# School Choice with Appeals

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# Appeals in England (and Northern Ireland)

- England uses a choice, centralized procedure to allocate pupils to schools.
- The procedure features an appeals procedure, run by an independent panel, with authority to allocate more students to schools than their published admission number.
- Regulated by the School Admission Appeals Code.
- Over 50,000 appeals each year, one in five appeals is upheld.

# Parents understand appeals

*"[Put] whichever Berks school you want ... higher than Burnham, so that you will then be able to appeal when you are refused a place."*

*"The headmaster at my 1st choice school for my 10 year old advised me to only put their school down on the application form. He said that if I put down other options I might get the 6th choice, in which case appealing that decision becomes much more difficult as I would have effectively been given one of my choices."*

# School choice and appeals

- Economists have guided school choice reforms, designing algorithms that help families attain better placements by making the ranking procedure more straightforward.
  **Very important:** school placements have long term consequences.

- Almost all of this literature ignores the possibility of appeals.

- **Key:** Appeals change how parents reports preferences and the quality of the placement produced, both in theory and in experiments.

# Roadmap

1. Institutional context.
2. Theoretical results.
3. Hypotheses and experimental design.
4. Experimental results.

# Institutional context

- **Free and online** school-specific appeals for rejections.

- In England, an appeal must be upheld if either:
  1. The school's admissions criteria were not properly followed or do not comply with the school admissions code.
  2. The parents' reasons for admission outweigh the school's justification for not accepting additional students.

- In Northern Ireland:
  1. The school did not apply, or misapplied, its admissions criteria.
  2. The child would have been offered a place had the criteria been correctly applied.

# Institutional context II

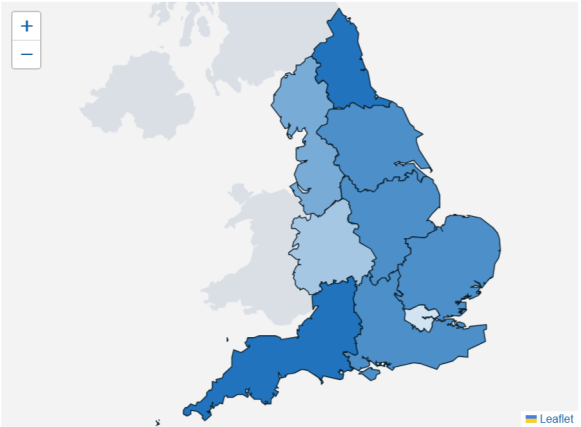
- For 2024/25: $14{,}584$ primary and $37{,}289$ secondary appeals were lodged.
  Of the appeals heard, $18\%$ of primary and $20\%$ of secondary appeals were successful.

- Sharp variation across the 152 local authorities: primary success rates ranged from 0 to $67\%$; secondary: 0 to $95\%$.

- NI: 25% of post-primary schools (47 out of 189) admitted more students than their published quotas due to successful appeals in 2023/24. The process is costly: 2021/22 appeals (810 lodged, 210 successful) costing approximately £130,000.

Successful appeals (percentage) (Secondary, 2025)

None selected




**Key to Successful appeals (percentage) (Secondary, 2025)**

- 10.1 to 13.5
- 13.6 to 17.0
- 17.1 to 20.5
- 20.6 to 24.0
- 24.1 to 27.6

# Model

- Students have strict preferences over schools, schools have priorities over students (ties allowed).
- Schools have a fixed capacity, binding first period but not after appeals.
- Two mechanisms: first come first served (called Immediate Acceptance, IA): priorities determine choice between two competing students at the same time, but any application to a full school is immediate rejection.

  Second mechanism: Deferred Acceptance (DA): you can apply to a school even if full, and kick out someone previously accepted if worse priority.
  Widely used: NI(!), Paris, Chile, NYC, ...

. .

8.4 Each Board of Governors will make a provisional selection for the Year 8 intake via the online Portal, of those pupils whom they wish to admit up to the school's admissions number, by the relevant date as specified in the separate annual Circular.

