

Strategic Competition: An overview

- The economics of industry – studying activities within an industry.
- Basic concepts from game theory

Competition in the short run

- Best-response functions, best-response curves
- Strategic substitutes, strategic complements
- Quantity competition, price competition
- Price competition, homogeneous goods, constant unit costs:
 - Discontinuous profit functions
 - Unique equilibrium: $p = MC$
 - The Bertrand paradox
- Resolving the Bertrand paradox
 - Product differentiation
 - Time horizon
 - Capacity constraints

Price competition with capacity constraints

- Consumer rationing
 - Efficient rationing, proportional rationing
- Low capacities: equilibrium with joint price P such that
$$Q(P) = \sum_i \bar{q}_i.$$

Capacity competition

- Stage 1: Firms choose capacities
- Stage 2: Firms choose prices
- Outcome as if one-stage competition in quantities

Quantity competition

- The Cournot model
- n -firm oligopoly
 - First: first-order condition for a typical firm
 - Then: invoke symmetry

Prices vs. quantities

- Bertrand or Cournot?
- Cost function
 - Constant returns to scale: Bertrand
 - Sharply increasing marginal costs: Cournot

Measuring concentration

- The Herfindahl index
- In a special case, it is proportional to total industry profits

Dynamic competition: Tacit collusion

- Deviation from a collusive price
 - long-term loss
 - short-term gain
- Finite number of periods
 - no cooperation
- Trigger strategies
- Folk theorem
- Collusion when firms are patient enough (δ high)
- Collusion when demand varies
 - May have collusion below monopoly price in high-demand state in order to make collusion sustainable.
 - Price war during boom?
- Infrequent interaction
- Multimarket contact
- Collusion when other firms' prices are unobservable
 - Low own demand: could be other firms' cheating, or low market demand.
 - Punishment after low demand, but not forever.

Dynamic competition: Price rigidities

- Alternating price setting
- A discrete price grid
- Markov strategies: based on payoff relevant information
- At least two equilibria:
 - collusion: kinked demand curve
 - price war and unstable prices: Edgeworth cycle

Product differentiation

- Horizontal differentiation
- Vertical differentiation

Horizontal differentiation

- The Hotelling model: *which* product variants are offered in equilibrium?
 - Consumers heterogeneous with respect to preferences
 - Transportation costs in product space: a measure of product differentiation
 - Price competition: Prices are higher when transportation costs are higher
 - Prices are strategic complements
 - Equilibrium variants: two-stage game
 - Stage 1: firms choose product variants
 - Stage 2: firms choose prices
 - Quadratic transportation costs: product variants in equilibrium are maximally differentiated
 - Social optimum: differentiated, but not max.
 - Equilibrium analysis: direct effect, strategic effect.

- The circular model: *how many* product variants are offered in equilibrium?
 - Two-stage game:
 - Stage 1: firms enter and spread evenly around the circle.
 - Stage 2: price competition.
 - Entry costs
 - Equilibrium: A firm balances gross profits from having a niche in the market against entry costs
 - Social optimum: An entry saves on consumers' transportation costs but affects other firms negatively.
 - In equilibrium, too many firms enter.

Advertising

- Informative, persuasive
- Informative advertising: firms choose both prices and advertising level.
 - More advertising: More consumers know about the firm's product
 - The more firms advertise, the tougher is price competition
 - Too much advertising in equilibrium? – Depends.

Vertical differentiation

- Quality competition
- Consumers agree on which product variant is the best
- Consumer heterogeneity with respect to taste for quality
- Two-stage duopoly game:
 - Stage 1: Firms choose qualities
 - Stage 2: Firms choose prices
 - In equilibrium: one high-quality firm, one low-quality firm
 - Maximum differentiation again, but now in qualities

Entry

- Strategies when confronting an entry threat
 - Blockading entry
 - Deterring entry
 - Accommodating entry
- Contestability theory
 - Prices before quantities? Hit-and-run entry.

- Model of treating an entry threat
 - Stage 1: Incumbent firm chooses K . Potential entrant makes entry decision.
 - Stage 2: Either incumbent firm is a monopolist, or the two firms compete by choosing $\{x_1, x_2\}$.
 - Analysis of stage 2: Comparative statics.
 - Stage 1: Increase in K has direct and strategic effects.

- Four possible strategies for the incumbent firm
 - Top Dog; Puppy Dog; Lean-and-Hungry Look; Fat Cat.
 - Depending on whether increase in K increases or decreases the incumbent's aggressivity
 - Depending on whether stage-2 variables are strategic complements or strategic substitutes
 - Depending on whether the incumbent wants to deter or accommodate entry.

Information

- Perfect Bayesian Equilibrium
- Strategies *and* beliefs in equilibrium
- Price competition with asymmetric information
 - The uninformed behave as if confronting a virtual, expected type of the other firm

- Dynamic model: The informed firm may try to affect the uninformed firm's beliefs about its type.
 - signalling game
 - Two periods of price competition: First-period prices higher because of the signalling
 - Entry deterrence: incumbent's price low in order to signal low costs
 - Welfare effects of asymmetric information: Lower price by the incumbent.

- Incomplete, symmetric information about demand: Signal-jamming
 - Each firm wants the other firm to set a high price in period 2. This leads each firm to set a high price in period 1.

- Incomplete information in the capital market: Dominant firm competes aggressively in order to get the financially weak firm to exit the market.

Auctions

- Various kinds of auctions
 - Open vs. sealed bids
 - Open bids: Ascending vs. descending bids
 - Sealed bids: First price vs. second price

- *Revenue equivalence*: Expected revenue for seller is the same in all four kinds of auctions.

- Bidding behaviour in sealed bid auctions: Second price: bid = valuation. First price: bids are shaded, $b < v$.
- Seller's optimum reservation price: parallel story to that of monopoly.
- Discrimination in auctions: Seller should discriminate in favour of the bad group in order to get higher bids from the good group.
- Risk averse bidders bid higher than risk neutral ones.
- Correlated valuations: winner's curse.

Vertical relations

- Contractual relationships producer/retailer
 - vertical integration
 - two-part tariff
 - resale price maintenance
 - Exclusive dealing, exclusive territories
- Vertical externality: double marginalization
- Horizontal externality: can be counteracted by a low wholesale price

Vertical foreclosure

- Essential facility, bottleneck production
- The Chicago school vs. the foreclosure doctrine
 - vertical foreclosure is no problem / is a problem.
 - Chicago school: there is only one monopoly profit
- A reconciliation: the role of commitment
- The bottleneck producer cannot get hold of a monopoly profit, because of a commitment problem when contracting with downstream firms
- Vertical foreclosure is a way of getting around this commitment problem, rather than of extending monopoly power to the downstream market.
- Thus, vertical foreclosure *is* potentially harmful – if the bottleneck producer is unable to commit to contracts.

R&D

- product innovation, process innovation
- drastic and non-drastring innovations
- the value of an innovation
 - to society
 - to a monopolist
 - to a competitive firm
 - to a monopolist facing an entry threat

- the replacement effect vs. the efficiency effect
- patent races
- [strategic timing of technology adoption]
- network externalities
 - excess inertia
 - strategic compatibility decisions, standardization

Mergers

- Cost savings from mergers: Oliver Williamson
- The authorities' assessment of a merger proposal
 - A proposed merger must be profitable.
 - Therefore it is welfare enhancing if the external effect is positive.
 - *External effect*: combined effect on other (non-merging) firms and consumers.
 - Effect on non-merging firms typically positive, effect on consumers typically negative.
 - In the merger-between-units-of-capital model: Effect on non-merging firms is particularly positive if non-merging firms are big.