Competitive Strategy: Week 11

Reputation and Cooperation

Simon Board

Why is Reputation Useful?

- Cooperation between competitors
  - Prices.
  - New product design, standards, market development, lobbying, advertising.
- Complementors.
  - New products.
- Suppliers
  - Reputation not to hold up suppliers.
- Buyers
  - Reputation for high quality product
- Entrants
  - Reputation for toughness to fight entry.

Tacit Cooperation over Prices

- Tacit cooperation
  - Cooperation without explicit agreements.
  - Agreements not enforceable by court.
- Key ingredients
  - Shared interest as basis for cooperation.
  - Mechanism for punishment.
  - Mechanism for recovering from mistakes.
- Warning: price fixing is illegal!
  - Cooperation on R&D or advertising is not.

Cases

- American Airlines circa 1990
  - After deregulation there were frequent price wars
  - Interpretation: AA was trying to teaching rivals how to cooperate.
  - But bankrupt rivals had no interest in playing along.
- 1955 Automobile Price War
  - 45% more cars were produced in 1955 than 1954 or 1956.
- Joint Executive Committee
  - Classic railroad cartel from 1880s
  - Involved in price war 1/3 of the time

Punishment

- Is punishment severe enough to deter defection?
  - Price war may need to be very long.
  - AA couldn't punish bankrupt airlines sufficiently.
- Is punishment credible?
  - Punishment is costly, but must be optimal after defection.
  - Idea: get punished for not punishing.
  - Problem: must avoid renegotiation.
- When to punish?
  - Is deviation deliberate or by mistake?
  - Threshold rule: market share cannot rise above 20%.
  - Ambiguous rule: prob of price war rises with market share.

Recovery

- How do you recover from mistakes?
- Could punish for fixed time
- Make punishment fit the crime
  - Deeper and longer price war for larger transgression.

A Mathematical Example

- Market
  - Two firms A and B
  - Costs zero
  - Demand $p = a - q$.
- Bertrand competition
  - Prices $p_A = p_B = 0$ and profits $\pi_A = \pi_B = 0$.
- Joint profit maximisation
  - Prices $p_A = p_B = a/2$ and both industry profits $\pi_M = a^2/4$.

Example II

- Suppose both firms agree to set $p_A = p_B = a/2$.
  - Problem: incentive to deviate.
- Punishment
  - If cheat then we revert to Bertrand competition.
- Grim strategy for $i \in \{A, B\}$
  - If no-one has ever defected $\rightarrow$ set $p_i = a/2$.
  - If someone has defected $\rightarrow$ set $p_i = 0$.
- Is this a subgame perfect equilibrium? Will any firm defect?

Example III

- Game
  - Each round firms choose p_i
  - Discount rate δ.
- Suppose no-one has defected.
  - If don't defect get $\pi_M/2$ forever.
  - If defect get π_M today, but get punished for rest of time.
  - Hence defect if

$$\begin{aligned} \pi_M &> \frac{\pi_M}{2} + \delta\frac{\pi_M}{2} + \delta^2\frac{\pi_M}{2} + \delta^3\frac{\pi_M}{2} + \dots \\ &= \frac{1}{1-\delta}\frac{\pi_M}{2} \end{aligned}$$

  - Defect if $\delta < 1/2$.

Example IV: Some Questions

- What are the shared interests of firms A and B?
- When do firms enter punishment phase?
- How is defection punished?
- Is "Nash reversion" punishment credible?
- Can firms recover from punishment phase?
- What if firms could renegotiate in punishment phase? Would this increase payoffs?

Problems with Tacit Collusion

- Lots of firms
  - More reason to deviate.
  - If there are N firms in Bertrand model, need $\delta \geq (N-1)/N$.
  - Harder to detect defection.
  - Harder to coordinate punishment.
- Small or failing firms
  - If firms differ they may have different incentives to defect.
  - Design punishments to stop those most likely to deviate.
  - Or ignore these firms.
- Entry
  - Successful cooperation promotes entry and free–riding.