Circular 2025 /11 Open Enrolment in Nursery Primary and Post Primary Schools Timetables - 2026/27 | Department of Education

8.5 The applications of pupils not selected at first preference stage will move to the second preference school for consideration. The Board of Governors will adjust their provisional list of admissions considering the Transfer Application of their criteria to further preferences.

# Alg 1: Immediate Acceptance (IA)

Abdulkadiroğlu & Tayfun Sönmez. School choice: A mechanism design approach. AER (2003).

| i1 | i2 | i3 | i4 | s1 | s2 | s3 | s4 |
|---|---|---|---|---|---|---|---|
| (s3) | s1 | s1 | (s1) | i1 | i3 | i4 | · |
| s2 | (s2) | s3 | s4 | i4 | i1 | i2 | · |
| s1 | s3 | s2 | · | i2 | i4 | i3 | · |
| s4 | s4 | (s4) | · | i3 | i2 | i1 | · |

| steps | s1 | s2 | s3 | s4 |
|---|---|---|---|---|
| round 1 | i2,i3,i4 | | i1 | |
| round 2 | i4 | i2 | i1,i3 | |
| round 3 | i4 | i2,i3 | i1 | |
| round 4 | i4 | i2 | i1 | i3 |

# Alg 1: Immediate Acceptance (IA)

Abdulkadiroğlu & Tayfun Sönmez. School choice: A mechanism design approach. AER (2003).

| i1 | i2 | i3 | i4 | s1 | s2 | s3 | s4 |
|---|---|---|---|---|---|---|---|
| (s3) | s1 | s1 | (s1) | i1 | i3 | i4 | · |
| s2 | (s2) | s3 | s4 | i4 | i1 | i2 | · |
| s1 | s3 | s2 | · | i2 | i4 | i3 | · |
| s4 | s4 | (s4) | · | i3 | i2 | i1 | · |

| steps | s1 | s2 | s3 | s4 |
|---|---|---|---|---|
| round 1 | i2,i3,i4 | | i1 | |
| round 2 | i4 | i2 | i1,i3 | |
| round 3 | i4 | i2,i3 | i1 | |
| round 4 | i4 | i2 | i1 | i3 |

**Pareto-efficient**: no harmless improvement possible for students.

**First-choice maximal**: as many students assigned to their top choice as possible.

But **manipulable and unstable!**

# Alg 2: Deferred Acceptance (DA)

Gale & Shapley. College Admissions and the Stability of Marriage. American Mathematical Monthly (1962).

| i1 | i2 | i3 | i4 | s1 | s2 | s3 | s4 |
|---|---|---|---|---|---|---|---|
| s3 | s1 | s1 | s1 | i1 | i3 | i4 | · |
| s2 | s2 | s3 | (s4) | i4 | i1 | i2 | · |
| (s1) | (s3) | (s2) | · | i2 | i4 | i3 | · |
| s4 | s4 | s4 | · | i3 | i2 | i1 | · |

| steps | s1 | s2 | s3 | s4 |
|---|---|---|---|---|
| round 1 | i2,i3,i4 | | i1 | |
| round 2 | i4 | i2 | i1,i3 | |
| round 3 | i4 | i1,i2 | i3 | |
| round 4 | i4 | i1 | i2,i3 | |
| round 5 | i4 | i1,i3 | i2 | |
| round 6 | i1,i4 | i3 | i2 | |
| round 7 | i1 | i3 | i2 | i4 |

**Strategy-proof and stable**.

But **Pareto inefficient!**

→ for almost everybody, with high probability: Ortega et al. ('26, *Theoretical Economics*).

# Appeals

After the IA or DA mechanism, parents can appeal; they succeed if:

r1 the school accepted someone with worse priority **[main rule]**.

r2 the school accepted someone with worse or equal priority violation.

r3 r1 or with some fixed, independent probability.
The random success chance is motivated by the wide variation in appeals success rate.

Parents can appeal to many schools, schools' quotas can be exceeded if need to.

# Two Theoretical Results

## Theorem 1

*IA with (r1) appeals is less manipulable than IA without.*

Between two mechanisms, $M$ is less manipulable than $N$ if, whenever a student can profitably manipulate $M$ at a preference profile, she can also profitably manipulate $N$ at that profile, but not vice versa. *(Pathak and Sönmez, AER'13)*.

