

ECON 301: MANAGERIAL ECONOMICS

Exam 1 Review: Topics 1–4

Fundamentals | Market Forces | Market Failures | Elasticity

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TOPIC 1

The Fundamentals of Managerial Economics

What is Economics?

It's the study of scarcity, the study of how people use resources and respond to incentives, or the study of decision-making.

We almost always face trade-offs when making decisions (as a result of scarcity):

- No such thing as a free lunch

Trade-offs consist of the **entire** set of things we might have done.

Opportunity cost: value of the best alternative = explicit cost (monetary) + implicit cost (foregone opportunity)

7 Principles of Effective Managerial Decision Making

1. Identify goals and constraints (firm goal = maximize profits)
2. Recognize the nature and importance of profits
3. Understand incentives (and perverse incentives!)
4. Understand markets (consumer-producer-consumer rivalries)
5. Recognize the time value of money
6. Use marginal analysis ($MB = MC$)
7. Make data-driven decisions

Profits & Opportunity Cost

$\Pi = \text{Total Revenue} - \text{Total Costs}$

$\text{Accounting Profit} = \text{TR} - \text{Explicit Costs}$

$\text{Economic Profit} = \text{TR} - \text{Explicit Costs} - \text{Implicit Costs}$

$\text{Opportunity Cost} = \text{Explicit Cost} + \text{Implicit Cost (value of best alternative foregone)}$

- Example: OC of college = tuition + books + foregone salary

Five Forces Framework & Incentives

Five Forces that determine profitability:

- Entry barriers
- Power of input suppliers
- Power of buyers
- Industry rivalry
- Substitutes & complements

Incentives matter: People act when $MB > MC$

- But be careful!
 - A Fine is a Price
 - Crowding out Intrinsic Motivation

Perverse Incentives: Poorly designed incentives can backfire

- Window Tax → people bricked up windows
- Hanoi Rat Massacre → people bred rats for bounties
- Wells Fargo → employees opened unauthorized accounts

Time Value of Money & NPV

- \$100 today is worth more than \$100 in one year
 - Can get interest on \$100. $\$100 \text{ today} = \$100 + \$100 \cdot i$ in 1 year

- $FV = (1 + i)^n PV$

$$PV = \frac{FV}{(1 + i)^n}$$

- Larger n or larger $i \rightarrow$ smaller PV
- $NPV = PV \text{ of benefits} - PV \text{ of costs}$
- $NPV > 0 \rightarrow$ good investment | $NPV < 0 \rightarrow$ bad investment

Time Value of Money & NPV

Present value of a *stream of* future values

$$PV = \frac{FV_1}{(1+i)^1} + \frac{FV_2}{(1+i)^2} + \frac{FV_3}{(1+i)^3} + \dots + \frac{FV_n}{(1+i)^n}$$

$$PV = \sum_{t=1}^n \frac{FV_t}{(1+i)^t}$$

Marginal Analysis & Regression

- Maximize Net Benefits: $\text{Max NB} = B(Q) - C(Q)$
- Optimal Q^* : Set $MB(Q) = MC(Q) \rightarrow MNB(Q) = 0$
- **Why?:** We care about how much Benefit the **next unit** gives us (Marginal changes in benefits and costs). Not the average benefit!
 - For everything! Not just producing quantity. How many slices of pizza should you eat?
- If $MB > MC \rightarrow \text{increase } Q$ | If $MB < MC \rightarrow \text{decrease } Q$
- **Regression:** $Y = a + bX + e$ (OLS minimizes sum of squared errors)
- Correlation $\neq$ Causation!
- Omitted variable bias & selection effects $\rightarrow$ use randomization for causal inference

