You have a billion dollars: what do you do?

What a billion buys for each person, what one dollar achieves in each line, the budget as a choice, which constraint each line lifts, and how to tell a year later whether it worked.

1 The arithmetic

big, and small

- Palmera · **10 million** people · gift **$1 billion**, once → `1,000,000,000 ÷ 10,000,000 = $100` each ≈ 50 days of Amara's pay (the course's Palmera farmer, $2 a day)
- Any line: **how many = money ÷ cost of one unit** · per person = budget ÷ people
- Practice · $400 million → **$40** each · nets for all: 5 million × $4 = **$20 million** · cash at $400 → `400 million ÷ 400` = **1 million** families

2 The menu

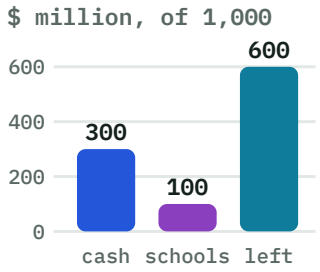
cost-effectiveness

- **Cost-effectiveness** = what one dollar buys in results (a life, a school year, a family reached) → compare different programs
- **Deworming** (pill against worms) · < **$0.50** a child a year (economists Miguel & Kremer, 2004; Evidence Action, a charity) → 3 million children × $0.50 = **$1.5 million**
- **Bed nets** (insecticide, against malaria mosquitoes) · **Cochrane** (network pooling medical trials) review (5 trials): ≈ **5.6 lives** saved a year per 1,000 children · 1 net = 2 people · 5 million × $5 = **$25 million** · + deworming ≈ $27 million < 3% of the billion
- **Cash transfers** (money, no conditions) · Kenya, **GiveDirectly** (charity, cash by phone), ≈ $1,000 a household, 653 villages, randomized (Egger, Haushofer, Miguel, Niehaus & Walker, 2022) → neighbors not hurt · each $1 → ≈ **$2.50** local spending over 2 years · toy $500 → `1,000 million ÷ 500` = **2 million** families
- Practice · per 100 children: A letter $1,000 → 10 extra school years = **$100**/year · B classrooms $20,000 → 50 = **$400**/year → per dollar A ×4 · "B adds 5× the years" × forgets the cost

3 The budget

a choice

- 3 lines share $1,000 million · cash $500 a family (`$1 M → 2,000` families) · **teaching at the right level** (group by reading level, not age; L7) toy $20 a child-year (`$1 M → 50,000`) · rest → roads, power, courts (L6, L8, L9) + $27 M nets and pills
- Cash 300 + schools 100 → left `1,000 − 300 − 100` = **$600 million**
- **Budget constraint** = every dollar in one line is missing from another = **opportunity cost** (Micro 1)
- Practice · $500 M: 600,000 families × $500 = **$300 M**, schools 100 → left **$100 M** · +$50 M schools = −100,000 families



4 Which constraint

Lessons 2-9

Cushion for risk (L5, L6, L9)	Rules and incentives (L2, L8)	Health and skills (L4, L7)
cash before a bad harvest · phone account for help in a drought · *rain insurance* · *grain store*	audits announced before a road (Olken, US economist, Indonesia) · school grants published · *land register* · *teachers' class photo*	bed nets · teaching at the right level · *vaccines* · *glasses*

- Cushion → a family survives a bad year without selling its field or animals (*italics* = practice)

5 Did it work?

limits · no verdict

- Money spent ≠ results → compare with similar places that did not get it = **control group** (L4) · lottery → groups alike → gap = effect
- Practice · cash trial (toy): roofs 20 → cash **50** vs control **30** → effect `50 − 30 = 20` per 100 · `100 × $500 ÷ 20` = **$2,500** an extra roof · 30 of the 50 there anyway
- Limits · a trial in Kenya = mechanism real somewhere → test small on Palmera first · evidence on deworming's long run disputed · $1 billion small vs a state's yearly budget · the state runs schools and roads
- One view: a few cheap, proven things at scale → lives now ⟷ other view: roads, courts, what only a state does → decide who prospers · evidence shows what each does, not which to choose

Watch out: "$1 billion, so poverty will end" × → $100 a person, once · bigger effect ≠ better use: compare **per dollar** · effect = treatment − control, not the rise from "before" · one trial ≠ proof everywhere