**H1**: Appeals reduce the manipulations in IA, but not in DA.

**Idea**: No need to skip speculative applications to rank a certain school first (because the certain school may be full by the time I apply). If the school is certain, I can just apply to all my preferred schools in order, if I get to that school I will get there through a successful appeal.

# Some remarks on Theorem 1

1. Appeals don't make IA strategy proof.
2. Every rule makes IA less manipulable.
3. In fact, r3 (prob rule) gives a further channel for truth-telling: give a try to a highly-demanded school (even where I stand no chance) because I may get there with a lottery ticket.
4. DA is strategy-proof and stable, so no changes with r1–but r2 makes it no longer strategy-proof!

# Second, main result

- IA is Pareto-efficient, unlike DA.
- But it is manipulable, so how do they compare in equilibrium?
- A seminal result shows that every equilibrium of IA's pref revelation game is wekaly dominated by truthful DA *(Ergin and Sönmez, JPubE,'06)*.
- Documented in the lab: IA looks more efficient with reported, but not real preferences. Means we cannot take high top-choice rates at face value.

# Second, main result p.2

The seminal IA-DA efficiency comparison flips when adding appeals.

## Theorem 2

*IA with (r1) appeals has an equilibrium that weakly Pareto dominates DA.*
*(strictly so if DA is inefficient at that problem)*
*the equilibrium is a strong Nash, but not unique in general.*

**H2**: Appeals reverse the IA-DA efficiency comparison.

# Proof sketch of Theorem 2

1. Think of IA as running rounds of applications, if somebody applies to a full school and has higher priority, just create a seat (modified IA).

2. Divide students into 3 groups per MIA:
   1. A: admitted normally $\longrightarrow$ MIA school, then truthful.
   2. O: admitted through extra capacity $\longrightarrow$ truthful.
   3. U: unassigned $\longrightarrow$ truthful.

3. We construct the equilibrium so that low-priority students get to schools first, and higher priority students enter the schools through an appeal.

# Experiment

# Why experiments?

Seminal paper by *Chen and Sonmez (JET, '06)*: DA significantly less manipulated than IA.

This finding "*played an important role to convince the Boston school district authorities to replace the previous mechanism*".

Preferences given by money, so we can observe truthfulness (very hard otherwise)

| Study | Mechanisms | Study | Mechanisms |
|---|---|---|---|
| Chen (*JET*, 2006) | DA, TTC, BOS | Kawagoe (*GEB*, 2018) | DA |
| Pais (*GEB*, 2008) | DA, TTC, BOS | Chen (*GEB*, 2019) | IA, PA, DA |
| Calsamiglia (*AER*, 2010) | DA, TTC, BOS | Ding (*EJ*, 2019) | DA, BOS |
| Klijn (*Exp Econ*, 2013) | DA, BOS | Dur (*Exp Econ*, 2019) | DA, BOS |
| Zhu (*WP*, 2015) | DA | Bó (*EJ*, 2020) | DA, IDAM, IDAM-NC |
| Castillo (*GEB*, 2016) | DA | Castillo (*Exp Econ*, 2021) | DA-TT, DA-TR |
| Chen (*JMID*, 2016) | TTC, DA, BOS | Dur (*JET*, 2021) | DA, BOS |
| Klijn (*EL*, 2016) | DA, TTC | Guillen (*Exp Econ*, 2021) | DA, TTC, RDA, RTTC |
| Featherstone (*GEB*, 2016) | DA, BOS | Koutout (*JBEE*, 2021) | DA, BOS |
| Lien (*Exp Econ*, 2016) | BOS, SD | Chen (*JET*, 2021) | DA, IA |
| Ding (*GEB*, 2017) | DA, BOS | Afacan (*GEB*, 2022) | DA |
| Guillen (*Exp Econ*, 2017) | TTC | Cho (*JET*, 2022) | DA, SIC, CADA |
| Basteck (*GEB*, 2018) | DA, BOS | Stephenson (*Exp Econ*, 2022) | DA, TTC, BOS |
| Chen (*GEB*, 2018) | DA, BOS | Cerrone (*EJ*, 2024) | DA, EADA |
| | | Freer (*GEB*, 2026) | DA, EADA, RM |