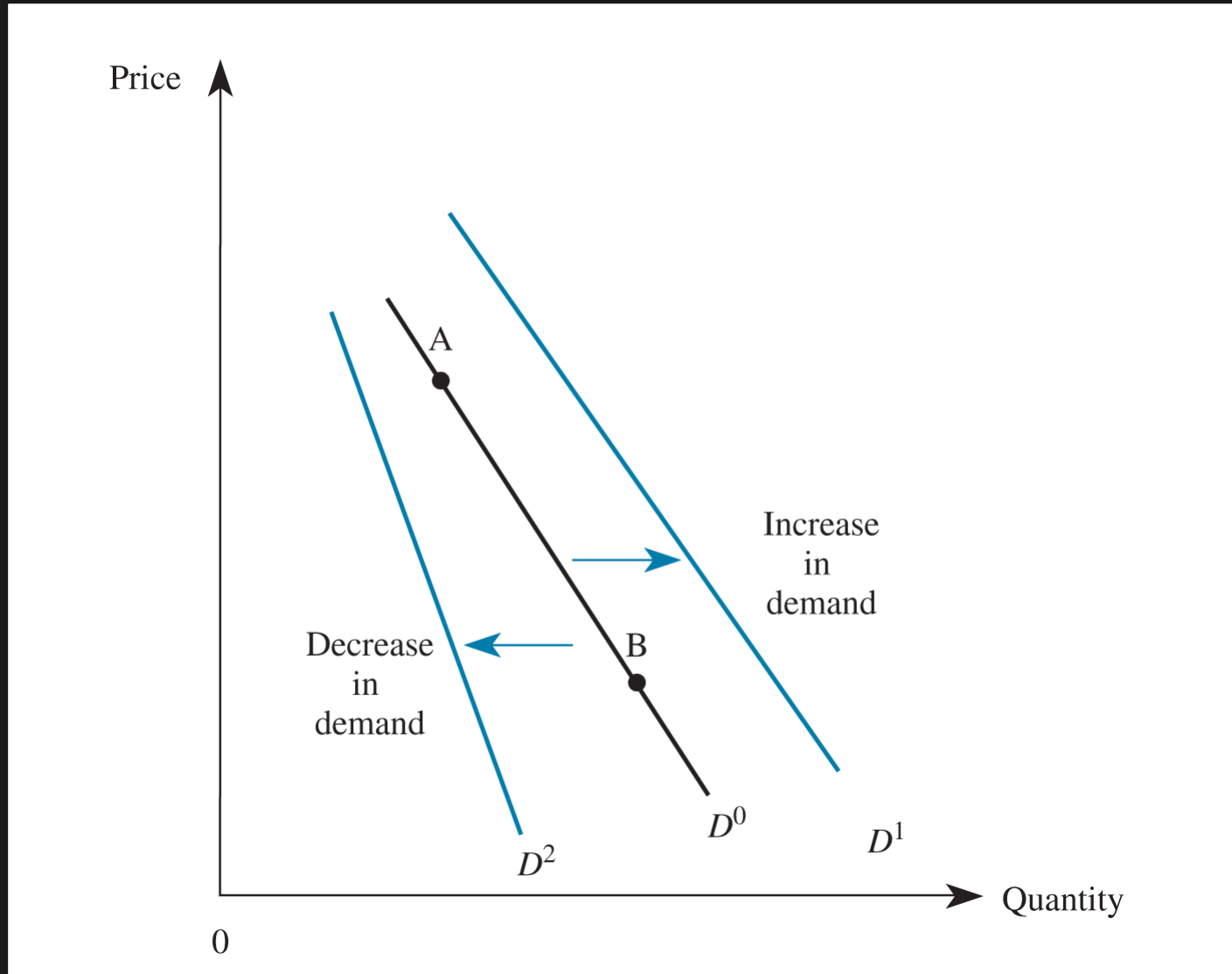
TOPIC 2

Market Forces: Supply & Demand

Demand

- Law of Demand: Price $\uparrow \rightarrow Q_d \downarrow$ (inverse relationship)
- Movement along curve = change in price (change in Q_d)
- Shift of curve = change in other factors (change in demand)
- Demand shifters:
 - • Income (normal vs. inferior goods)
 - • Prices of related goods (substitutes & complements)
 - • Advertising & consumer tastes
 - • Population
 - • Consumer expectations
- Linear demand: $Q_x = \alpha_0 + \alpha_1 P_x + \alpha_2 P_y + \alpha_3 M + \alpha_4 H$
- Inverse demand: solve for P in terms of Q (used to graph)

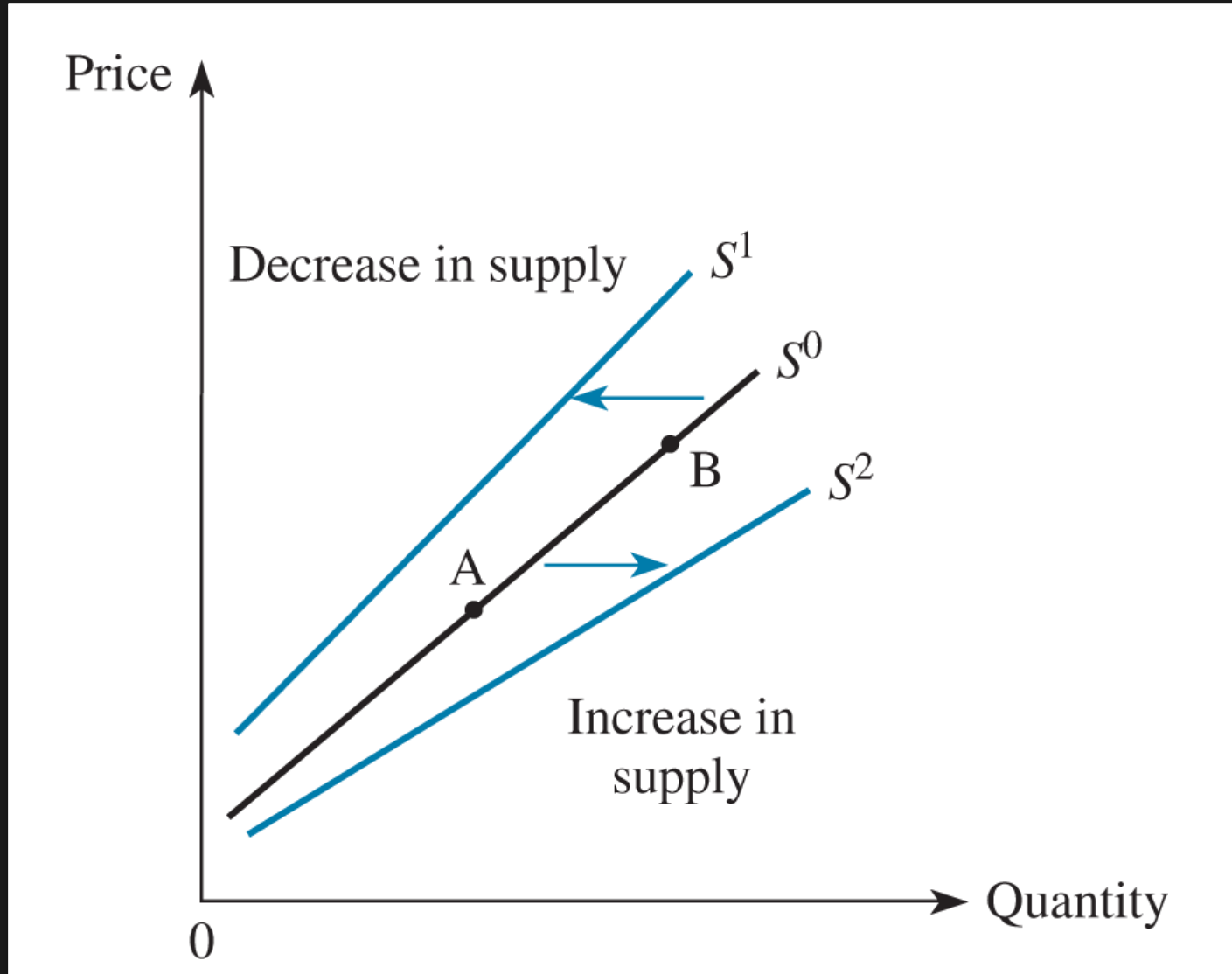
Demand



Supply

- Law of Supply: Price $\uparrow \rightarrow Q_s \uparrow$ (positive relationship)
- Movement along curve = change in price (change in Q_s)
- Shift of curve = change in other factors (change in supply)
- Supply shifters:
 - • Input prices
 - • Technology / government regulation
 - • Number of firms
 - • Substitutes in production
 - • Taxes
 - • Producer expectations
- Taxes shift supply up/left:
 - • Excise tax: fixed \$ per unit
 - • Ad valorem tax: percentage of price
- Linear supply: $Q_s = \beta_0 + \beta_1 P_x + \beta_2 W + \beta_3 P_r + \beta_4 H$

