COOPERATION

Context and concepts

- Context: How can you persuade a competitor to avoid a price war?
- Concepts: cooperation, competition, complementors, repeated games, punishment, facilitating practices.

War and peace

- Business is simultaneously war and peace, competition and cooperation:
  - Cooperation in creating value
  - Competition in dividing it up

You have to compete and cooperate at the same time.
--Ray Noorda, Novell

- "Co-opetition":
  - Cooperate with your eyes open
  - Compete without killing opposition

Co-opetition

Firms with complementary products are "complementors" (they have "complementary" interests):
- Hardware and software (PCs, games, music, movies)
- Microprocessors and operating systems
- Cars and auto loans

Direct competitors can also be complementors:
- Compaq and Dell: compete with each other for the latest Intel chip; complement each other in defraying Intel's R&D costs.
- American and Delta: compete with each other for landing slots and gates; complement each other in defraying Boeing's R&D costs.
- Cingular and VoiceStream: ditto.

Complementors

More examples

- Magazine free gifts (cover mounts)
  - Coop: music companies, etc. find an outlet
  - Comp: gift wars
- Competition between Ivy League schools:
  - Is the Ivy League moving to a worse equilibrium?
  - Why did Princeton deviate from the previous equilibrium?
- Can you think of others?
Leverage from repetition

- Idea: If two (or more) firms interact repeatedly, future meetings are a source of leverage for both sides. They provide an opportunity for one firm to “punish” the other if it behaves in a noncooperative way. Curiously, this possibility of punishment may deter firms from acting noncooperatively in the first place.
- Examples:
  - Price war: If Firm A cuts price, Firm B can follow suit. Firm A soon learns this, and will think carefully about price cuts in the future. (United and American)
  - Entry: Sony and Barco might cooperate on market segments. If Barco enters mid-range market, Sony can enter high-end market to retaliate. This might have deterred Barco if they had thought this way. Intel and Microsoft have a similar hardware/software split.

The Bertrand price game

- In the Bertrand price game, we contrasted
  - The “cooperative” outcome: set the monopoly price, split the market, and make (say) M/2. (M = monopoly profits).
  - The Nash equilibrium: price at MC, make zero.
- To show: cooperation can be a Nash equilibrium if the game is played repeatedly

Cooperation in repeated games

- Consider Bertrand game played at dates t=1,2,...
- Suppose firms maximize the present discounted value of profits:

\[ V = \pi_1 + \delta \pi_2 + \delta^2 \pi_3 + \ldots \]

\[ \pi_t = \text{profit at date } t \]
\[ \delta = \text{discount factor (today's value of a dollar tomorrow)} \]

Einstein on discounting

- Claim: in the repeated game, the cooperative outcome (set the monopoly price) can be a Nash equilibrium.
- Equilibrium strategies:
  - If all firms set monopoly price in the past, stick to it.
  - If one firm ever sets price different from monopoly price, revert to pricing at marginal cost forever. (This “punishment” is what supports the equilibrium.)

Cooperation...

- Value of cooperating: if firm sets monopoly price, expected payoff is

\[ V = \frac{1}{2} M + \frac{1}{2} M \delta + \frac{1}{2} M \delta^2 + \ldots = \frac{M}{1 - \delta} \]

- Value of undercutting rival: if firm sets price just below monopoly price, expected payoff is

\[ V' = M - \delta M + \delta^2 M + \ldots = M \frac{1}{1 - \delta} \]

- For cooperation to be an equilibrium, we need \( V > V' \), which requires \( \delta < \frac{1}{2} \). (Firms have to care sufficiently about the future for punishment to work.)
- Try to show: with n equal firms, the condition is \( \delta > (n-1)/n \).
Punishment/retaliation is a disciplinary device that supports cooperation. Explicit price-fixing is illegal, but an understanding of repeated games may produce a similar outcome legally. Cooperation requires firms to care about the future. Factors that affect feasibility of cooperation:
- market growth rate: high growth makes future more important, supports cooperation.
- probability of survival: firms facing bankruptcy may not have a future, will be less inclined to cooperate.
- speed of response: a non-cooperating firm gets the market for one period. If a period is short, this is less valuable and cooperation is easier to support.
- information: it’s harder to support cooperation if the other firm’s prices and sales aren’t known.

Price wars happen in many industries on occasion. Why?
- High demand now makes cheating more attractive; eg, cement; seasonal price wars.
- Law demand may lead firms to suspect cheating by others, which triggers punishment; eg, barge shipping.
- One of the firms is in financial distress, so that the future does not matter that much; eg, Northwest Airlines.
- One of the firms wants to signal its strength and gain market share; eg, Murdoch in NY and London.

Great Lakes shipping (1880s)

Market structure
- Cooperation harder with many firms
- Also harder if firms are asymmetric in size; eg, bromide cartel

Multimarket contact. Examples:
- Zaibatsu
- ICI, Farben, DuPont
- Maxwell House vs Folger’s
- Dog food

Probability of detection
- Aircraft prices
- Advertising rates
- Concrete in Denmark

Severity/credibility of punishments
- DeBeers

Other factors
- US
  - Sherman Act; exceptions
  - Criminal offence – jail sentences
- EU
  - Article 85 Treaty of Rome
  - Exemptions
  - “It’s a thin line between competition and cooperation”
    - Research agreements
    - Information exchange
- EU
  - Article 85 Treaty of Rome
  - Exemptions
  - “It’s a thin line between competition and cooperation”
    - Research agreements
    - Information exchange
- EU
  - Article 85 Treaty of Rome
  - Exemptions
  - “It’s a thin line between competition and cooperation”
    - Research agreements
    - Information exchange

Facilitating practices
- Best-customer clauses
  - GE and Westinghouse
  - DuPont and Ethyl
  - Chrysler
- Transfer payments in sports
- Government mandated measures
  - Ready-mixed concrete in Denmark
  - Federal Election Campaign Act
  - Medicaid reimbursement rules

The law
Danish concrete

Average 10-MPa Concrete Prices in Århus.

Takeaways

- Firms compete, but they frequently have common interests as well:
  - Produce complementary products
  - Share a supplier
  - Benefit from informal cooperation
- Repeated interaction provides firms with strategic leverage over each other that may encourage cooperation: repeated games, multimarket contact...
- Other “tricks” may help to support cooperation, too: best-customers, guaranteed low prices, good information...

Practice problem 2.16