



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.

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Oligopoly

the market type

- **Few big sellers** · barriers to entry (land, pumps, years to break even)
- **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**)

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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 / <u>6,000</u>	2,000 / 8,000
Island Low	<u>8,000</u> / 2,000	<u>4,000</u> / <u>4,000</u>

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Nash equilibrium

+ prisoner's dilemma

- **Nash equilibrium** (John Nash, US mathematician) = everyone plays a best reply → nobody gains by moving alone · gas: (Low, Low) \$4,000 each
- **Prisoner's dilemma** → 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 dominant = Accept → (Enter, Accept) · threat to fight = not credible (Fight \$2,000 < Accept \$4,000)

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Cartel & repeated game

cheating, tit-for-tat

- **Cartel** = 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: $8,000 + 3 \times 4,000 = \$20,000 < \text{deal } 4 \times 6,000 = \$24,000$ → cheating does not pay

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Monopolistic competition

short run

- **Many sellers** · **free entry and exit** · **differentiated products** → loyal regulars → own downward demand (not a price taker)
- Rule = as monopoly: $MR = MC$, then go up to demand for the price · **Profit** = $(P - ATC) \times Q$
- 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**

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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:
 $P = 6 - 0.01Q \Rightarrow Q = 200$, $P = ATC = \$4$
- Rent shock (transfer case): fixed \$200 → \$450 → loss \$250 at 100 books → exits → $P = 10 - 0.02Q \Rightarrow Q = 150$, $P = ATC = \$7$ → 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

