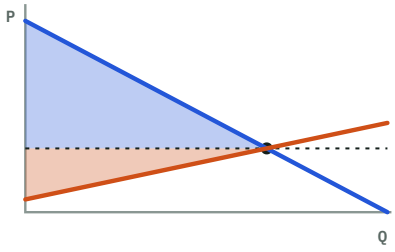
Who gains, who loses?

Consumer and producer surplus, deadweight loss, price controls, taxes and tariffs — concert tickets, city rent, milk and bikes.

1 Surplus

the gains from trade

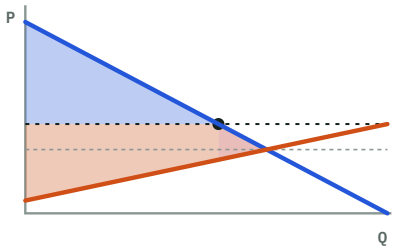
- **Consumer surplus (CS)** → top price a buyer would pay, minus what they pay, summed over every buyer · Ben: top `$120` – pays `$50` = keeps `$70`
- **Producer surplus (PS)** → price a seller gets, minus their minimum price, summed over every seller
- Tickets market (`P` = price, `Q` = quantity): `Demand: P = 150 − 0.1Q` · `Supply: P = 10 + 0.04Q` → equilibrium **$50, 1,000 tickets**
- On the chart: CS = area under demand, above price · PS = area above supply, below price
- At equilibrium: `CS = ½ × 1,000 × $100 = $50,000` · `PS = ½ × 1,000 × $40 = $20,000`



2 Total surplus

largest at equilibrium

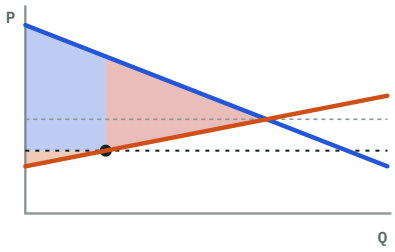
- **Total surplus = CS + PS** is largest exactly at the free-market price
- Move the price away (up or down) and some trades that help both sides stop happening
- **Deadweight loss (DWL)** → total surplus lost to those missing trades
- At $70: `CS = $32,000` · at $30: `PS = $5,000` — both below their equilibrium best
- Priced at $40 by mistake: 750 sold (not 1,000) → `CS $54,375` · `PS $11,250` · `DWL $4,375`



3 Price ceiling

a legal maximum

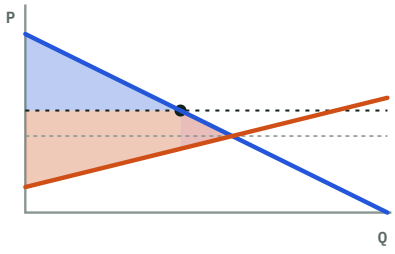
- Rent market: `Demand: P = 2,400 − 2Q` · `Supply: P = 600 + Q` → equilibrium **$1,200, 600 homes**
- City caps rent at **$800** (below equilibrium) → SHORTAGE
- Renters want 800 homes, landlords offer only 200 → **600 homes short**
- Landlords' PS falls from $180,000 to **$20,000**; some of the loss is deadweight, some shifts to the renters lucky enough to get a home · `DWL = $240,000`



4 Price floor

a legal minimum

- Milk market: `Demand: P = 7 − 0.01Q` · `Supply: P = 1 + 0.005Q` → equilibrium **$3, 400 (thousand gallons)** → areas in thousands of dollars
- Government sets a floor at **$4** (above equilibrium) → UNSOLD SURPLUS (more offered than bought; ≠ CS/PS gain)
- Farmers offer 600, buyers take only 300 → **300,000 gallons unsold**
- Farmers' PS still rises, from $400,000 to **$675,000**: fewer gallons sell, but each earns much more

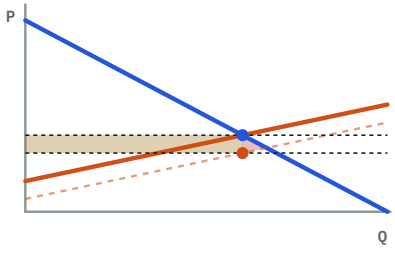


5 A per-unit tax

the wedge, and a subsidy

- A **$14** tax on tickets shifts supply up by $14 → a wedge between what buyers pay and sellers keep
- 900 tickets sell (down from 1,000): buyers pay `$60`, promoters keep `$46`
- **Tax revenue** = $14 × 900 = `$12,600`
- **DWL** = $700: the 100 tickets that stop trading · half the tax ($7) → 950 sold, DWL `$175` = ¼ → DWL grows with the **square** of the tax
- **Subsidy** = tax in reverse → supply shifts down · milk $1.50 → 500,000 gallons, buyers $2, farmers $3.50 → cost `$1.50 × 500,000 = $750,000` · DWL $75,000: extra gallons cost more than buyers value them

Watch out: revenue (or subsidy cost) = amount × the **new** quantity · $14 × 1,000 = $14,000 is wrong



6 Who really pays?

incidence and tariffs

- **Tax incidence** → whichever side reacts less to price (the less elastic side) bears more of the tax, whoever is legally billed
- Fans' demand elasticity 0.5, promoters' supply elasticity 1.25 → fans absorb $10 of the $14, promoters only $4
- **Tariff** → a tax on an imported good; world price (abroad) $80 + $20 tariff → price at home $100
- Imports fall from 300 to 150 bikes; tariff revenue = $20 × 150 = `$3,000`, not $20 × 300