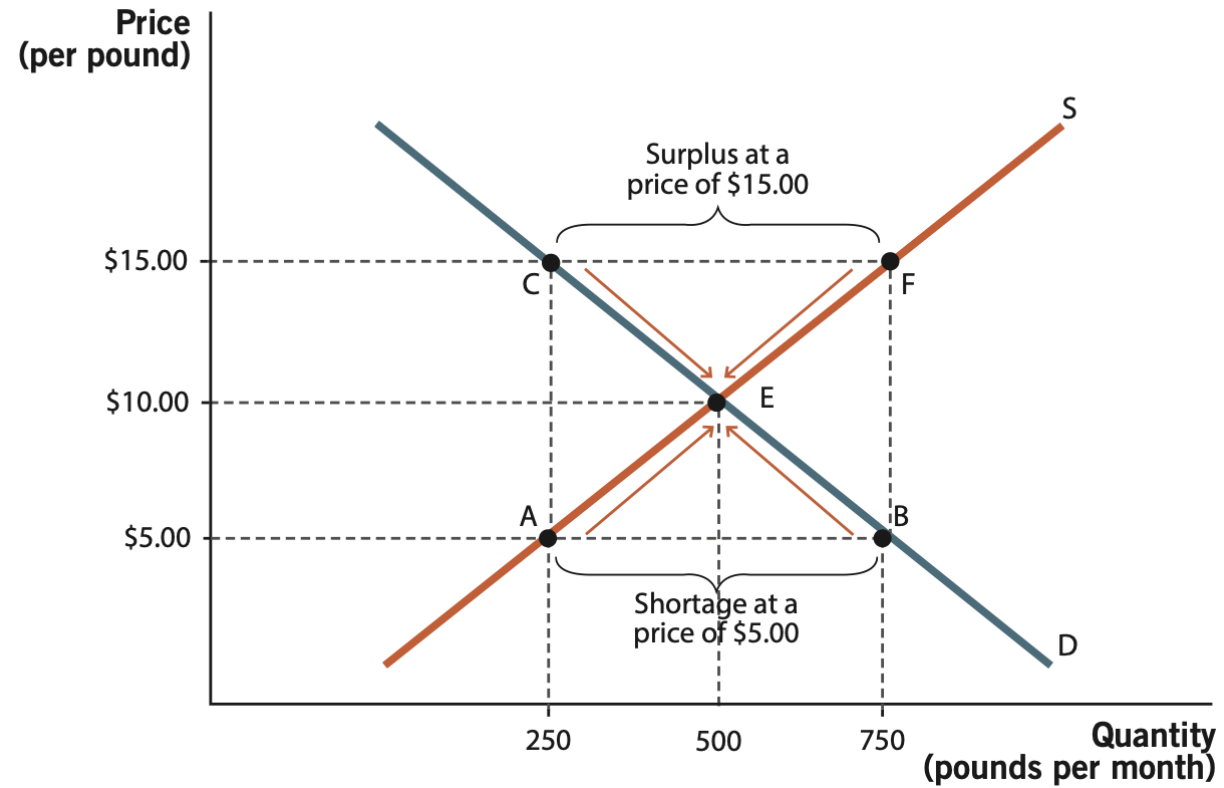
Supply



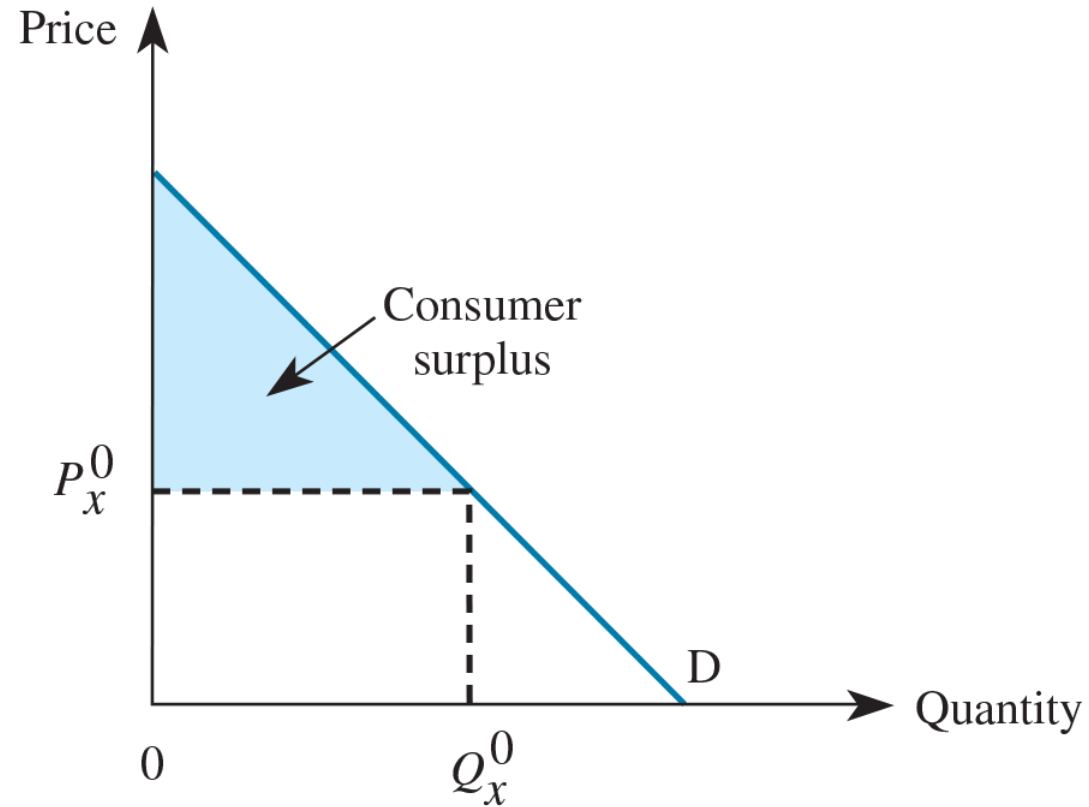
Equilibrium, CS & PS

- Equilibrium: Set $Q_d = Q_s \rightarrow$ solve for P^* and Q^*
- If $Q_d > Q_s \rightarrow$ shortage $\rightarrow$ price rises
- If $Q_d < Q_s \rightarrow$ surplus $\rightarrow$ price falls
- Consumer Surplus = WTP – Price paid (area below D, above P^*)
- Producer Surplus = Price received – WTA (area above S, below P^*)
- Total Surplus = CS + PS (maximized at equilibrium)
 - This is how we measure 'efficiency' in economics

