

Economics Course Review

Supply and Demand

Demand Curve (# purchased at total price) *Supply curve* (# sold at each price) *Market equilibrium* (where demand = supply)
Cost Functions - relationship of total costs to total output; *Fixed* (consistent), *variable* (increase), *sunk costs* (irrecoverable)
Average cost - $AC(Q) = TC(Q) / Q$ *Marginal cost* - $MC(Q) = TC(Q+\Delta Q) - TC(Q) / \Delta Q$
Economic Profit = Sales Revenue - Economic Cost (includes opportunity cost) {annualized NPV calculation}
Price elasticity of demand = % change in quantity demanded / % change in price; Inelastic ($E < 1$) or elastic ($E > 1$)
Total revenue function - how firm's revenues vary as function of how much it sells $TR(Q) = P(Q)Q$
Marginal revenue function - change in total revenue from sale of ΔQ additional $MR(Q) = TR(Q+\Delta Q) - TR(Q) / \Delta Q$
Total Cost Curve: minimum cost for output; fixed cost, variable cost ($TC = FC + VC$), average cost ($AC = TC/Q$), marginal cost
Profit maximization: $MC = MR$ ($MR > MC$ higher profit if lower price, $MC > MR$ higher profit if higher price)
Average cost curve (u-shape): AC vs. MC : AC decreases where $MC < AC$, AC flat at intersection, AC increases where $MC > AC$.

Perfect Competition and Monopoly

Producer and consumer surplus

Perfect competition - many sellers, homogenous good, smart buyers, no sw. costs

Monopoly - firm with significant market share or ability to set prices above MC

Herfindahl Index - market concentration by share of firms $= (S_1)^2 + (S_2)^2 + (S_3)^2 \dots$

Efficiency: Productive (produce lowest AC), Allocative (consumers will pay more, max surplus), Technological (incentives to innovate), Pareto (better1- worse2)

Competitive equilibrium: exhibits productive + allocative efficiencies (mono can't)

Economies of scale - average cost declines as output increases; $MC <$ overall AC

Economies of scope - savings from increasing variety of goods; synergies

Sources of scale/scope: spread FC, productivity, inventories, cube-square rule

Substitutes - price of X increases, purchases X decrease, and purchases Y increase

Competitors - *Direct* (choice directly affects other), *Indirect* (through choice of 3rd)

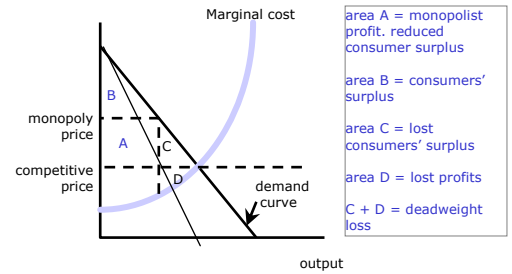
Switching costs/network effects - cost to use competing good; consumers benefit using dominant product (software, mobile)

Market conditions drive down prices when (2 of 3): many sellers, consumers perceive product as homogenous, excess capacity

Barriers to entry - factors making it unprofitable for new entrants; structural: control of resources, economies of scale/scope,

Entry conditions: Blockaded (structural barriers high), Accommodated (ineffective/costly to deter), Deterred (by incumbents)

Exit barriers - obligations firms must meet whether or not they cease operations (labor agreements, purchase commitments etc.)



Pricing and Profit

Price discrimination - different prices for same good; can not happen in fully competitive markets

Cost differences vs. price discrimination - is ratio of prices across markets different from the ratio of marginal costs?

Third degree (selection by indicators) - observable buyer characteristics, sellers establish different prices (ex. student discounts)

Second-degree (self-selection) - choice of products including clauses in addition to price (ex. discounted rates on fares)

Non-linear pricing - unit price depends on the quantity purchased (but not on identity of the consumer)

Two-part tariff - consists of fixed part (all customers pay), and proportional part (based on customer's use of product/service)

First-degree (perfect discrimination) - seller sets different prices for each buyer and each unit purchased (ex. small-town doc.)