Problems cont.

- Competition on other dimensions
  - If cooperate on advertising, then price competition may increase.
- Demand Variation
  - When demand unusually high, have large incentive to deviate.
  - Could increase punishments.
  - Could create exemptions and not risk price war.
- Differentiated Products
  - Makes price comparisons harder.
  - Also changes nature of competition.
- Reaction Time
  - Long reaction time like low δ, so cooperation harder to sustain.

Problems cont.

- Environmental Randomness
  - Suppose market price of oil falls.
  - Is this random, or did OPEC country defect?
- Communications problems
  - How specify exactly what type of adverts are allowed?
- Need infinite period game.
  - Suppose game lasts for 10 periods.
  - Then cheat in period 10 for sure.
  - Thus cheat in period 9 for sure.
  - Thus cooperation cannot be sustained!
- When fixing prices: Confessions

Problem: Allocating Production in a Cartel

- Two firms A and B with costs $c_A(q) = 0$ and $c_B(q) = 1$.
  - Linear demand, $q(p) = a - p$, where $a \geq 2$
- Bertrand production
  - A prices at $p_A = 1$. Profits: $\pi_A = (a - 1)$ and $\pi_B = 0$.
- Joint profit maximising problem
  - A prices at $p_A = a/2$. Profits: $\pi_A = a^2/4$ and $\pi_B = 0$.
- If transfers are possible
  - Nash bargaining: A pays B half of gain from cooperation.
  - Problem: Firm may misrepresent costs.
- If transfers not possible
  - B gets some production, although this is inefficient.

Aiding Tacit Cooperation

- Industry associations
  - Lobby government, help advertising, provide information to consumers.
- Published price lists
  - Makes pricing more transparent.
  - Example: General Electric's electric turbines.
- Most–Favoured Customer clauses
  - Commit not to make secret price cut to an individual.
- Exclusive territories
  - Make market sharing rule transparent.

Aiding Tacit Cooperation cont.

- Preannouncing future price increases
  - Reduces lag time.
  - Example: because of fuel prices, prices will rise by 10%
- Incremental Steps
  - If don't trust rivals take small steps.
- Multi-market contact
  - Easy to trust if interact in many markets: more possibilities for punishment.
- Unused capacity
  - Increases threat of punishment.

Reputation for Quality

- A firm chooses quality $q \in \{q_L, q_H\}$ at cost $\{c_L, c_H\}$.
  - Utility of buyer equals $q - p$.
  - Buyer only sees quality after they purchase good.
- One shot game
  - Firm produces $q = q_L$ and charge price $p = q_L$.
- Repeated game.
  - Buyer: pays q_H if firm chosen q_H in past, else pays q_L.
  - Firm chooses high quality if

$$\frac{1}{1-\delta}(q_H - c_H) \geq (q_H - c_L) + \frac{\delta}{1-\delta}(q_L - c_L)$$

Reputation to Fight Entry

- Entry Game
  1. Entrant E chooses to enter or not.
  2. If E enters, incumbent I chooses to fight or not.

$$\begin{aligned}(u_I, u_E) &= (200, 0) \quad E \text{ doesn't enter} \\ &= (75, 75) \quad \text{if } E \text{ enters and } I \text{ acquiesces} \\ &= (-50, -50) \quad \text{if } E \text{ enters and } I \text{ fights}\end{aligned}$$

- One period game: E enters and I acquiesces.
- Repeated game ("chain store game")
  - E's strategy: enter if I has ever acquiesced.
  - I can credibly fight if

$$-50 + 200\,\delta/(1-\delta) \geq 75/(1-\delta)$$

Assignment

- Read "The Real Lesson of Enron's Implosion" by McAfee (on website).
- Why is Enron's collapse puzzling?
- What was Enron's role in the gas market?
- Why is trust important in this market?
- Can you think of other firms in the trust business?