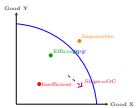


Week 1: Intro



Core Concepts

- **Scarcity:** Resources limited, wants unlimited \Rightarrow must choose.
- **Opportunity Cost:** Value of *best alternative forgone*. “No free lunch.”
- E.g. Med school = Tuition + Books + **Forgone Earnings**.
- E.g. “Free” vaccine clinic: OC of time (travel + wait).
- **Marginal Thinking:** Decide on the *next* unit. If $MB > MC$, do it; if $MB < MC$, stop. Optimal: $MB = MC$.
- **Sunk Costs:** Irrelevant to future decisions.
- **Rationality:** 1. Complete; 2. Transitive ($A > B, B > C \Rightarrow A > C$); 3. Respond to Incentives.
- **Positive:** “What is?” Testable. **Normative:** “What should be?” Value judgment.

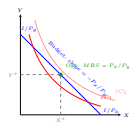
8 Factors of Health Econ

1. **Derived Demand:** Want health, not care itself.
2. **Uncertainty:** When sick? Treatment works?
3. **Gov’t Involvement:** Largest payer & regulator.
4. **Externalities:** Vaccination \rightarrow herd immunity.
5. **Non-profit Firms:** Many hospitals non-profit.
6. **Equity:** Fairness in resource distribution.
7. **Asymmetric Info:** Dr knows more \rightarrow principal-agent; weakens “shopping”.
8. **Insurance:** Effective price \ll true cost \rightarrow moral hazard.

PPF (Production Possibility Frontier)

- On curve = Efficient; Inside = Inefficient; Outside = Impossible.
- Slope = OC (MRT). Concave (bowed out) due to specialization.
- Shifts outward: tech progress or resource growth.

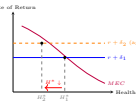
Week 2: Demand



Utility & Consumer Choice

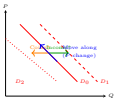
- **Utility:** Satisfaction. **Diminishing MU:** Extra unit \rightarrow less satisfaction.
- **Demand Curve** = WTP = Marginal Benefit curve.
- **IC:** Same-utility bundles. Downward sloping, Convex, Never cross. Far = higher U .
- **MRS** = |Slope of IC| = MU_x/MU_y . Diminishing.
- **Budget:** $I = P_x X + P_y Y$. Slope = $-P_x/P_y$.
- **Optimum:** Tangency. $MRS_{xy} = \frac{P_x}{P_y} \iff \frac{MU_x}{P_x} = \frac{MU_y}{P_y}$ (equal “bang per buck”).

Grossman Model



- People demand **Health**, not care. Care is **derived demand**.
- Health: 1. **Consumption good** (feel good); 2. **Investment good** (healthy time h_t).
- $H_t = H_{t-1}(1 - \delta) + I_{t-1}$. Optimal: $MEC = r + \delta$.
- Age $\uparrow \rightarrow \delta \uparrow \rightarrow H^* \downarrow$. Wage/Edu $\uparrow \rightarrow MEC$ right $\rightarrow H^* \uparrow$.

Demand Shifters



Move along: Only own-price change.

Shift: Non-price factors:

1. **Income** \uparrow : Normal good \rightarrow D Right.
2. **Related prices:** Sub $P \uparrow \rightarrow$ D Right; Comp $P \uparrow \rightarrow$ D Left.
3. **Tastes.** 4. **Expectations.** 5. **# Buyers.**

Coinsurance \uparrow : OOP price $\uparrow \rightarrow$ D Left (provider-price axis) or move along (OOP axis). **Draw graph!**

Elasticity

Own-Price: $E_d = \frac{\% \Delta Q}{\% \Delta P}$.

$|E| > 1$ Elastic $P \uparrow \rightarrow TR \downarrow$
 $|E| < 1$ Inelastic $P \uparrow \rightarrow TR \uparrow$
 $|E| = 1$ Unit TR max/unchanged

Cross: $E_{xy} = \frac{\% \Delta Q_x}{\% \Delta P_y}$. > 0 Subs; < 0 Comps.

Income: $E_I = \frac{\% \Delta Q}{\% \Delta I}$. < 0 Inferior; $0-1$ Necessity; > 1 Luxury.