Equilibrium, CS & PS



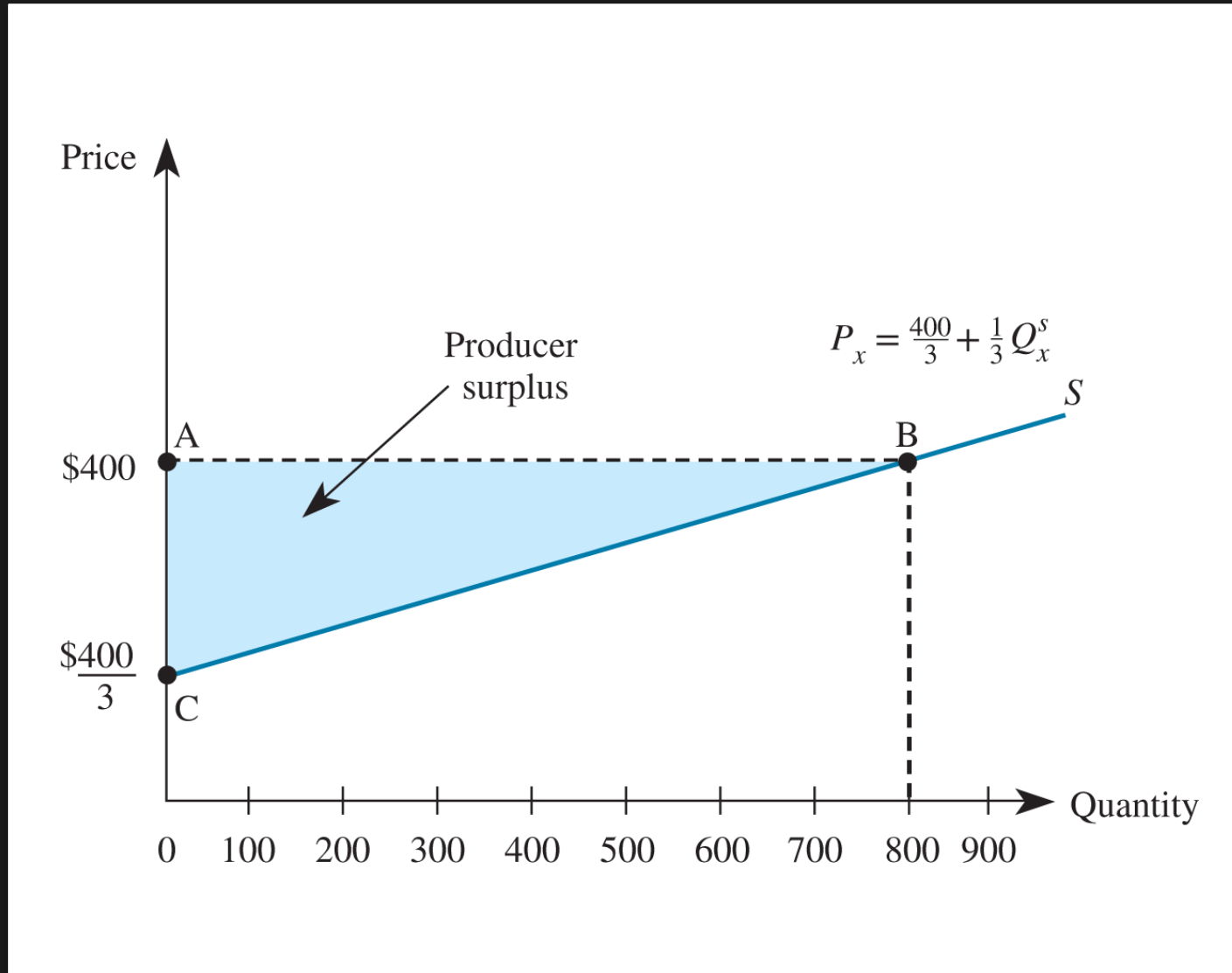
Equilibrium, CS & PS



(b)

$$CS = \frac{\text{Quantity at equilibrium} * (\text{max price} - \text{Equilibrium price})}{2}$$

