

# Spring 2021 Intermediate Microeconomics Outline

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## 2. Supply and Demand

- Demand: Curves, Functions, Schedules
- Law of Demand
- Factors influencing Demand
- Supply: Curves, Functions, Schedules
- Law of Supply
- Factors influencing Supply
- Market Equilibrium
- What Happens when Supply and Demand Don't Intersect
- Effects of Shifts of Supply and/or Demand
- Elasticity: %-change in Quantity/%-change in Price
- Elasticity: Alternative to (inverse) Slope
- Elasticity with Linear Demand
- Perfectly Elastic (horizontal) and Perfectly Inelastic (vertical) Supply and Demand
- Relation between Elasticity of Demand and Total Spending (revenue)
- Elasticities of Demand: Price, Cross-price, Income
- Elasticity of Supply

## 3. Using Supply and Demand to Analyze Markets

- Consumer's Surplus
- Demand Curve as Marginal Value to Consumer (aka Marginal Willingness to Pay)
- Producer's Surplus (note: in short run PS = Profit + FC)
- Price Ceilings and Floors
- Excise Taxes: Excess Burden, Incidence & Elasticity

$$t_D = t \times \frac{|\varepsilon_S|}{|\varepsilon_S| + |\varepsilon_D|}, \quad t_S = t \times \frac{|\varepsilon_D|}{|\varepsilon_S| + |\varepsilon_D|}$$

## 4. Consumer Behavior

- Preferences: Completeness, Transitivity, Monotonicity (More is Better)
- Indifference Map and Utility
- Subjective Trade-offs: Marginal Rate of Substitution,  $MRS = MU_x / MU_y$
- Substitutes, Complements and the Shape of Indifference Curves
- Constraints: The Budget Line
- Objective Trade-offs: Slope of Budget Line ( $-P_x/P_y$ )
- Consumer's Optimum I:  $MRS = P_x/P_y$  or  $MU_x/P_x = MU_y/P_y$
- Consumer's Optimum II: Corner Solutions

## 5. Individual and Market Demand

- Normal and Inferior Goods
- Income Expansion Path and Engel Curve
- How much does utility cost?
- Behind the Demand Curve: Income and Substitution Effects
- Inferior Goods and Giffen Goods
- Application: Labor Supply
- Application: Borrowing and Saving

## 6. Producer Behavior

- Production Function
- Short-run (at least one fixed input) and Long-run (no fixed inputs)
- Production with a single variable factor
  - Total, Average, and Marginal Products
  - Relation between Marginal and Average
  - Law of Diminishing Returns
- Production with two variable inputs (e.g., long-run)
  - Isoquants
  - Marginal Rate of Technical Substitution:  $MRTS_{LK} = MP_L / MP_K$  (slope of isoquant)
  - Shape of isoquants and substitution (more sharply curved = more complementary)
  - Constant, Diminishing and Increasing Returns to Scale
  - Technical Change

## 7. Costs

- Opportunity Cost
- Sunk Costs
- Costs in Short-run: FC (from fixed factor K), VC (from variable factor L)
- Shape of SR Cost Curves: ATC, AVC, MC
- Long-run Cost Minimizing Inputs
- Minimum requires  $MRTS_{LK} = w/r$ . Equivalently,  $MP_K / r = MP_L / w$ .
- Deriving the Cost Function
- Relation of SR and LR Cost Curves
- In short run,  $MC = w / MP_L$ . In long run,  $MC = w / MP_L = r / MP_K$
- Returns to Scale

## 8. Supply in a Competitive Market

- Perfectly Competitive Markets
- Demand as seen by a Price-taker, Price-taking implies  $p = MR$
- Profit Maximization:  $MR = MC$  becomes  $p = MC$
- Short-run Shutdown condition ( $p < AVC$ )
- Supply is MC curve (above AVC)
- Profitability (compare  $p$  and ATC)
- Producer's Surplus (compare  $p$  and AVC)
- Entry and Exit imply Zero Long-run Economic Profit
- In Long-run Equilibrium:  $p = MC = ATC$
- Long-run Supply: Increasing and Constant Cost Industries
- Analysis of Economic Changes (Demand, Costs) in Short and Long Runs

## 9. Market Power and Monopoly

- Monopoly: One seller, no entry, no close substitutes
- Sources of Monopoly
- Marginal Revenue:  $MR = p \times (1 + 1/\varepsilon_D) < p$
- Marginal Revenue with Linear Demand: Same vertical intercept, twice the slope. I.e., if  $p = a - bq$ ,  $MR = a - 2bq$
- Profit Maximization:  $MR = MC$
- Profit Maximization with Markup Pricing:  $p = \frac{\varepsilon_D}{1 + \varepsilon_D} \times MC$
- Response of Monopoly to Shifts in Demand
- Response of Monopoly to Cost Changes
- Excise Taxes and Monopoly
- Deadweight Loss due to Monopoly
- Regulation: Effect of Price Ceilings

## 10. Market Power and Pricing Strategies

- The Key: Preventing Resale
- Perfect Price Discrimination (First Degree)
- Price Discrimination: Segmented Markets (Third Degree):  $p_i/p_j = (1 + 1/\varepsilon_j)/(1 + 1/\varepsilon_i)$  where  $\varepsilon$  is the signed elasticity of demand
- Indirect Price Discrimination (Second Degree): Quantity Discounts, Versioning, and Coupons
- Price Discrimination: Bundling
- Advanced Pricing Strategies: Two-part Tariffs

## 11. Imperfect Competition

- (Nash) Equilibrium in Oligopoly
  - Best Responses
  - Equilibrium as Mutual Best Responses
  - Example: Advertising Game
  - Dominant Strategies
- Oligopoly: Few sellers of identical or differentiated products. Esp. duopoly = 2 sellers.
- Cartels
- When are Cartels unstable? (covered in game theory chapter)
- Cournot Competition
  - Cournot Competition with two firms
  - Cournot Competition with many firms
  - Cournot Competition with entry (Fixed cost controls entry)
- Stackelberg Competition
- Bertrand Competition with Identical Goods ( $P = MC$ )
- Bertrand Competition with Differentiated Goods (Reaction Functions)

## 12. Game Theory

- What is a Game?
  - Pure and Mixed Strategies
  - Expected Payoffs
  - Nash Equilibrium
  - Dominant Strategies
- Games with Multiple Nash Equilibria
  - Coordination Game
  - Escape! (full information)
- Games that require Mixed Strategies for solution
  - Rock, Paper, Scissors
  - Escape! (partial information)
- Extensive Form Games
  - Imperfect Information
  - Perfect Information
  - Solution by Backwards Induction
- Repeated Games
- Grim Trigger and Tit-for-tat: Probabilities and Discounting
- Sequential Games
  - Commitment and Credibility
  - Entry Deterrence

## 13. Investment, Time, and Insurance

- Interest Rates and Discounting
- Present (Discounted) Value
- Bond Prices and Interest Rates
- Rule of 72