can always make additional sales secretly to a retailer.
  - Also, when contracting externalities are present, M will have an incentive to sell more than the monopoly level, because he and the retailer he secretly sells to will ignore the negative effect those sales have on the other retailer.

An assumption about beliefs:

- Upon receiving an offer, retailer j must form some conjecture about the offer that the other retailer received.
- A common assumption is *passive beliefs*: retailer R_j has a fixed conjecture $(\bar{x}_{-j}, \bar{t}_{-j})$ about the offer received by the other retailer, which is unaffected by the offer that R_j himself receives.
- In eq'm, ea. retailer's conjecture must be correct.

Bilateral Contracting Principle:

- If two agents act in isolation and have common information, then they will bargain to the efficient outcome.
- *Claim:* In any equilibrium, ea. manufacturer-retailer pair will agree to a contract that maximizes their joint payoff, taking as given the contract being signed between M and R_{-j}.

Proof.

- Suppose that M writes a contract $(\bar{x}_{-j}, \bar{t}_{-j})$ with R_{-j}.
- If R_j correctly anticipates this, then he will be willing to pay all of his (anticipated) profit $[p_j(x_j, \bar{x}_{-j}) - c_R]\, x_j$ in return for x_j units.
- Holding his contract with R_{-j} fixed, M will choose the quantity he offers to R_j to maximize his own profit. This profit is

$$\begin{aligned} & t_j + \bar{t}_{-j} - c_M(x_j + \bar{x}_{-j}) \\ = \; & \underbrace{[p_j(x_j, \bar{x}_{-j}) - (c_R + c_M)]\, x_j}_{\text{Bilateral surplus}} + \underbrace{(\bar{t}_{-j} - c_M \bar{x}_{-j})}_{\text{trade with } R_{-j}} \end{aligned}$$

  which is the joint profit of M and R_j.

□

- Therefore, (x_A^*, x_B^*) must satisfy:

$$\begin{aligned} x_A^* &= \arg\max_{x_A} [p_A(x_A, x_B^*) - (c_R + c_M)]\, x_A \\ x_B^* &= \arg\max_{x_B} [p_B(x_A^*, x_B) - (c_R + c_M)]\, x_B \end{aligned} \tag{1}$$

- These would be the same conditions if M did not exist, and R_1 and R_2 competed as duopolists, ea. with marginal cost $c_R + c_M$.
- The joint profit of this outcome is

$$\hat{\Pi} = \sum_j [p_j(x_A^*, x_B^*) - (c_R + c_M)]\, x_j\,,$$

  and since M makes a TIOLI offer, he receives all of this profit.

- Now let us reconsider the two special cases from earlier.
- *Case 1:* The retailers sell in distinct local markets.
  - (1) become

$$\begin{aligned} x_A^* &= \arg\max_{x_A} [P_A(x_A) - (c_R + c_M)]\, x_A \\ x_B^* &= \arg\max_{x_B} [P_B(x_B) - (c_R + c_M)]\, x_B \end{aligned}$$

- Observe that (x_A^*, x_B^*) coincide with the joint monopoly outcome.

◦ *Case 2:* The retailers are undifferentiated.

- (1) become

$$
\begin{aligned}
x_A^* &= \arg\max_{x_A} \left[p\left(x_A + x_B^*\right) - \left(c_R + c_M\right)\right] x_A \\
x_B^* &= \arg\max_{x_B} \left[P\left(x_A^* + x_B\right) - \left(c_R + c_M\right)\right] x_B
\end{aligned}
$$

- Observe that this results in the standard Cournot duopoly outcome.

Main Takeaway:

◦ When contracting externalities are absent, bilateral contracting achieves the joint profit-maximizing outcome.

◦ Why can't M simply "impose" the monopoly outcome?

- Because M suffers from a commitment problem arising from the combined presence of the contracting externality and private offers.

Market Outcome when Exclusive Agreements are Possible

◦ A contract now takes the form (x, e, t), where $e = 1$ if the contract is exclusive and $e = 0$ if it is not.

◦ Assume that the retailer can offer to either or both retailers nonexclusive contracts, but can offer only one contract if he chooses to offer an exclusive contract.

◦ We change the assumption of *passive beliefs* in two ways:

1. If a retailer is offered an exclusive contract, he knows that the other retailer has not received any offer.
2. Whenever R_j is offered the equilibrium nonexclusive quantity x_j^*, he believes that M has also offered R_{-j} his equilibrium nonexclusive quantity x_{-j}^*.

◦ Suppose M offers R_j the exclusive contract with $x_j = x_j^e$ and $t_j = \left[p_j\left(x_j^e, 0\right) - c_R\right] x_j^e$.

- R_j will accept the contract since it gives him payoff 0.

– This contract yields M profit Π_j^e.