# Experiment

- $2 \times 3$ between-subject design.

| | IA | DA |
|---|---|---|
| No appeals | ✓ | ✓ |
| $r_1$ | ✓ | ✓ |
| $r_3$ (prob) | ✓ | ✓ |

- 1,022 participants across 59 independent matching groups.
- Payoffs: 15, 10, 5 points for first, second, third choice; 0 if unassigned.
- Two randomly selected rounds paid (1 point = £0.50), plus a £5 show-up fee.
- Average total payment: £13.21.

# Problem agents face

| $i_1$ | $i_2$ | $i_3$ | $i_4$ | $i_5$ | $i_6$ | $i_7$ | $s_1$ | $s_2$ | $s_3$ |
|---|---|---|---|---|---|---|---|---|---|
| $s_3$ | $s_3$ | $s_2$ | $s_1$ | $s_1$ | $s_2$ | $s_3$ | $i_6, i_7$ | $i_4$ | $i_4, i_5$ |
| $s_2$ | $s_2$ | $s_1$ | $s_3$ | $s_2$ | $s_3$ | $s_2$ | $i_5$ | $i_1, i_2, i_3, i_5$ | $i_3, i_6$ |
| $s_1$ | $s_1$ | $s_3$ | $s_2$ | $s_3$ | $s_1$ | $s_1$ | $i_2, i_3, i_4$ | $i_6, i_7$ | $i_2, i_7$ |
| $\cdot$ | $\cdot$ | $\cdot$ | $\cdot$ | $\cdot$ | $\cdot$ | $\cdot$ | $i_1$ | $\cdot$ | $i_1$ |

Under truthful reporting

| $i_1$ | $i_2$ | $i_3$ | $i_4$ | $i_5$ | $i_6$ | $i_7$ |
|---|---|---|---|---|---|---|
| $s_3$ | $\underline{\boxed{s_3}}$ | $\underline{\boxed{s_2}}$ | $\underline{\boxed{s_1}}$ | $\underline{\boxed{s_1}}$ | $\underline{\boxed{s_2}}$ | $\underline{\boxed{s_3}}$ |
| $\boxed{\boxed{s_2}}$ | $\boxed{s_2}$ | $s_1$ | $\boxed{s_3}$ | $s_2$ | $s_3$ | $s_2$ |
| $s_1$ | $s_1$ | $s_3$ | $s_2$ | $\boxed{s_3}$ | $\boxed{s_1}$ | $\boxed{s_1}$ |
| $\underline{\cdot}$ | $\cdot$ | $\boxed{\cdot}$ | $\cdot$ | $\cdot$ | $\cdot$ | $\cdot$ |

$\boxed{s}$ DA $\quad$ $\underline{s}$ IA $\quad$ $\boxed{\boxed{s}}$ IA with strict appeals

# Interface

1. Subjects are explained the mechanism.
2. Subjects see all info and rank schools.
3. Subjects hear preliminary allocation.
4. Subjects can appeal freely (but need to type a password, small effort cost).
5. Subjects complete a short demographic questionnaire, are pay and dismissed.

# Ranking Decision: Round 10

Instructions Procedure Example

| Student type | S1 | S2 | S3 | S4 | S5 | S6 | S7 |
|---|---|---|---|---|---|---|---|
| 15 points | C | C | B | A | A | B | C |
| 10 points | B | B | A | C | B | C | B |
| 5 points | A | A | C | B | C | A | A |
| 0 points | | | | | | | |

