Should you start a price war?

Few sellers watch each other: read the payoff matrix. Many sellers with different products: MR = MC, then entry and exit.

1 Oligopoly

the market type

- **Few big sellers** · barriers to entry (land, pumps, years to earn back the cost)
- **Interdependent** ⇒ my best price depends on the rival's move · a price cut of $3.00 → $2.50 pulls drivers across the road ⇒ rival must respond
- **Game theory** → players · choices · **payoffs** · tool = the **payoff matrix** (row player blue, column player orange)

2 Best reply

dominant strategy

- **Best reply** = my highest payoff given the rival's choice · look column by column (row player), row by row (column player)
- **Dominant strategy** = best reply whatever the rival does · gas: Low beats High ($4,000 vs $2,000; $8,000 vs $6,000)
- **Underline method** ⇒ underline each best reply · cell with **both** numbers underlined = equilibrium

	Cross Road High	Cross Road Low
Island High	6,000 / 6,000	2,000 / 8,000
Island Low	8,000 / 2,000	4,000 / 4,000

3 Nash equilibrium

+ prisoner's dilemma

- **Nash equilibrium** (John Nash, US mathematician, 1950) = everyone plays a best reply ⇒ nobody gains by moving alone · gas: (Low, Low) $4,000 each
- **Prisoner's dilemma** (story: 2 suspects, each betrays) → own best choice ⇒ outcome worse for both · (High, High) = $6,000 each > (Low, Low) = $4,000 each
- No dominant strategy → several equilibria possible · food trucks: (North, South) and (South, North), $5,000 vs $3,000
- Practice · ads: (Ad, Ad) $4,000 each vs (No ad, No ad) $5,000 each · **entry game**: Incumbent (firm already there) dominant = Accept ⇒ (Enter, Accept) · threat to fight = not credible (Fight $2,000 < Accept $4,000)

4 Cartel & repeated game

cheating, tit-for-tat

- **Cartel** (collusion) = firms agree to act as one seller · both High ⇒ $6,000 each · usually **illegal** (buyers pay more)
- Temptation → cheat alone: $8,000 vs $6,000 ⇒ each member fears the other's cheat ⇒ cartels **collapse**
- **Repeated game** ⇒ cheat today, punished tomorrow · **tit-for-tat** = cooperate first, then copy the rival's last move
- 4 weeks · cheat wk 1, then Low: 8,000 + 3 × 4,000 = **$20,000** < deal 4 × 6,000 = **$24,000** ⇒ cheating does not pay

5 Monopolistic competition

short run

- **Many sellers** · **free entry and exit** · **differentiated products** ⇒ loyal regulars ⇒ own downward demand (not a price taker = too small to set price)
- Rule = as monopoly: `MR = MC`, then go up to demand for the price · `Profit = (P − ATC) × Q`
- MR = marginal revenue (extra $ from 1 more unit) · MC = marginal cost (extra cost of 1 more unit) · ATC = average total cost (all costs ÷ Q)
- Café: `P = 10 − 0.01Q`, MC $2, fixed $400 ⇒ Q = **400**, P = **$6**, ATC = $3 ⇒ profit **$1,200**
- Bookshop: `P = 12 − 0.02Q`, MC $4, fixed $200 ⇒ Q = **200**, P = $8, ATC = $5 ⇒ profit **$600**

6 Long run

entry, exit, cost of variety

- **Profit > 0** ⇒ entry ⇒ each shop's demand shifts **left** · **loss** ⇒ exit ⇒ demand shifts **right** · stops when profit = 0
- **Long-run equilibrium** → demand just touches ATC · café: `P = 6 − 0.01Q` ⇒ Q = **200**, P = ATC = **$4**
- Rent shock (practice ex. 5): fixed $200 → $450 ⇒ loss $250 at 100 books ⇒ exits ⇒ `P = 10 − 0.02Q` ⇒ Q = **150**, P = ATC = **$7** ⇒ survivors sell more, at a higher price
- Cost of variety → **excess capacity** (ATC still falling) · **markup** P > MC even at zero profit · advertising defends demand, raises costs
- Zero profit ≠ competitive price: differentiation keeps P above MC · fixed cost moves ATC, never MR or MC

