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 \( (R_A \text{ and } R_B) \) 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 \( x^e_j = \arg\max \{ [p_j(x_j, 0) - (c_R + c_M)] x_j \} \) denote the joint profit-maximizing sales level for each product if it is the only one being sold. Results in profit

\[
\Pi^e_j = [p_j(x^e_j, 0) - (c_R + c_M)] x^e_j,
\]

and note that \( \Pi^e_j \leq \Pi^{**} \).

**Main Question:** Will the contracting process lead the parties to achieve the joint monopoly profit \( \Pi^{**} \)?

- 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

$$t_j + \bar{t}_{-j} - c_M (x_j + \bar{x}_{-j})$$

$$= \left[ p_j (x_j, \bar{x}_{-j}) - (c_R + c_M) \right] x_j + \left( \bar{t}_{-j} - c_M \bar{x}_{-j} \right)$$

Bilateral surplus trade with $R_{-j}$

which is the joint profit of $M$ and $R_j$.

Therefore, $(x^*_A, x^*_B)$ must satisfy:

$$x^*_A = \arg\max_{x_A} [p_A (x_A, x^*_B) - (c_R + c_M)] x_A$$

(1)

$$x^*_B = \arg\max_{x_B} [p_B (x^*_A, x_B) - (c_R + c_M)] x_B$$

- 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

$$x^*_A = \arg\max_{x_A} [P_A (x_A) - (c_R + c_M)] x_A$$

$$x^*_B = \arg\max_{x_B} [P_B (x_B) - (c_R + c_M)] x_B$$
– Observe that \((x_A^*, x_B^*)\) coincide with the joint monopoly outcome.

○ *Case 2:* The retailers are undifferentiated.

– (1) become

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

– 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 \(t_j = [p_j \left(x_j^e, 0\right) - c_R] x_j^e\).

  – \(R_j\) will accept the contract since it gives him payoff 0.
This contract yields $M$ profit $\Pi^j$.

- If there is an eq’em 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’em involves an exclusive contract with $R_j$ if $\Pi^j > \max \left\{ \Pi^e_{-j}, \hat{\Pi} \right\}$.
- If $\hat{\Pi} > \max \left\{ \Pi^e_A, \Pi^e_B \right\}$, then the eq’em contracts must be non-exclusive.

Let us return to the 2 special cases from before.

- **Case 1:** The retailers sell in distinct local markets.
  
  $\hat{\Pi} = \Pi^e_A + \Pi^e_B = \Pi^{**} > \max \left\{ \Pi^e_A, \Pi^e_B \right\}$, 
  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.
  
  $\Pi^e_A = \Pi^e_B = \Pi^{**} > \hat{\Pi}$, 
  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

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

○ 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 \(\Pi_j < \Pi^{**}\), 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 $\pi^A_2$ and $\pi^B_2$) 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 $R_1$, $\pi^A_2$ and $\pi^B_2$ 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 $\infty$.
- $R_1$’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

$$(v_1 - c_B) + [(c_A - c_B) - (v_2 - c_A)] < f$$

(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

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

**Question #3:** When joint profits are maximized by excluding $M_B$, can a joint profit $\Pi^*_A$ 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 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

$$\max\{\hat{\Pi}, \Pi_B\} < \Pi^*_A = \Pi^{**}$$

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 $\bar{v}_1 < \bar{v}_1$ for the 1st and 2nd unit, respectively.
  2. $M_A$ and $M_B$ can supply any number of units in each market.
  3. $\bar{v}_1 > c_A > \bar{v}_1 > c_B$, 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 $(v_1 - c_B) + (c_A - c_B) > f$, 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 than 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**