**Your student type:** Student S2.

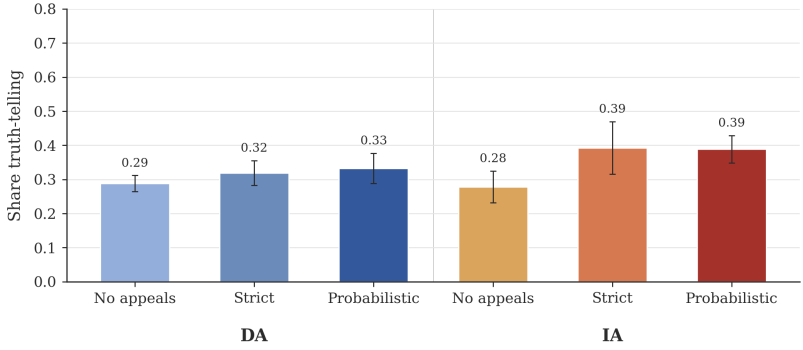
Hide School Priorities

| School | A | B | C |
|---|---|---|---|
| 1st priority | S6, S7 | S4 | S4, S5 |
| 2nd priority | S5 | S1, S2, S3, S5 | S3, S6 |
| 3rd priority | S2, S3, S4 | S6, S7 | S2, S7 |
| 4th priority | S1 | | S1 |

Please rank the schools below and press Next to submit your preference list.

# Experimental results

# R1: Truthfulness

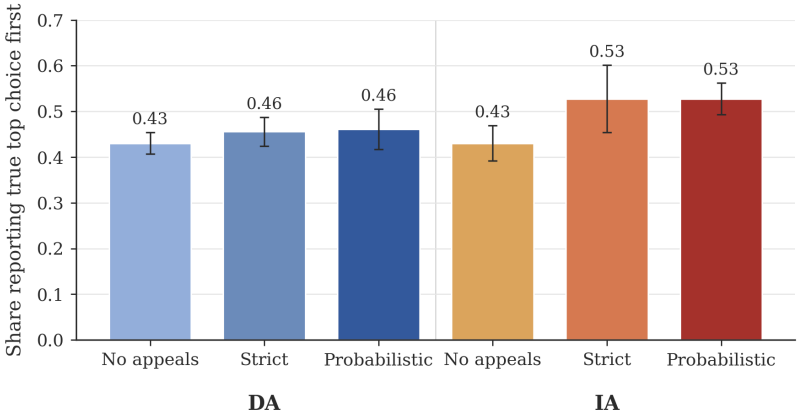



*95% CIs clustered at matching group*

# Truth-telling

| | | | | |
|---|---|---|---|---|
| **Panel A. IA treatments** | | | | |
| IA strict | $0.11^{***}$ | $0.11^{***}$ | $0.11^{***}$ | $0.12^{***}$ |
| | (0.04) | (0.04) | (0.04) | (0.04) |
| IA probabilistic | $0.11^{***}$ | $0.11^{***}$ | $0.11^{***}$ | $0.11^{***}$ |
| | (0.03) | (0.03) | (0.03) | (0.03) |
| **Panel B. DA treatments** | | | | |
| DA strict | 0.03 | 0.03 | 0.03 | $0.03^{*}$ |
| | (0.02) | (0.02) | (0.02) | (0.02) |
| DA probabilistic | $0.04^{*}$ | $0.04^{*}$ | $0.04^{*}$ | $0.04^{*}$ |
| | (0.02) | (0.02) | (0.02) | (0.02) |
| Round | No | Yes | Yes | Yes |
| Participant type | No | No | Yes | Yes |
| Demographics + risk att. | No | No | No | Yes |

# R1: Truthfulness (first choie)




*95% CIs clustered at matching group*

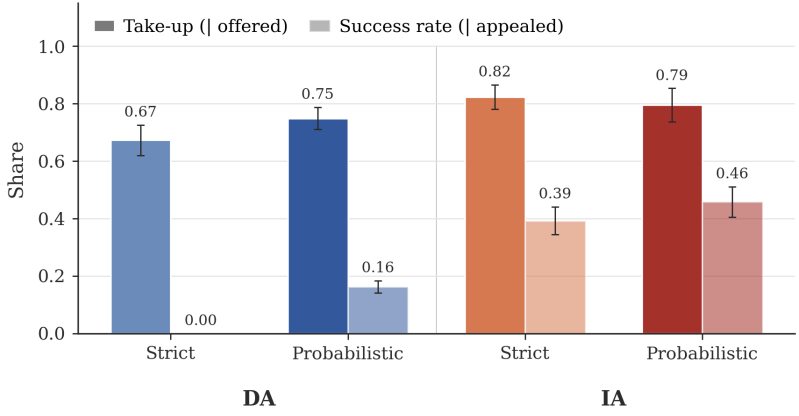
# Consequential misreports

Under DA, only about $9 - 7$ percent of non-truthful reports are consequential. Every consequential DA report is harmful.

