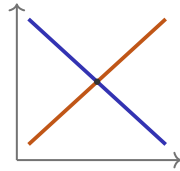


## Supply and Demand

AP Microeconomics ■ Unit 2

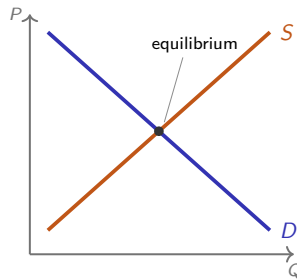
AP Microeconomics



### Supply and Demand

#### What we will cover

- 1 Demand & supply
- 2 Elasticity (PED & PES)
- 3 Cross-price & income elasticity
- 4 Equilibrium & surplus
- 5 Price controls & taxes
- 6 International trade



# 1 Demand & supply

## The law of demand

**Demand** 需求 is the whole price–quantity relationship; **quantity demanded** 需求量 is one point on it.

- price up  $\Rightarrow$  quantity down (**inverse** 反向关系)
- **substitution effect** 替代效应: switch to cheaper goods
- **income effect** 收入效应: your money buys less



*Buyers respond when prices change*

## Movement vs shift

### **Movement along** 沿曲线移动

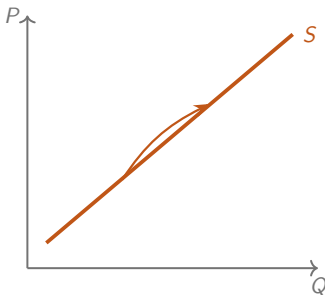
only the good's **own price** changed – slide to another point

### **Shift** 移动

something **else** changed – whole curve moves left/right

**TIPEN** shifts demand: **Tastes** 偏好, Income, Prices of related goods (**substitutes** 替代品/**complements** 互补品), Expectations, Number of buyers.

## The law of supply



**Supply** 供给: price up  $\Rightarrow$  quantity up (a **direct relationship** 正向关系). The curve slopes up because each extra unit adds **marginal cost** 边际成本.

**TITEN** shifts supply: **Technology** 技术, Input prices, Taxes/**subsidies** 补贴, Expectations, Number of sellers.

# 2 Elasticity

Supply and Demand  
└ Elasticity

## Price elasticity of demand

**PED** 需求价格弹性 =  $\frac{\% \Delta Q_d}{\% \Delta P}$  – how strongly quantity responds to price. Use the **midpoint method** 中点法 and read  $|PED|$ .

**Elastic**  
 $|PED| > 1$

**Unit elastic**  
 $|PED| = 1$

**Inelastic**  
 $|PED| < 1$

More elastic when: many substitutes, a large share of income, more **time** 时间 to adjust.

Supply and Demand  
└ Elasticity

## The total revenue test

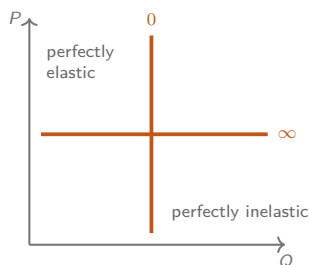
$TR = P \times Q$ . When you change price, elasticity decides whether revenue rises.

**Elastic**  
price & TR move **opposite**  
cut price → TR up

**Inelastic**  
price & TR move **together**  
raise price → TR up

On a straight-line demand curve the **upper** half is elastic, the **midpoint** is unit elastic, the **lower** half inelastic. TR is greatest at the midpoint.

## Price elasticity of supply



**PES** 供给价格弹性 =  $\frac{\% \Delta Q_s}{\% \Delta P}$  (positive).

- $> 1$  elastic,  $< 1$  inelastic
- horizontal S: **perfectly elastic** 完全弹性 ( $\infty$ )
- vertical S: **perfectly inelastic** 完全无弹性 (0)

More elastic with more **time** 时间跨度 and **spare capacity** 闲置产能.

## Cross-price & income elasticity

**XED** 交叉价格弹性 =  $\frac{\% \Delta Q_x}{\% \Delta P_y}$

- +  $\Rightarrow$  substitutes
- $\Rightarrow$  complements

**YED** 收入弹性 =  $\frac{\% \Delta Q}{\% \Delta \text{income}}$

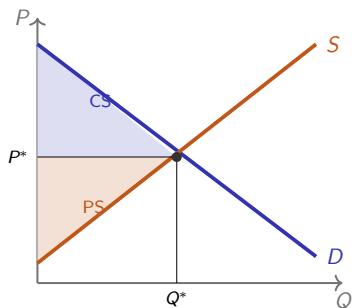
- +  $\Rightarrow$  **normal good** 正常商品
- $\Rightarrow$  **inferior good** 低档商品

### Worked example

Income rises 10%; bus-ticket demand falls 5%.  $YED = \frac{-5\%}{10\%} = -0.5$  – negative, so bus travel is an **inferior good**.