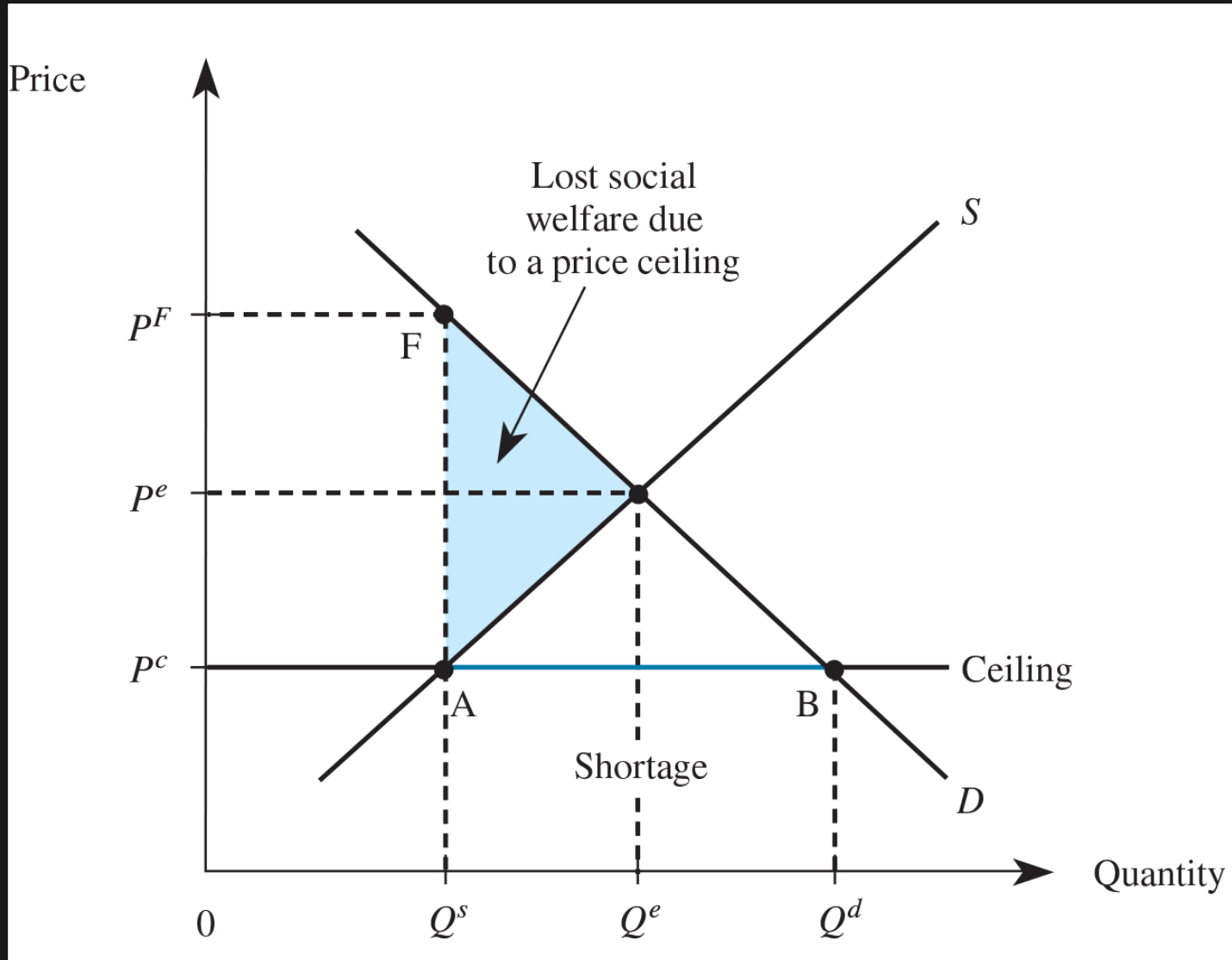
Equilibrium, CS & PS



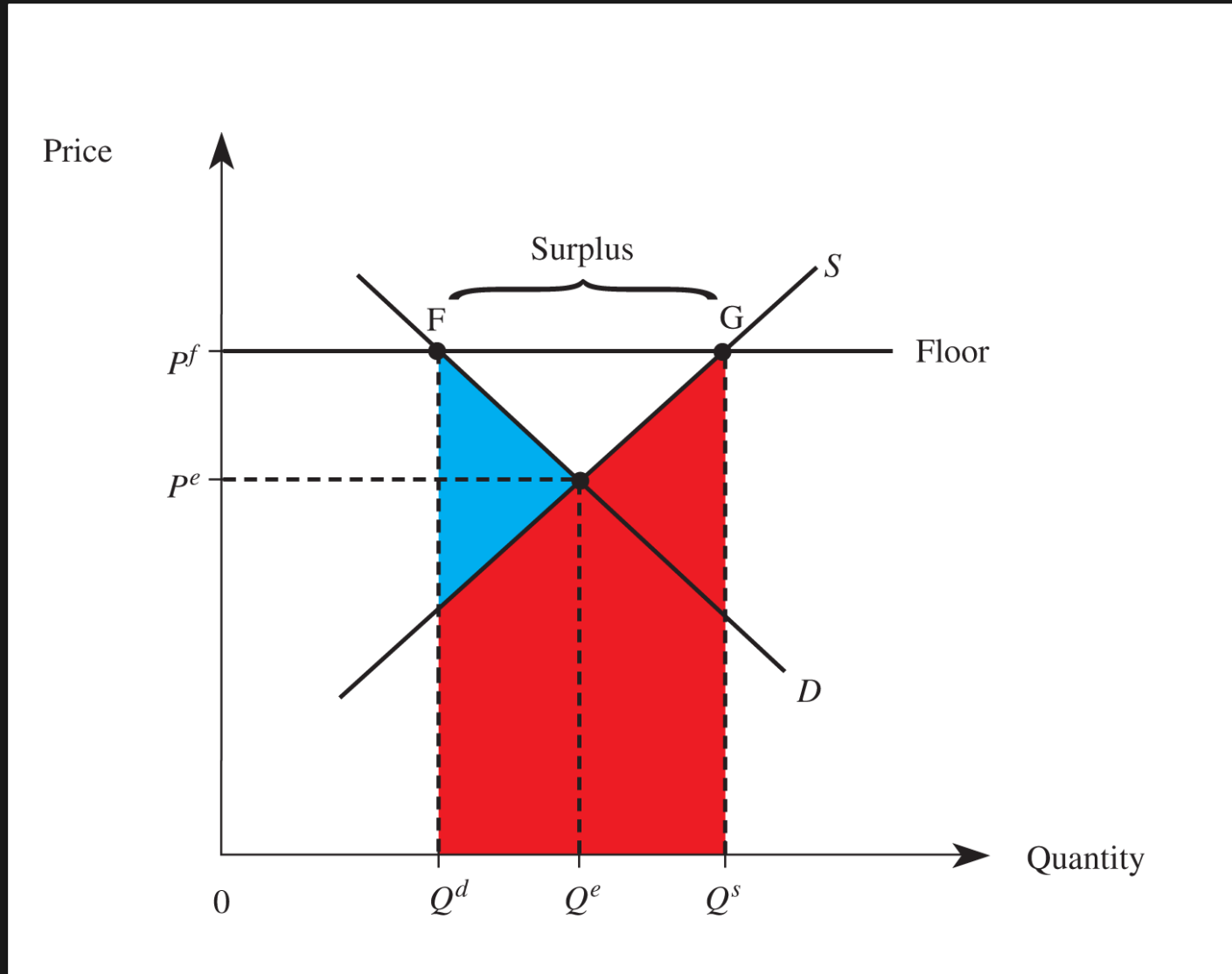
Price Controls

- Price Ceiling (below P^*): creates shortage + deadweight loss
 - Examples: rent control, gas price caps, price gouging laws
- Price Floor (above P^*): creates surplus + deadweight loss
 - Examples: minimum wage, agricultural price supports
- Binding vs. Non-binding: only binding controls affect the market
- **Full Economic Price** = Price + opportunity cost of waiting
 - OC of waiting is the non-pecuniary price
 - Full Economic Price of Price Floor (or Ceiling) > Market Equilibrium

Price Ceiling



Price Floors



Comparative Statics

- *Comparative static analysis*
 - The study of the movement from one equilibrium to another
- Competitive markets, operating free of price restraints, will be analyzed when:
 - Demand increases
 - (equilibrium price and quantity increase)
 - Supply increases.
 - (equilibrium price decreases and quantity increases)
 - Demand and supply simultaneously change.
 - TBD!

