Some Anticompetitive Effects of Strategic Alliances and Joint Ventures

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Outline

1. Introduction

2. Different alliance types – anticompetitive effects
   i. Output Joint Ventures/Cross-Ownership
   ii. Input Joint Ventures – Sharing Alliances
   iii. Input Joint Venture – Joint Manufacturing

3. Using Joint Ventures to Support Collusion

4. Conclusions
1. Introduction/Motivation

- much interest in strategic alliances and joint ventures
- appearing in many industries, taking many forms, e.g.
  - research and development JVs
  - exchange of technical information, product standards
  - joint marketing
  - coordination of complementary activities
  - sharing of physical facilities e.g. joint production SAs
- many efficiencies possible, but competition concerns as well
  - SAs restrict independence of decision-making
On Airline Alliances

- arguably, one of the most SA-intensive industry

- alliances do many things:
  - code-sharing of flights
  - sharing of ground crews (e.g. baggage, maintenance)
  - sharing of terminal facilities and slots
  - joint marketing agreements
  - shared frequent flier programs

- has likely been the most carefully scrutinized industry –
  code sharing agreements have been challenged by the U.S. DOT since at least 1987 (a UA/BA code sharing plan)
Clearly alliances have many efficiency benefits – among them:

- economies of scale
- sharing of tangible and intangible assets
- coordination of complementary activities
- faster access to new markets
But some concerns....

Competition agencies have expressed concerns:


- FTC/DOJ: Guidelines for Collaborations Among Competitors (April 7, 2000)

Sources of Concern

• they can remove independent decision-making from a market
• they align interests so that even if decision-making is “independent” it becomes cooperative
• they can discourage entry
• they can facilitate collusion through information sharing and building a “culture of cooperation”
• cooperation in one market can “spill over” to other markets
2(i). Output Joint Ventures – Partial Equity Interests

- much early work motivated by GM-Toyota 1984 joint venture, but equity sharing has been part of airline alliances as well

  e.g. Reynolds and Snapp (IJIO, 1986)

- essentially Cournot model with cross-ownership
- not surprisingly, cross-ownership shifts reactions functions inward and reduces incentive to expand output
- example: linear demand, 5 Cournot competitors with 10% equity interest in each other → market output 10% below normal independent Cournot level
More recent work

- Private equity deals have multiplied number of cases of owners with shares of competing businesses.

- Work now distinguishes between
  - “cross ownership” (firms own pieces of each other) and
  - “common ownership” (common owners own pieces of multiple firms)
- both structures can reduce competition.

- Vertical equity alliances can have foreclosure effects.
2(ii). Input Joint Ventures – Sharing Alliances

Based on: *Strategic Alliances, Shared Facilities and Entry Deterrence* (Chen & Ross, *RAND*, 2000)

**On Sharing Alliances:**
- sharing of physical facilities, e.g. terminal space, ground crews
- could be sharing a plane via code-sharing
- joint production agreements
- “swap” or “exchange” agreements (e.g. in petroleum and aluminum)
- can be a way to facilitate entry when an entrant can share incumbent’s capacity
Central Result:

By offering a sharing alliance to a potential entrant, an incumbent might be able to discourage that entrant from a larger scale of entry with additional capacity. The alliance is essentially an offer to share something closer to monopoly profits rather than lower duopoly profits.

• related to Gallini’s [1984] theory of licensing

• important point is that the alliance may improve welfare relative to the pre-alliance situation, but reduce it relative to what would have happened without the alliance

• if treated as a merger, this would be a “prevention of competition case” rather than a “lessening of competition”
Outline of the Model:

- one incumbent monopolist, one potential entrant, demand faced by incumbent is $P(x)$, entrant may produce identical or differentiated product

- costs: $C = F + V(x)$ where $V' > 0$ and $V'' \geq 0$

- two stage entry game:
  1. Entrant appears, incumbent can make only one take-it-or-leave-it offer to entrant to share facility. Entrant decides to accept alliance or to enter with its own facility.

Note: alliance involves incumbent offering to provide up to $y$ units of capacity to the entrant at a price $r$ per unit.