# 3 Equilibrium & surplus

## Equilibrium, consumer & producer surplus



**Equilibrium** 均衡: where  $D$  meets  $S$ ;  
 $Q_d = Q_s$ .

- **consumer surplus** 消费者剩余: below  $D$ , above  $P^*$
- **producer surplus** 生产者剩余: above  $S$ , below  $P^*$

Total surplus is largest here – **allocative efficiency** 配置效率, where  $MB = MC$ .

## Worked example – surplus

### Solve for equilibrium and surplus

Demand  $P = 20 - Q$ , supply  $P = 2 + Q$ . Set equal:  $20 - Q = 2 + Q \Rightarrow Q = 9$ ,  $P = \$11$ .

Consumer surplus  $= \frac{1}{2} \times 9 \times (20 - 11) = \$40.50$ .

Producer surplus  $= \frac{1}{2} \times 9 \times (11 - 2) = \$40.50$ .

**Total surplus** = \$81.

## Disequilibrium & shifts

**Price too high  $\Rightarrow$  surplus** 过剩  $\rightarrow$  price falls

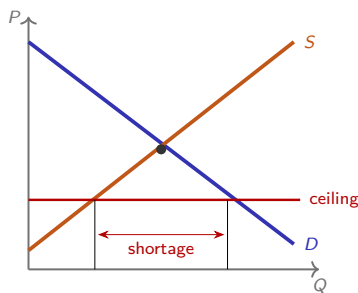
**Price too low  $\Rightarrow$  shortage** 短缺  $\rightarrow$  price rises

Shift rules:  $D$  right  $\rightarrow P \uparrow Q \uparrow$ ;  $D$  left  $\rightarrow P \downarrow Q \downarrow$ ;  $S$  right  $\rightarrow P \downarrow Q \uparrow$ ;  $S$  left  $\rightarrow P \uparrow Q \downarrow$ . When **both shift** 同时移动, one result is **indeterminate** 不确定.

# 4 Intervention & trade

Supply and Demand  
└ Intervention & trade

## Price controls



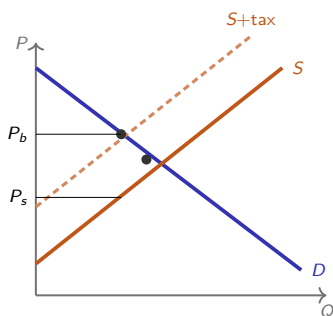
**Price ceiling** 价格上限 (max): binds **below** equilibrium  $\Rightarrow$  shortage (rent control).

**Price floor** 价格下限 (min): binds **above** equilibrium  $\Rightarrow$  surplus (minimum wage).

Any binding control cuts quantity below efficient: a **deadweight loss** 无谓损失.

Supply and Demand  
└ Intervention & trade

## Taxes & incidence



A **per-unit tax** 从量税 shifts S up by the tax: buyers pay more (P<sub>b</sub>), sellers keep less (P<sub>s</sub>), quantity falls, deadweight loss appears.

**Tax incidence** 税收归宿: the **more inelastic** side pays the larger share – it cannot escape by changing quantity.

## International trade

Under **autarky** 自给自足 the price is domestic; opening up, the country trades at the **world price** 世界价格.

- World price **below** domestic  $\Rightarrow$  **importer** 进口国; CS up
- World price **above** domestic  $\Rightarrow$  **exporter** 出口国; PS up

**Free trade** 自由贸易 raises total surplus. A **tariff** 关税 or quota creates deadweight loss.



*Open trade links local and world prices*

## Key points

**Own price**  $\rightarrow$  move along;  
a **determinant**  $\rightarrow$  shift

**PED/PES** classify response;  
TR test follows elasticity

**Equilibrium** maximises total surplus ( $MB = MC$ )

Controls, taxes & tariffs  $\rightarrow$  **deadweight loss**

## Check yourself

- 1 Price rises and total revenue falls. Elastic or inelastic?
- 2 A change in price: movement or shift?
- 3 A price ceiling below equilibrium causes what?
- 4 Who bears more of a tax – the more inelastic side or the more elastic?

**Answers** 1. elastic 2. a movement along the curve 3. a shortage 4. the more inelastic side