Chapter 4 Summary: Allocating Students to Schools

Theory, methods, and empirical insights (Che, Grenet, He)

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Motivation: Why "school choice" needs market design

- Traditional **neighborhood assignment** limits parental choice and can amplify inequities.
- Strong linkage between **housing markets** and school assignment can create allocative inefficiency.
- Key twist vs. standard markets: assignment is typically **not price-mediated** $\Rightarrow$ rules matter.
- Matching theory provides tools to analyze trade-offs: **fairness, efficiency, strategy-proofness**.

Model framework (school choice as many-to-one matching)

- Students $i \in \mathcal{I}$; schools $s \in \mathcal{J}$ with capacities q_s.
- Students have strict preferences P_i over schools + outside option (unassigned).
- Schools have priority orders π_s (policy priorities: walk zone, siblings, test scores, etc.).
- Assignment μ maps students to a school (or unmatched) and respects capacities.

Normative goals

Efficiency (Pareto), Stability / No justified envy (fairness), Strategy-proofness (truth-telling).

Diagnosing Market Failures (Assignment design problems)

- **Coupling residence and school** can force families to trade off housing vs. school preference.
- **Oversubscription** (popular schools) + **no tuition** $\Rightarrow$ must ration seats by rules.
- Simple lotteries ignore **preference intensity**; strict geographic priority can recreate inefficiencies.
- Design challenge: balance **efficiency**, **fairness/priorities**, and **simplicity/incentives**.

Before reforms: what went wrong? (NYC & Boston)

- NYC (pre-2004): decentralized process $\Rightarrow$ **congestion** and coordination failures.
- Boston (Immediate Acceptance / "Boston mechanism"):
  - can violate priorities (instability / justified envy),
  - **not strategy-proof** $\Rightarrow$ rewards sophisticated strategists.
- Practical takeaway: the mechanism must be **understandable** and **incentive-aware**.

Core mechanisms

Deferred Acceptance (DA)

- Student-proposing, multi-round.
- **Strategy-proof**.
- Delivers **stable** matching (no justified envy, non-wasteful).

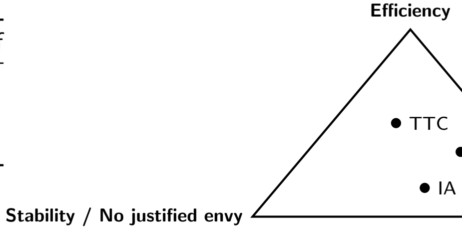
Top Trading Cycles (TTC)

- Students point to favorite; schools point to top priority.
- Clears cycles recursively.
- **Strategy-proof** and **Pareto efficient** (for students),
- but can be **unstable** (justified envy can arise).

Evaluating and Comparing Designs (trade-offs)

Mechanism	Eff.	Stable/Fair	Strat.-proof
DA	○	✓	✓
TTC	✓	× / ○	✓
IA	○	×	×

✓ strong ○ depends/partial × weak



Key idea: cannot maxim
⇒ choose a principled c

Coarse priorities, tie-breaking, and policy constraints

- Real priorities are often **coarse** (ties): walk-zone, sibling, etc.
- Tie-breaking matters:
  - STB: one lottery shared across schools,
  - MTB: separate lottery per school.
- Policy goals can include **affirmative action** (quotas/reserves) in controlled choice.
- Bottom line: "small" implementation choices can change welfare and perceived fairness.

Empirical agenda: learning preferences and evaluating reforms

- Matching theory helps:
  - infer student preferences from submitted rankings and admin data,
  - simulate counterfactual policies and welfare impacts.
- Central challenge: **strategic reporting** under non-strategy-proof mechanisms.
- Chapter roadmap: theory (mechanisms) $\rightarrow$ estimation methods $\rightarrow$ empirical lessons.

Takeaways

1. School assignment is a **market design problem without prices**.
2. Mechanisms trade off **efficiency**, **fairness/stability**, **incentives**.
3. DA is widely used because it is **strategy-proof** and produces **stable** outcomes.
4. Empirics matter: preference estimation + counterfactual simulation guide policy decisions.