2. Entrant and incumbent independently decide on their rates of output (Cournot) and payoffs are realized.
Two cases:

- consider two cases of substitutability:

1. Perfect substitutes: \( P(x_1 + x_2) \)

2. Independent demands: \( P_i(x_i) \) for \( i = 1,2 \)
Results -- Perfect Substitutes

1. Incumbent would like to pay entrant to stay out (i.e. rental payments are negative)

2. If such payments not allowed (i.e. rental payments must be non-negative), alliance leads to higher output than monopoly, but less than Cournot duopoly

3. As the fixed cost of the entrant increases, the output and profit of the incumbent increases and the output of the entrant and total market output falls.
Results -- Perfect Substitutes

4. An alliance will typically dominate entry for the two firms

5. Depending on the relative steepness of marginal costs and demand either:
   
   (i) the alliance will always reduce welfare relative to entry (if mc rises very quickly relative to steepness of demand)

   (ii) the relative social benefits of alliance vs. entry will depend on the level of fixed costs
Again:

the relative social benefits of alliance vs. entry will depend on the level of fixed costs

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<td>$F_{\text{min}}$</td>
<td>$F_0$</td>
<td>$F_1$</td>
<td>$F_{\text{max}}$</td>
<td>F</td>
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I  II  III  IV

- alliance, no entry (entry would be efficient relative to alliance)
- alliance, no entry (entry would not be efficient relative to alliance)
- no alliance, no entry
Results: Separate Markets

(e.g. entrant airline uses gates and ground crews to support flights to different destinations from those served by incumbent.)

- entrant not a competitive threat, but is a profit opportunity

Different results:

- rent will now be strictly positive
- if mc is constant, alliance has no effect on price, must be efficient (saves fixed cost)
- alliance may proceed even if entrant could not enter alone
Separate Markets

Welfare effects:

- alliance more likely to be welfare improving, but not necessarily

- (i) with rising mc, alliance raises price to incumbent’s customers – loss of consumers’ surplus here could outweigh gains to firms and customers of entrant

- (ii) and alliance can be a substitute for entry with a new facility with the resulting lower marginal costs and prices
2(iii). Input Joint Ventures – Joint Manufacturing

Based on: *Cooperating Upstream while Competing Downstream: A Theory of Input Joint Ventures* (Chen & Ross, *IJIO*, 2003)

Type of JV:

Parents jointly own a supplier of a key input used in fixed proportions to produce final output. e.g. joint ownership of a terminal

Purpose: To understand the effects on input and output prices, and on the efficiency of these agreements, compared with a number of alternatives including independent third-party supply and the complete merger (or cartelization) of the parties
Input Joint Ventures

**Key features:** two firms, differentiated products

Fixed proportions – both firms use the same input in their production processes, 1 unit input per unit output – no other inputs or costs downstream.

Input can be produced at a constant marginal cost $c$ with a fixed cost $F$ in order to establish the necessary production facility.
The Joint Venture

Assume JV formed by parents to produce input

Assume each owns 50%

Two Stage Game:

Stage 1: JV chooses a price for input of $w$ (with double approval)

Stage 2: Parents compete, choosing downstream prices $p_i$, non-cooperatively
Results:

1. JV could be welfare-reducing in the sense that it results in higher final goods prices than in the competitive input market benchmark. (Need to consider fixed costs savings too.)

2. Under some conditions the input joint venture allows the parties to replicate merger

3. Parents may commit to buy all their supplies from JV, even if it is less efficient than alternatives.
   ▶ JV may need to impose requirements contracts

4. Requiring the input JV to function completely independently can also be inefficient – this can exacerbate a double-marginalization problem
Extensions: If there are firms outside the JV

- Now it can be possible that the JV is worse than a merger

- High input prices can be used as a pre-commitment to higher downstream prices, softening downstream competition if Bertrand competition downstream

- If competition downstream is Cournot, lower input prices can confer a Stackleberg-type advantage
3. Spillover Effects: JVs Supporting Collusion

Observation:

Many firms will have joint ventures that require their cooperation in one market (A) while the firms continue to compete in other markets (B).

Examples: GM-Toyota
Banks
Dairies
Aluminum companies
Airline alliances on select routes
Spillover Effects: Concerns

Suppose we are not worried about the fact they do not compete in the JV market (many other competitors there) – we might still be worried that cooperation in market A might make them less vigorous competitors in market B.