Indiv vs Market: Single firm $|E_d|$ HIGH (subs exist); whole category $|E_d|$ LOW (no subs, necessity).

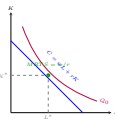
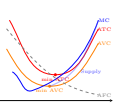
TR Test Calculation

$TR_{new} = (1 + \% \Delta P)(1 + E_d \cdot \% \Delta P) \cdot TR_{old}$
E.g. $\% \Delta P = 15\%$, $E_d = -0.12$: $TR_{new} = 1.15 \times 0.982 = 1.129 \cdot TR$ (\uparrow 12.9%).
E.g. $E_d = -1.6$: $TR_{new} = 1.15 \times 0.76 = 0.874 \cdot TR$ (\downarrow 12.6%).

Moral Hazard & RAND

- **Ex-ante:** Less prevention (insured \rightarrow less careful).
- **Ex-post:** More care use (OOP price low).
- **RAND HIE:** RCT. $E_d \approx -0.2$ (inelastic but $\neq 0$). Higher copay \rightarrow less use. Poor/sick harmed by high cost-sharing.

Week 3: Supply



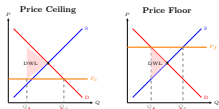
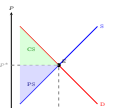
Production $Q = f(L, K)$

- **Short Run:** K fixed. **Long Run:** All variable.
- $MP_L = \partial Q / \partial L$. **Diminishing MP:** $MP_L \downarrow$ as $L \uparrow$.
- $AP_L = Q/L$. **Key:** MP crosses AP at AP 's **max**.
- $MP > AP \Rightarrow AP \uparrow$; $MP < AP \Rightarrow AP \downarrow$; $MP = AP \Rightarrow AP$ max.
- **Cobb-Douglas** $Q = AK^\alpha L^\beta$: $MP_L = \beta Q/L$, $MP_K = \alpha Q/K$.
- **Isoquant:** Same- Q combos. Slope = $-MP_L/MP_K$.
- **Isocost:** $C = wL + rK$. Slope = $-w/r$.
- **Optimal:** $\frac{MP_L}{MP_K} = \frac{w}{r} \iff \frac{MP_L}{w} = \frac{MP_K}{r}$.
- **RTS:** $\alpha + \beta > 1$ IRS; $= 1$ CRS; < 1 DRS.

Costs

- $TC = TFC + TVC$. $ATC = AFC + AVC$.
- $AFC \rightarrow 0$ as $Q \uparrow$, so $ATC \rightarrow AVC$.
- $MC = \Delta TVC / \Delta Q = w/MP_L$. $MC \propto 1/MP_L$.
- MC crosses ATC & AVC at their **min**.
- **Supply** = MC above min AVC (shutdown).
- $MR = MC$ (profit max). Perfect comp: $P = MC$.

Week 4: Markets



Equilibrium & Welfare

- Eq: $Q_d = Q_s$. Max Total Surplus.
- **CS:** Below D, above P^* . **PS:** Above S, below P^* .
- $TS = CS + PS$. **DWL:** Triangle pointing to eq.
- **Comp Statics:** D \uparrow : $P \uparrow$ $Q \uparrow$. S \uparrow : $P \downarrow$ $Q \uparrow$. D \uparrow S \downarrow : $P \uparrow$, Q ambig.

Gov’t Interventions

- **Ceiling:** Binding if $< P^*$. Shortage, black markets, queues, quality \downarrow .
- **Floor:** Binding if $> P^*$. Surplus (e.g. unemployment).
- **Tax:** Inelastic side pays more. $DWL = \frac{1}{2} \cdot \text{Tax} \cdot \Delta Q$.

Key Calculations

Ex 1: VMP_L vs Wage

Hire if $VMP_L = P \cdot MP_L \geq W$.

L	Q	MP	VMP	Hire?
5	250	30	180	Yes
6	260	10	60	No

Stop at $L = 5$.

Ex 2: Cobb-Douglas

$Q = K^{0.4} L^{0.6}$, $w = r = 1$, Budget = 200.

1. $MP_L = 0.6Q/L$, $MP_K = 0.4Q/K$.
2. $MRTS = 1.5K/L$. Set $w/r = 1$. $\Rightarrow L = 1.5K$.
3. $L + K = 200 \Rightarrow 2.5K = 200$. $K^* = 80$, $L^* = 120$.