Under IA, by contrast, almost two thirds of non-truthful reports are consequential in every treatment.

Participants exploit IA's manipulability poorly: among consequential reports, about $40$ percent are beneficial and $60$ percent are harmful.

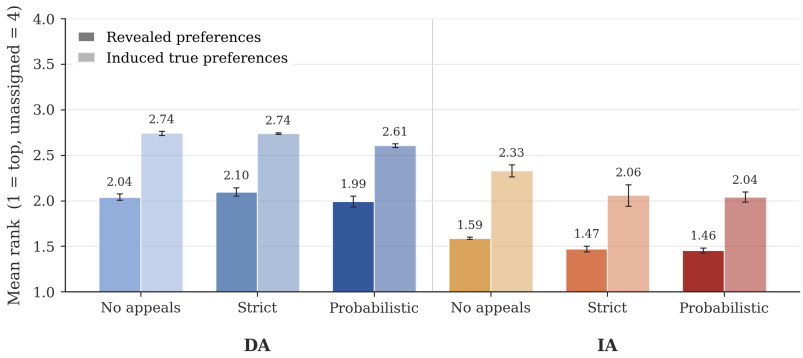
# R2: Appeal decisions




*95% CIs clustered at matching group*

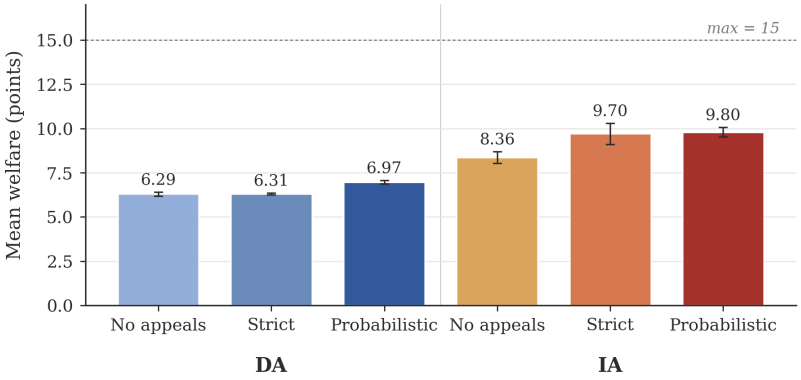
| | Any appeal | Appeal opportunity taken |
|---|---|---|
| DA, probabilistic appeals | $0.08^{**}$ | $0.05$ |
| | $(0.03)$ | $(0.03)$ |
| IA, strict appeals | $0.11^{***}$ | $0.03$ |
| | $(0.04)$ | $(0.04)$ |
| IA, probabilistic appeals | $0.08^{**}$ | $0.05$ |
| | $(0.04)$ | $(0.04)$ |
| Strict priority claim | $-0.01$ | $0.07^{***}$ |
| | $(0.02)$ | $(0.03)$ |
| Number of appeal opportunities | $0.11^{***}$ | $\cdot$ |
| | $(0.03)$ | |
| Appeal target: second choice | $\cdot$ | $-0.05^{***}$ |
| | | $(0.01)$ |
| Appeal target: third choice | $\cdot$ | $-0.10^{***}$ |
| | | $(0.02)$ |