CS

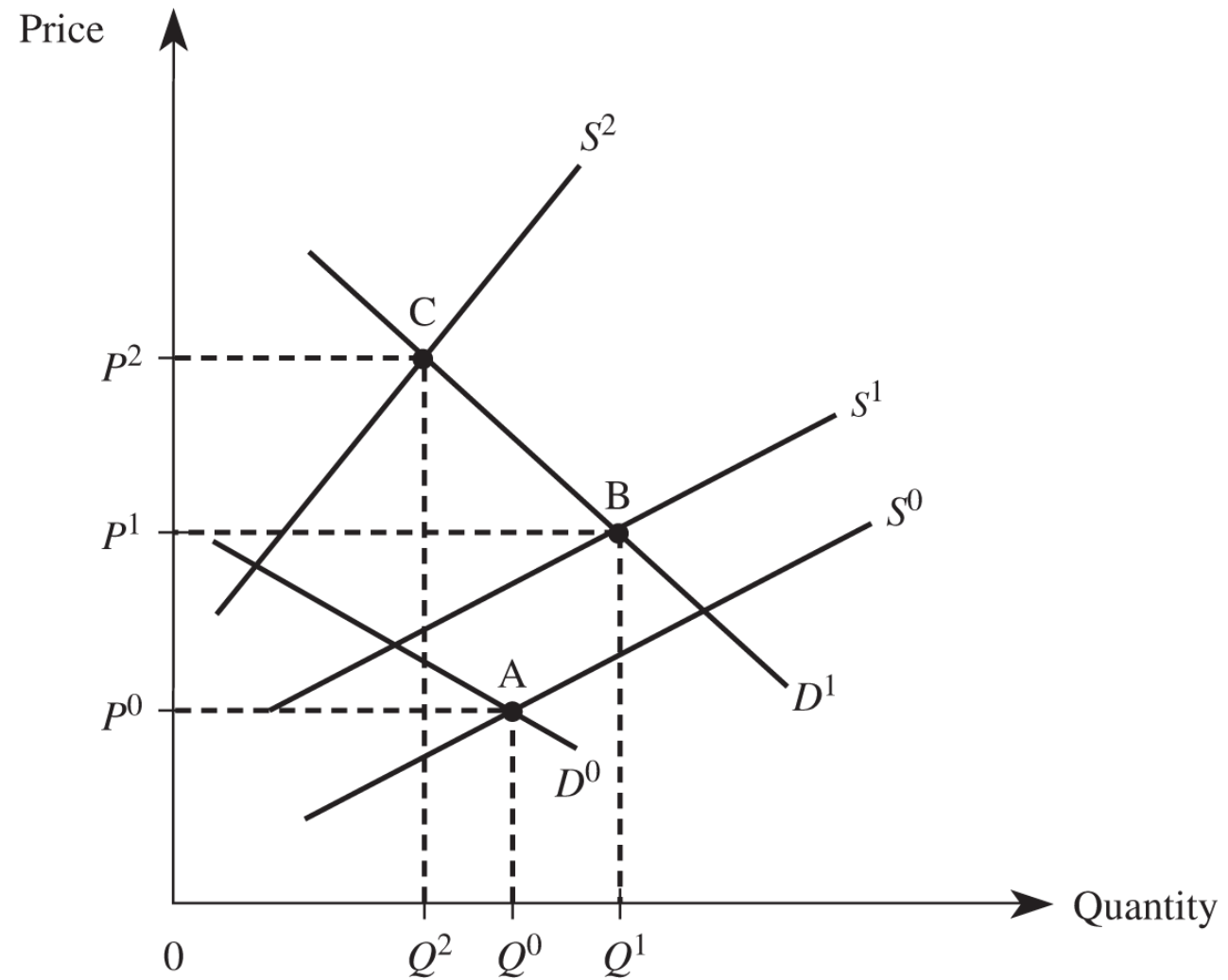


Table 2–2**Equilibrium Price and Quantity: The Impact of Simultaneous Shifts in Demand and Supply**

Nature of the Change	Increase in Demand	Decrease in Demand
Increase in Supply	Price: Ambiguous	Price: Decreases
	Quantity: Increases	Quantity: Ambiguous
Decrease in Supply	Price: Increases	Price: Ambiguous
	Quantity: Ambiguous	Quantity: Decreases