Mechanisms:
1. Better information for detection of cartel cheating
2. Easier to “cover” cartel meetings
3. Culture of cooperation
4. Multi-market contact (e.g. Bernheim and Whinston, 1990)
Cooperation Spilling over into Second Market

Based on: *Sustaining Cooperation with Joint Ventures* (Cooper-Ross, *JLEO* 2009)

Questions:

- How can a joint venture influence the behaviour of partners in other markets in which they should compete – even when there is no demand or cost-side linkages between the two markets?

- Can abandoning a successful JV ever be a credible punishment strategy to support collusion?

- Can cooperative behaviour from a JV lead to a spirit of cooperation that carries forward into other markets?
Sustaining Cooperation with JVs

Answer builds on ideas from:

(i) Bernheim and Whinston [1990] on multimarket contact

(ii) Friedman [1985] and Benoit-Krishna [1985] on the use of multiple equilibria in finite games to support cooperation

(iii) Kreps and Wilson [1982] and Milgrom and Roberts [1982] on signaling games
Our Setup:

Firms play two games, payoffs are not directly connected

(a) a market game (MG) – in which they compete PD-fashion (e.g. a Bertrand game)

<table>
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<th>PD Game</th>
<th>Firm 2</th>
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<tr>
<td></td>
<td>Collude</td>
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<tr>
<td>Firm 1</td>
<td></td>
</tr>
<tr>
<td>Collude</td>
<td>$c,c$</td>
</tr>
<tr>
<td>Compete</td>
<td>$d,b$</td>
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Where we assume: $d > c > 0 > b$
(b) a joint venture game (JV) - a coordination game

<table>
<thead>
<tr>
<th>Joint Venture</th>
<th>Firm 2</th>
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<tbody>
<tr>
<td></td>
<td>High effort</td>
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<tr>
<td>Firm 1</td>
<td>( x_h, x_h )</td>
</tr>
<tr>
<td></td>
<td>( x_l, z )</td>
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Where we assume: \( x_h > x_l > z \)
The joint venture as a coordination game

1. CG structure could come from team production: e.g., \( R = 2Ke_1e_2 \) with \( C(e_i) = e_i^3/3 \).

2. CG structure could come from a PD with imperfect contract enforcement.

3. CG structure could be deliberate! Parties may not write contracts that could protect them from coordination failure even when such contracts are possible!
Sequencing and Repetition

In this paper we analyze the effects of the JV on competition in the MG and show how they are influenced by 2 conditions:

(1) the order in which the games are played
   • MG followed by JV (MG → JV): JV as a punishment tool
   • JV followed by MG (JV → MG): cooperation in JV develops “spirit of cooperation” or trust that facilitates cooperation in the MG

(2) the number of repetitions of the games
   • one-shot
   • finite repetitions
   • infinite repetitions
Joint Ventures as Credible Punishments

• here we study MG → JV
• can the threat of JV collapse be a credible one?

(i) One-Shot MG → JV

• consider the following candidate equilibrium: everyone plays Collude in the MG and High in the JV on the equilibrium path – if anyone defects in MG, all players play Low in JV
• under these strategies the combined payoff matrix would look like this:
<table>
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<tr>
<td><strong>Collude</strong></td>
<td><strong>Collude</strong></td>
</tr>
<tr>
<td>$c + x_h, c + x_h$</td>
<td>$b + x_l, d + x_l$</td>
</tr>
<tr>
<td>$d + x_l, b + x_l$</td>
<td>$x_l, x_l$</td>
</tr>
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</table>

**Notes:**

1. if $c + x_h > d + x_l$ (or $d - c < x_h - x_l$)  
   → this will itself be a coordination game (recall that $b < 0$)
2. collusion in MG can be supported as part of equilibrium in one-shot
   ♦ JV punishment is credible due to multiple equilibria
3. JV must be “important enough” ($x_h - x_l$ must be greater than $d - c$)
4. borrows from Friedman and Benoit-Krishna
5. may be (will be) other equilibria
(ii) Finitely Repeated MG → JV

- expands scope for cooperation
- let $T =$ number of repetitions of sequence (MG → JV)
- $T^* =$ be number of periods of competition in the MG
- no discounting
Finitely Repeated MG → JV: Candidate Equilibrium

- collusion for $T-T^*$ periods and both firms pick High in JV
- after period $T-T^*$, firms compete in MG and play High in JV
- any defection leads to competition in MG and Low in JV for the rest of play
Finitely Repeated MG → JV: Candidate Equilibrium