Versioning: packages price/quality, buyers sorted on willingness to pay; *Bundling*: purchase entire bundle (pure) or components (mixed)

Welfare/Efficiency Effects - total efficiency may decrease as a result of price discrimination, welfare effects ambiguous; there are cases when price discrimination implies strict Pareto improvement - both seller and consumers are better off as a result

Oligopoly

Oligopoly - market with small number of important firms, competitor decisions and reactions are very important, interdependent

Game Theory - analysis of optimal simultaneous decision making with rational decision makers anticipating competitors' actions

Nash Equilibrium - outcome where each does best given strategies of other; not necessarily corresponding to outcome that maximizes aggregate profit of players; pursuit of self-interest leads each to take action that is detrimental to collective interest

Bertrand (competition through pricing) and *Cournot* (competition through quantity) models are stagnant: simultaneous choices; firm should take long view and choose quantity to maximize present value of profits over entire time horizon

Pricing Rivalry: intuition, collision; responses and tit-for-tat pricing; 'folk theorem' that for sufficiently low discount rates, any price between monopoly price and marginal cost can be sustained; coordination problem of achieving specific equilibrium in tree

Market concentration impact - cooperative pricing more likely to be an equilibrium in concentrated market than fragmented one

Reaction functions - depict how one the choice of one firm is impacted by the choice of another firm

Dynamics

Repeated games - finite, cheating will still occur; infinite, may be able to maintain high prices by punishing cheating firm

Co-operative/collusive pricing - whenever prices exceed the Nash equilibrium level; perfect collusion maximizes joint profits

Facilitating practices - coordination (price leadership), detection (transparent pricing), incentives (price guarantees to buyers)

Credible Commitments: irreversible and known by entrants: Capital, R&D, Experience curve, Preemptive patenting, Advertising...

Entry Strategies: Enter as small player; Differentiate product; Rely on anti-trust authorities to constrain aggressive reaction

Game Trees - used when decisions are sequential; Subgame Perfect Nash Equilibrium - optimal actions at each stage in tree

Subgame Perfect Nash Equilibrium - Each chooses optimal action at each stage and believes other players will also

Cooperative pricing facilitators: price leadership, advance announcement, favoured customer clauses, uniform delivered prices

Entry Detering Strategies: Limit Pricing (before entry), Predatory Pricing (after entry so others exit), Creating Excess Capacity

Exit Promoting Strategies: Wars of attrition - parties expend resources battling; survivor claims its reward, loser gets nothing

Auctions

English auction (open ascending): price rises continuously until one buyer left to pay announced price

Dutch auction (open descending): price drops until one bidder accepts going price; only one bid is placed

Sealed bid auction: bidders submit final bids; winner is bidder with highest bid and pays that bid (1st price) or second (2nd price)

Anglo-Dutch Auction (Klemperer) - combo English and Dutch; begins with ascending to final 2, then final sealed-bid offer

Private value: depends on bidder; *Common value*: depends how others value it; *Correlated value*: depends on both

Collusion - participants explicitly or tacitly agree to avoid bidding up prices (difficult in sealed-bid)

Winner's curse: winner likely party that most overestimated value, exacerbates problem of weaker bidders not participating

Entry deterrence - Ascending auctions allow bidders to deter the entry of rivals (Auctions with too few bidders can be inefficient)

Predation - bidder can develop aggressive reputation, rivals less willing to participate, or bid less aggressively

Revenue Equivalence Theorem: revenues equal for auction types if bidders risk-neutral; risk-averse buyers (1st price), sellers (2nd price)

Incentive Design

Agency Relationship: agent acts on behalf of principal; often conflicting interests

Risk-incentive trade-off: high-powered contracts \Rightarrow strong incentives, high risk, Low-powered contracts \Rightarrow weak incentives, low risk

Incentive-intensity principle: $Pay = Salary + (B \times Perf)$ High B = high powered: manager less risk-averse, effort impacts profits,

Informativeness principle (ideal inc. pay): include factors reducing error of effort estimate, exclude others incl. risk out of agent control

Efficiency: *First-best* agent takes efficient actions, receives threshold wage; *Second-best* balance of incentive/risk (insuring the agent)

'Multidimensional' Agency: Most jobs require multiple effort types, agents neglect parts not rewarded

Subjective Performance Measures: Rewards more dimensions of effort. But cannot be legally enforced

Hidden information: *Sorting* - employer doesn't know worker's ability; *Ratchet effect* - employer doesn't know task difficulty, adjusts targets and bonuses after seeing outcomes (agents don't work hard as fear that low effort will be perceived anyway)