TOPIC 3

Market Failures

Four Market Failures

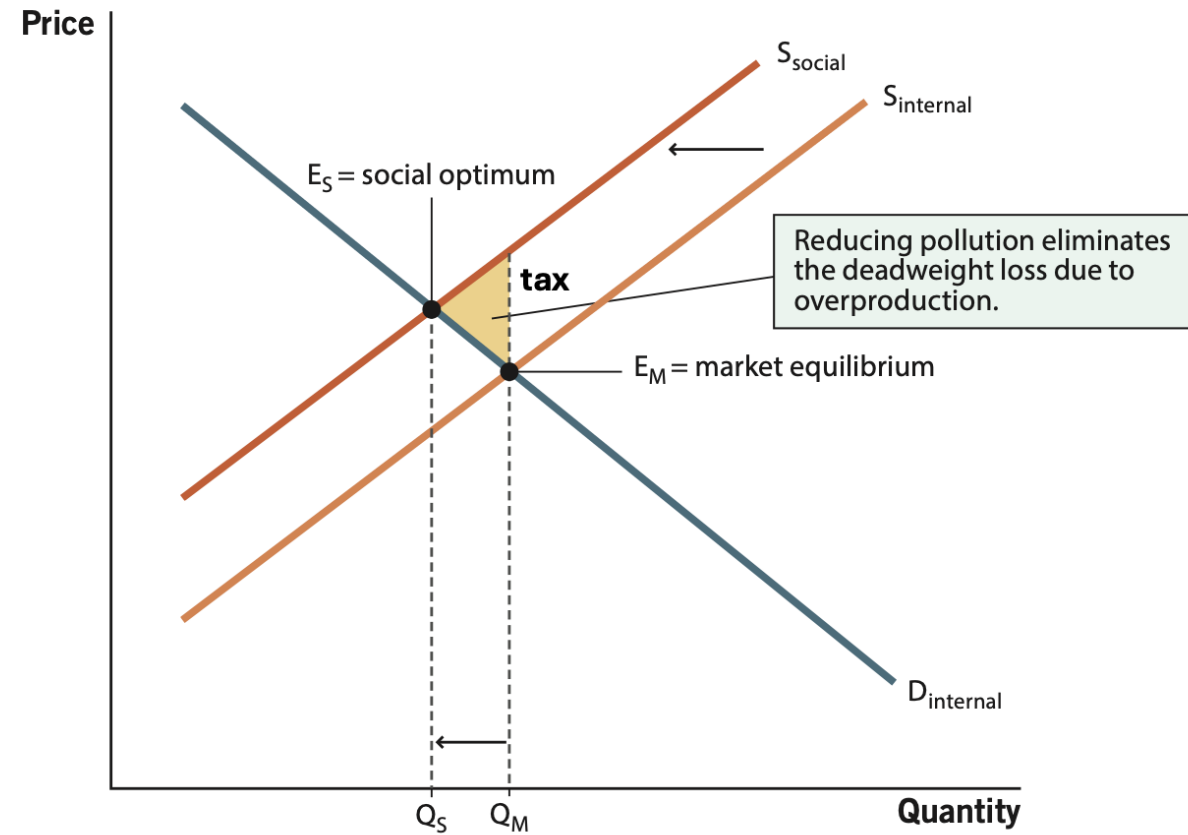
Sometimes the Market does not allocate goods efficiently! We have four types of market failures:

1. Market Power (will discuss in later weeks)
2. Externalities
3. Public Goods
4. Incomplete Information

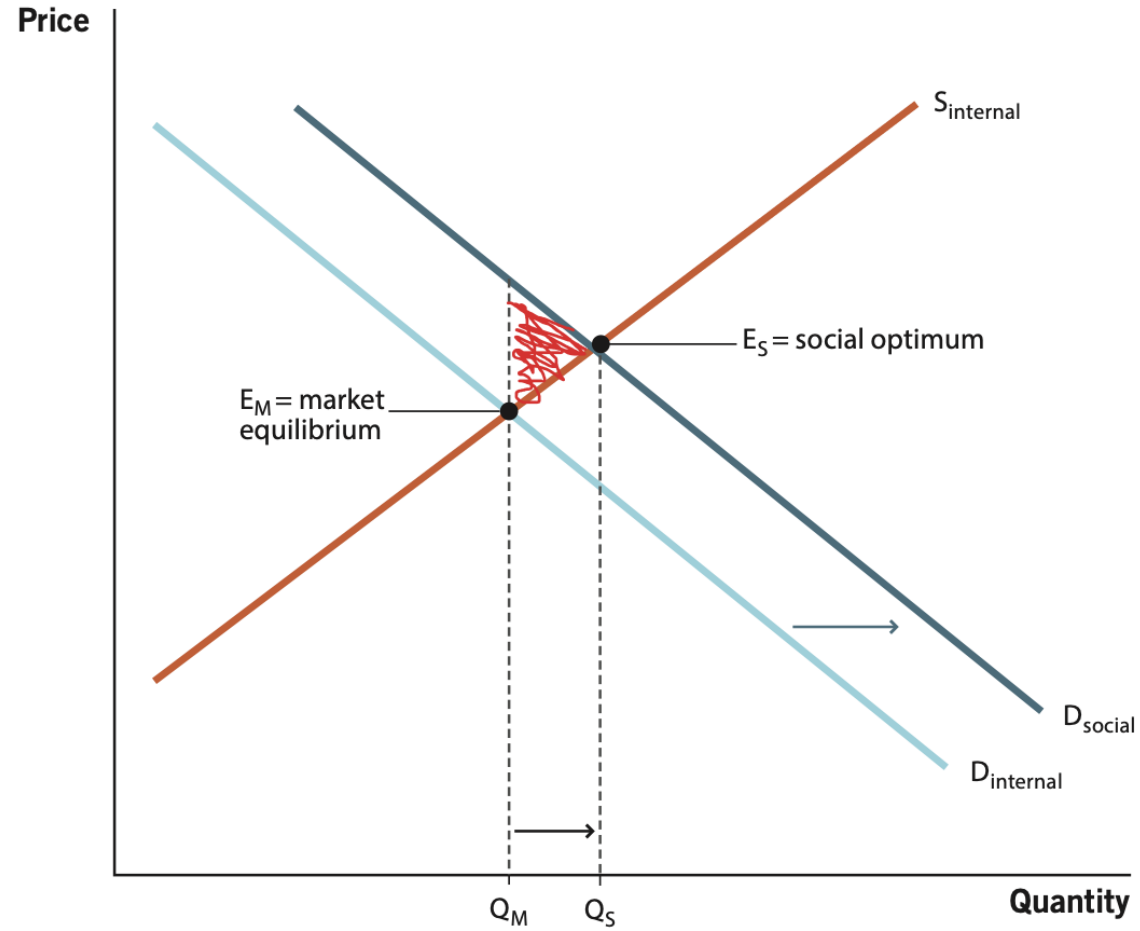
Externalities

- **Externality**: cost or benefit to a third party not involved in the transaction
- **Negative externalities** → overproduction (social cost > private cost)
 - Solutions: taxes (Pigouvian), permits, regulation, congestion pricing
- **Positive externalities** → underproduction (social benefit > private benefit)
 - Solutions: subsidies to increase output to socially efficient level
- Coase Theorem: if transaction costs are low + property rights defined, parties bargain to efficient outcome
- Optimal pollution $\neq$ zero pollution (where MC of abatement = MB)

Negative Externalities



Positive Externalities



Types of Goods & Public Goods

- Four types based on rivalry & excludability:
 - ***Nonrival goods***: the consumption of the good by one person does not preclude other people from also consuming the good.
 - ***Non-exclusionary good***: once provided, no one can be excluded from consuming the good.
1. **Private goods**: rival + excludable (sandwich)
 2. **Club goods**: nonrival + excludable (HBO, gym during non peak hours)
 3. **Common resources**: rival + nonexcludable (tuna in ocean)
 4. **Public goods**: nonrival + nonexcludable (national defense)