Ex 3: Cost Inference

$w = 100/\text{h}$, $L = 10\text{h}$, $Q = 20$, $TFC = 50000$.

- $AP = 2$ pts/hr. Avg time = 30 min/pt.
- $AVC = 1000/20 = \$50$. $ATC = 51000/20 = \$2550$.
- Diminishing $MP \Rightarrow MP < AP \Rightarrow$ last pt > 30 min; $MC > \$50$.

Ex 4: Equilibrium

$Q_d = 100 - 2P$, $Q_s = 2P$. $\Rightarrow P^* = 25$, $Q^* = 50$.
 $CS = \frac{1}{2}(50 - 25)(50) = 625$. $PS = \frac{1}{2}(25)(50) = 625$.
 $TS = 1250$.

Exam Traps

1. Price Δ = **move along**. Non-price = **shift**.
2. Coinsurance \uparrow : D Left (provider-price axis) or move along (OOP axis).
3. 100% insurance \neq perfectly inelastic. D still slopes down; at $P = 0$.
4. Optimal health \neq max health. Optimal: $MB = MC$.
5. Indiv $|E_d| \gg$ Market $|E_d|$: firm has subs; category doesn’t.
6. “Compare A vs B”: explain **both sides**.
7. Graph Qs: **ALWAYS draw**. Label axes, curves, shifts, eq points.
8. Budget slope = $-P_x/P_y$. IC slope = $-MU_x/MU_y$.

More Key Concepts

Supply Shifters

Move along S: Only own-price. **Shift S:**

1. **Input prices** \uparrow : S Left (costlier to produce).
2. **Technology** improves: S Right (cheaper/more output).
3. **# Sellers** \uparrow : S Right.
4. **Expectations:** Expect future $P \uparrow \rightarrow$ S Left now.
5. **Gov’t policy:** Subsidies \rightarrow S Right; Regulations \rightarrow S Left.

Determinants of Elasticity

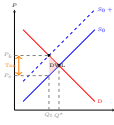
Why is $|E_d|$ higher for some goods?

- **Substitutes available:** More subs \rightarrow more elastic.
- **Necessity vs Luxury:** Necessities inelastic (insulin).
- **Budget share:** Large share \rightarrow more elastic (housing).
- **Time horizon:** Longer time \rightarrow more elastic (can adjust).
- **Market definition:** Narrower \rightarrow more elastic (Pepsi vs “soda”).

Shutdown & Profit Rules

- **Profit:** $\pi = TR - TC = (P - ATC) \times Q$.
- $P > ATC$: Positive profit (economic profit).
- $AVC < P < ATC$: Negative profit, but still operate (covers variable costs; loss $<$ TFC).
- $P < AVC$: **Shut down** (SR). Loss from operating exceeds TFC.
- $P < ATC$: **Exit** (LR). No fixed costs in long run.

Tax Incidence



- Tax creates wedge: Buyer pays P_b , seller gets $P_s = P_b - \text{Tax}$.
- **Inelastic side bears more burden** (can’t escape).
- Q falls from Q^* to Q_t . DWL = triangle between old and new Q .

Arc (Midpoint) Elasticity

$$E_d = \frac{\Delta Q / \bar{Q}}{\Delta P / \bar{P}} = \frac{(Q_2 - Q_1) / [(Q_1 + Q_2) / 2]}{(P_2 - P_1) / [(P_1 + P_2) / 2]}$$

Use midpoint to avoid direction-dependence.

Cross-Price Calc Example

$E_{xy} = 1.2$ (Coke & Pepsi). Coke $P \uparrow$ 10%:

$\% \Delta Q_{Pepsi} = 1.2 \times 10\% = 12\% \uparrow$.

$E_{xy} > 0 \rightarrow$ Substitutes. Coke expensive \rightarrow buy Pepsi.

$E_{xy} = -0.5$ (physician & hospital). Physician $P \downarrow$:

$\% \Delta Q_{hosp} = -0.5 \times (\text{neg}) = \text{positive} \rightarrow$ D Right.

$E_{xy} < 0 \rightarrow$ Complements. Cheaper doctor \rightarrow more hospital use.