- If there is an eq'm without an exclusive contract, then ea. M / R_j pair must be maximizing its bilateral surplus, so this must involve quantities (x_A^*, x_B^*), and give M profit $\hat{\Pi}$ (as before).
- Therefore, the eq'm involves an exclusive contract with R_j if $\Pi_j^e > \max\left\{\Pi_{-j}^e, \hat{\Pi}\right\}$.
- If $\hat{\Pi} > \max\{\Pi_A^e, \Pi_B^e\}$, then the eq'm contracts must be non-exclusive.

- Let us return to the 2 special cases from before.
- *Case 1:* The retailers sell in distinct local markets.

$$\hat{\Pi} = \Pi_A^e + \Pi_B^e = \Pi^{**} > \max\{\Pi_A^e, \Pi_B^e\} \ ,$$

so we will never see exclusives.

– *Intuition:* Non-exclusives involve no contracting externality, and so an exclusive outcome only sacrifices profit from selling in one of the markets.

- *Case 2:* The retailers are undifferentiated.

$$\Pi_A^e = \Pi_B^e = \Pi^{**} > \hat{\Pi} \, ,$$

so M will always sign an exclusive contract with one of the retailers.

– *Intuition:* No loss from selling through a single retailer in this case, and contracting externalities are eliminated with an exclusive contract.

– In this case, exclusive contracts lower consumer and aggregate surplus.

Exclusive Contracts to Reduce Competition in Input Markets (***Skipped in class***)

- Exclusive contracts can be adopted as a means of reducing competition in input markets.

Model (Bernheim and Whinston, JPE, 1998)

- A retailer (R) and two manufacturers (M_A and M_B), who compete to make sales to the retailer.
- In selling quantities x_A and x_B, the retailer faces inverse demand $p_A(x_A, x_B)$ and $p_B(x_A, x_B)$.
- R has marginal cost c_R, and M_A and M_B have marginal cost c_M, respectively.
- *Bargaining Process:* R makes simultaneous private offers to M_A and M_B, who then decide whether to accept it.

No Input Market Competition

- Optimal sales levels solve

$$\max_{x_A, x_B} \left\{ \sum_j \left[p_j(x_A, x_B) - (c_M + c_R)\right] x_j \right\}$$

- This yields total profits

$$\Pi^{**} = \sum_j \left[p_j\left(x_A^{**}, x_B^{**}\right) - (c_M + c_R)\right] x_j^{**}$$

- There are no contracting externalities here: Given his contractual trade with R, M_j's profit $t_j - c_M x_j$ is not affected by changes in R's trade with M_{-j}.
  - Therefore, bilateral contracting maximizes the joint profit of the 3 parties, so $\hat{\Pi} = \Pi^{**}$.
  - Moreover, if $(x_A^{**}, x_B^{**}) > 0$, we have $\Pi_j^e < \Pi^{**}$, so even if exclusives are possible, they will not arise.

Manufacturers Compete in Buying Inputs

- Assume that the cost of these inputs are given by $c_M(x_A + x_B)$, where $c_M(\cdot)$ is strictly increasing.
  - This generates contracting externalities.
  - So bilateral contracting in the absence of exclusives will no longer result in the joint profit maximization outcome, and so $\hat{\Pi} < \Pi^{**}$.

- Suppose that M_A and M_B are undifferentiated and downstream consumers have the same valuation p for ea. unit of their products.
  - Then $p_A(x_A, x_B) = p_B(x_A, x_B) = p$, and the model becomes isomorphic to Hart and Tirole (1990). (It is just flipped vertically.)
  - In this case, we would always see an exclusive being signed, whose objective is to reduce the manufacturers' competition for inputs.

Exclusive Contracts to Reduce Competition in Another Retail Market (*Skipped in class*)

Model (Bernheim and Whinston, JPE, 1998)

- Variation of the previous model.
- An existing retail market with one monopoly retailer (R_1) and two manufacturers (M_A and M_B).
- Two periods:
  - At $t = 1$: R_1, M_A and M_B write long-term bilateral contracts for supply in $t = 2$.
  - At $t = 1.5$: M_B can make an investment i_B in cost reduction at cost $f(i_B)$.
  - At $t = 2$: A second retail market with monopoly retailer R_2 emerges, and M_A and M_B compete to make sales to R_2.
- How does the presence of R_2 change the model ?
  - The profits of M_A and M_B in the second market (say π_2^A and π_2^B) depend on M_B's investment in cost reduction.
  - In turn, M_B's desired investment in cost reduction will depend on the outcome of contracting with R_1. (Cost reduction is more attractive for M_B, the higher is his sales level with R_1.)
  - So at the time of contracting with R_1, π_2^A and π_2^B are functions of M_A and M_B's contractual commitments (x_{1A}, x_{1B}) with R_1.
  - Moreover, because of the possibility of monopolizing R_2, the joint profit of R_1, M_A, and M_B may be highest if x_{1B} is low enough so that M_B chooses not to invest.
  - Now ea. M_j's profit function includes future profits from market 2 , so contracting externalities are present, which can lead to exclusives being signed.