Types of Goods & Public Goods

- **Tragedy of the Commons:** individuals overuse common resources
 - Individually optimal $\neq$ socially optimal
 - This is a type of negative externality
 - • Private property or collective action (Ostrom) can help
- **Public Goods** → Free Rider Problem: individuals under-contribute
 - Always have an incentive to 'lie' about their true value and contribute \$0 towards the public good
- Solutions: government provision via taxes, mechanism design

Incomplete & Asymmetric Information

- Markets need good information to function efficiently
- Asymmetric information: one party knows more than the other
- Akerlof's 'Market for Lemons': adverse selection in used car markets
 - Buyers won't pay full price → quality sellers leave → only lemons remain
- Government solutions: insider trading rules, certification, truth in lending/advertising

TOPIC 4

Elasticity

Elasticity Basics

- What is Elasticity?
 - It's just measuring the % change in one variable given the % change in another variable!
 - E.G- Elasticity of Exam Score given Attendance?
 - How much does someone's score on the exam increase (in % terms) given they attend 1% more classes.

Own Price Elasticity of Demand

Two ways to write elasticity of demand

$$1. \text{ Elasticity} = \frac{\% \Delta Q_d}{\% \Delta P}$$

$$2. \text{ Elasticity} = \frac{\Delta Q_x}{\Delta P_x} \frac{P_x}{Q_x}$$

Always negative (by law of demand) — look at absolute value

- $|E| > 1 \rightarrow$ Elastic (responsive to price changes)
- $|E| < 1 \rightarrow$ Inelastic (unresponsive to price changes)
- $|E| = 1 \rightarrow$ Unitary elastic

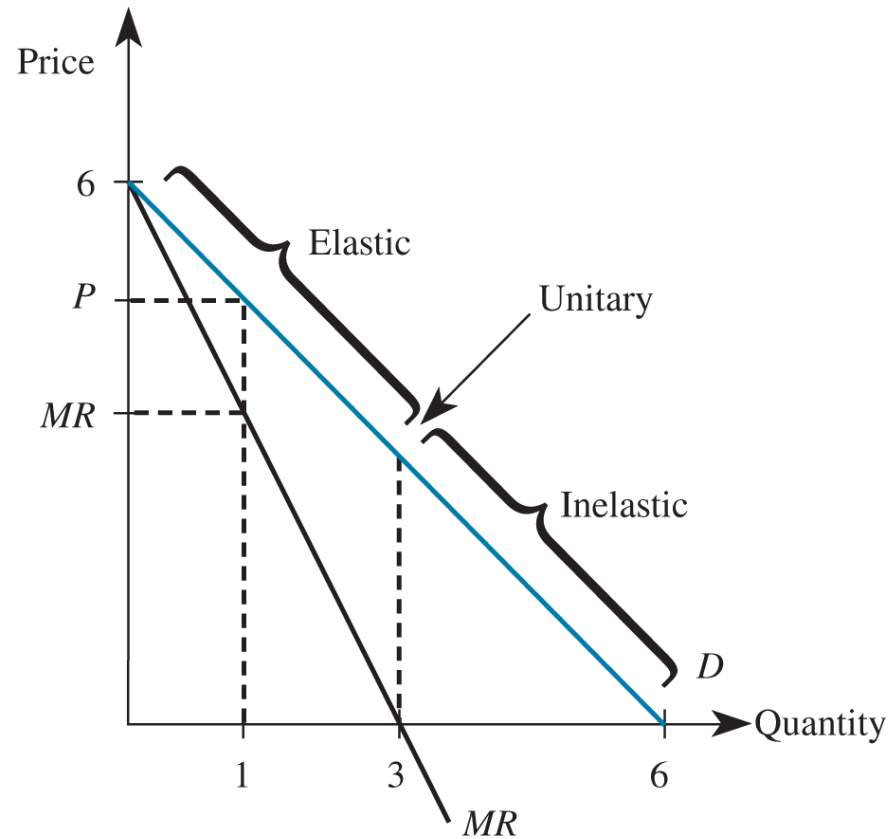
Determinants of elasticity

- Substitutes
- share of budget,
- Time horizon

Elasticity along the demand curve

Remember $\epsilon_{Q_x, P_x} = \frac{dQ_x}{dP_x} \frac{P_x}{Q_x}$

$\frac{P_x}{Q_x}$ is changing at each point!



Elasticity, Total Revenue & Marginal Revenue

- $TR = P \times Q$ (maximized at unitary elasticity)
- Elastic demand: $\downarrow$ Price $\rightarrow$ $\uparrow$ TR | $MR > 0$
- Inelastic demand: $\downarrow$ Price $\rightarrow$ $\downarrow$ TR | $MR < 0$
- Unitary elastic: TR maximized | $MR = 0$

$$MR = P \frac{1+E}{E}$$

- MR is always below the demand curve (lowering price applies to ALL units)

Cross-Price & Income Elasticity

$$\text{Cross-Price Elasticity} = \frac{\% \Delta Q_d}{\% \Delta P_y}$$

- If $E(x,y) > 0 \rightarrow$ substitutes | If $E(x,y) < 0 \rightarrow$ complements

$$\text{Income Elasticity} = \frac{\% \Delta Q_d}{\% \Delta M}$$

If $E(M) > 0 \rightarrow$ normal good | If $E(M) < 0 \rightarrow$ inferior good

Elasticity: Linear vs. Log-Linear

Linear Demand: $Q_x = \alpha_0 + \alpha_1 P_x + \alpha_2 P_y + \alpha_3 M + \dots$

- Own price elasticity: $E = \alpha_1 \times (P_x / Q_x)$
- Cross-price elasticity: $E = \alpha_2 \times (P_y / Q_x)$
- Income elasticity: $E = \alpha_3 \times (M / Q_x)$
- If Inverse Demand curve (P_x on left hand side), the slope is inverted.
-

Log-Linear: $\ln(Q_x) = \beta_0 + \beta_1 \ln(P_x) + \beta_2 \ln(P_y) + \beta_3 \ln(M) + \dots$

In log-linear, coefficients ARE the elasticities directly!

Good Luck on the Exam!

Review your lecture notes, textbook, homework, and practice questions.

Office Hours & Questions: Professor Grodeck