• $T^*$ determined as part of equilibrium as the number of periods of competition (where collusion cannot be supported):

$$c + (1+T^*) x_h = d + (1+T^*) x_l$$

  LHS = payoff from cooperating in period before $T^*$
  RHS = payoff from competing in period before $T^*$

• note that if $x_h - x_l > d - c$ then $T^*$ can be zero – can support collusion with just one repetition (as above)

• Result: if $T > T^* = [(d-c) - (x_h - x_l)] / (x_h - x_l)$

  we can support collusion for $T-T^*$ periods
(iii) Infinitely Repeated MG $\rightarrow$ JV

- discount factor $\delta$
- candidate equilibrium based on a grim strategy:
  all firms collude in MG and play High in JV, any defection would result in competition in MG and Low in JV forever

payoff from colluding $\geq$ defecting when:

$$c + x_h + \delta \left( \frac{c + x_h}{1 - \delta} \right) \geq d + x_1 + \delta \left( \frac{x_1}{1 - \delta} \right)$$
Infinitely Repeated MG → JV

Collusion can be supported if:

$$\delta \geq \delta^* = \frac{(d - c) - (x_h - x_l)}{d}$$

So JV weakens condition for collusion – without JV condition would be:

$$\delta \geq \delta^* = \frac{(d - c)}{d}$$

Parallels here with Bernheim and Whinston [1990], but:

• here JV can only help – adds punishment power without increasing gain from cheating
Briefly: A Different Effect with JV→MG
The Signaling Effects of Joint Ventures

• in a one-shot can we get a JV to influence the play of a subsequent PD game?

• not with purely rational players, but what if we have other types, e.g. “altruists” - related to Milgrom and Roberts [1982] and Kreps and Wilson [1982]

• we assume “best-response altruists” – would like to cooperate – get a “warm glow” if both players collude in the MG
Signaling when MG follows JV

Candidate equilibrium:

- egoists all compete in MG regardless of play in JV
- altruists who see High in the JV collude in MG
- in equilibrium some fraction of egoists will play High in JV and some will play Low
Result:

- **Proposition:** If the fraction of altruists is less than or equal to a critical level then there exists a sub-game perfect Nash equilibrium in which the altruists and a fraction of the egoists coordinate on high effort in the JV and altruists collude in the market game iff their partner put forth high effort in the JV.

- Conditions exist here under which altruists would not cooperate in MG without prior play of JV – seeing High in JV leads (via Bayesian updating) to greater confidence (“trust”) that they are facing another altruist.
Discussion – Implications for Competition Policy

• JVs and SAs should be on the “coordinated effects checklist”

• does not require a direct connection between the markets – connection can be created via “beliefs”

• relevant to the review of the JV/SA but also of mergers in other markets – e.g. how much remaining competition exists post merger if remaining firms are linked via JVs in other markets?
Discussion – Implications for Competition Policy

Theory suggests we look at the following --

• number of firms in market vs. in JV
• size of gains from JV relative to gains from collusion
• type of JV contract – does a coordination problem exist (and did they deliberately not correct it)?
• correlation of JV profits and market game profits
  • does a breakdown in one correspond to a breakdown in the other?
• ownership shares might need to be adjusted to create right coordination game
Testing the theory

- hard to isolate “beliefs” effect in real markets since most JVs have some connection to other activities

- maybe most promising: experiments
  1. MG → JV : JV as punishment
  2. JV → MG : spirit of cooperation
4. Conclusion

- for all their recognized benefits, strategic alliances and joint ventures do represent a loss of independent decision-making in markets and therefore can raise concerns regarding loss of competition
- general lesson from all these models is that whenever conditions are such that you would be concerned about a merger of the JV partners, you might want to carefully analyze any JV they propose

Conditions:
- concentrated markets
- barriers to entry
- evidence of current market power (e.g. high prices / profits)
- history of collusion
Conclusion (con’t)

- while requiring a JV to be run independently if it is an output JV might be a good idea, it is likely not a good idea if it is an input JV

- this all said, a JV in a concentrated market should get the kind of evaluation contemplated by Williamson for mergers – i.e. a benefit / cost analysis that considers the efficiency benefits as well as the costs due to any lessening of competition

- must be aware that the anticompetitive effects of a joint venture may come in a different market from that in which the joint venture operates – and may have these effects by altering firms’ beliefs about others’ play
Thank you!

for any follow-up:

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