An Example

- Suppose that M_A and M_B produce an undifferentiated product.
  - M_A has unit cost c_A.
  - M_B has cost $c_B < c_A$ if he invests $f > 0$, otherwise, he has cost ∞.
- R_1's value for the product is v_1 per unit, for up to 2 units.
- R_2 has value v_2 for up to one unit.
- Ea. manufacturer can produce at most one unit in a given retail market.
- Also, assume $\min\{v_1, v_2\} > c_A > c_B$, and M_A and M_B engage in Bertrand bidding to sell to R_2 in $t = 2$.

Question #1: **When is it socially efficient for M_B to invest?**

- If the net surplus from M_B's presence is positive; *i.e.*, if $(v_1 - c_B) + (c_A - c_B) > f$.
  - *First term:* social value of M_B supplying R_1 with a second unit.
  - *Second term:* social gain from cheaper production of R_2's single unit.
- Observe that M_B will choose not to invest if he is excluded from R_1's business if by investing and competing for R_2's business he would earn a negative profit; *i.e.*, if $f > c_A - c_B$.
  - Assume that this condition holds. (Otherwise, exclusion would be impossible.)

Question #2: **What sales level to R_1 maximize the joint profit of R_1, M_A and M_B?**

- Two possibilities:
  1. R_1 contracts for one unit from M_A and none from M_B, M_B does not invest, and M_A sells one unit to R_2 at price v_2.
  2. R_1 buys one unit from ea. M_A and M_B, M_B invests, and M_B sells one unit to R_2 at price c_A after competing with M_A for R_2's business

- The first (which involves exclusion of M_B) generates larger joint profit if

$$(v_1 - c_B) + [(c_A - c_B) - (v_2 - c_A)] < f \tag{2}$$

  - *First term:* social value of M_B supplying R_1 with a second unit.
  - Second term: difference between the manufacturers' joint profits in selling to R_2 when they compete, $(c_A - c_B)$, and when M_A monopolizes R_2, $(v_2 - c_A)$.
  - This condition is satisfied when $v_2 - c_A$ is sufficiently large, in which case we have

$$\Pi_A^e = \Pi^{**} = (v_1 - c_B) + (v_2 - c_A)$$

Question #3: **When joint profits are maximized by excluding M_B, can a joint profit Π_A^e be achieved without an exclusive?**

- To do so, R_1 would need to buy only one unit from M_A and none from M_B.
- But R_1 may hen have an incentive to deviate by also buying a unit from M_B. R_1 will do so if the bilateral surplus from trading with M_B is positive, which is the case if $(v_1 - c_B) + (c_A - c_B) > f$.
- So when the above condition and (2) holds, we have $\max\left\{\hat{\Pi}, \Pi_B^e\right\} < \Pi_A^e = \Pi^{**}$, so R_1 will sign an exclusive contract with M_A whose purpose is the reduction of competition in selling to R_2.
- In the above setting, a ban on exclusive contracting would prevent M_B's exclusion and raise aggregate welfare.
  - Is this a good idea?
- *Caveat:* Such a ban may lead to exclusion of M_B through quantity contracts, which may be even less efficient than exclusion via an exclusive contract.

Example:

- Assumptions:
  1. R_1's valuations are $\bar{v}_1$ and $\underline{v}_1 < \bar{v}_1$ for the 1^{st} and 2^{nd} unit, respectively.
  2. M_A and M_B can supply any number of units in each market.
  3. $\bar{v}_1 > c_A > \underline{v}_1 > c_B$, so efficiency calls for M_B to supply R_1 with 2 units if active, and for M_A to supply R_1 with only one unit if M_B is not active.

- If R_1 and M_A sign an exclusive contract, then R_1 will buy only one unit from M_A.
- If exclusives are banned and $(\underline{v}_1 - c_B) + (c_A - c_B) > f$, selling one unit to R_1 will not exclude M_B, because R_1 and M_B would find it worthwhile to trade a unit.
- In this case, R_1 and M_A may end up excluding M_B by signing a quantity contract for two units, which is less efficient that is exclusion through an exclusive contract.

Multiseller / Multibuyer Models

- The models we have studied so far involve one seller and multiple buyers, and multiple buyers and one seller.
- Little is known about how to handle contracting with several parties on both sides of the market.
- Leading multiseller / multibuyer model is Besanko and Perry (RAND, 1994).
- Many open questions!!!

References

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