# R3: Efficiency (lower = better)




*95% CIs clustered at matching group*

# R3: Efficiency (points)




*95% CIs clustered at matching group*

| | | | | |
|---|---|---|---|---|
| **Panel A. IA treatments** | | | | |
| IA strict | $-0.27^{***}$ | $-0.27^{***}$ | $-0.27^{***}$ | $-0.27^{***}$ |
| | (0.07) | (0.07) | (0.07) | (0.07) |
| IA probabilistic | $-0.29^{***}$ | $-0.29^{***}$ | $-0.29^{***}$ | $-0.29^{***}$ |
| | (0.05) | (0.05) | (0.04) | (0.04) |
| **Panel B. DA treatments** | | | | |
| DA strict | 0.00 | 0.00 | 0.00 | 0.00 |
| | (0.01) | (0.01) | (0.01) | (0.01) |
| DA probabilistic | $-0.12^{***}$ | $-0.12^{***}$ | $-0.11^{***}$ | $-0.11^{***}$ |
| | (0.01) | (0.01) | (0.01) | (0.01) |
| **Panel C. Change in rank gap between DA and IA relative to no appeals** | | | | |
| Strict appeals | $0.26^{***}$ | $0.26^{***}$ | $0.27^{***}$ | $0.27^{***}$ |
| | (0.07) | (0.07) | (0.07) | (0.07) |
| Probabilistic appeals | $0.16^{***}$ | $0.16^{***}$ | $0.18^{***}$ | $0.18^{***}$ |
| | (0.05) | (0.05) | (0.05) | (0.05) |
| Round effects | No | Yes | Yes | Yes |
| Demographics + risk att. | No | No | No | Yes |

# Increase in efficiency gap

- Appeals do not switch efficiency because, interestingly, IA is already more efficient than DA without appeals (questions the truthfulness in IA, despite their strategy-prrofness, common in new papers–Cerrone EJ'24, Freer '26).

- Without appeals, realized IA strictly Pareto-dominates truthful DA in 11% of market-rounds. With strict appeals: 48% (+36 percentage points, $p < 0.001$).

# When do gains occur?

With strict appeals, IA's average rank improves by 0.27. You may say-this is all because of creating extra seats.

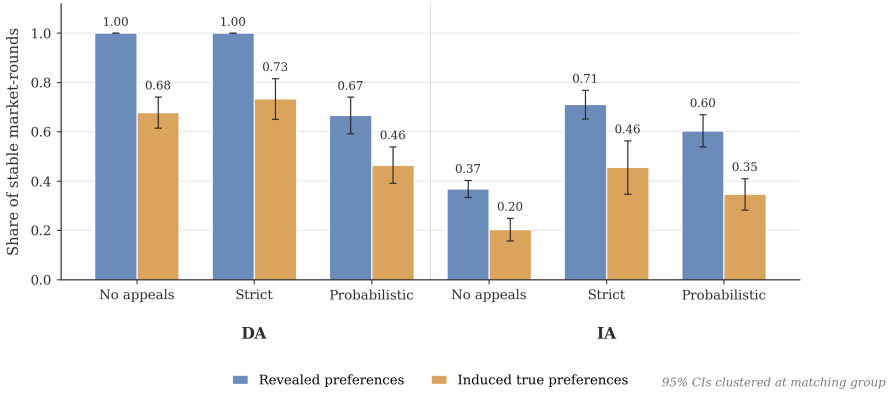
We can decompose the gains in changes in behavior, versus extra capacity.

60% of the improvement is already present in the first-stage assignment, before any appeals are resolved.

Only 40% comes from the added seats (take the reports and plug them in IA versus IA with r1).

| Treatment | Total rank change (1) | First-stage change (2) | Subsequent appeal change (3) |
|---|---|---|---|
| DA, strict appeals | 0.00 | 0.00 | — |
| | (0.01) | (0.01) | |
| DA, probabilistic appeals | 0.14*** | 0.02 | 0.12*** |
| | (0.01) | (0.01) | (0.01) |
| IA, strict appeals | 0.27*** | 0.16** | 0.11*** |
| | (0.07) | (0.06) | (0.01) |
| IA, probabilistic appeals | 0.29*** | 0.17*** | 0.12*** |
| | (0.04) | (0.04) | (0.01) |

# R4: Stability




Under IA, strict appeals reduce blocking pairs, but can generate wastefulness so stability is not guaranteed.

| | Blocking pairs | Wasted-seat claims | Stable market-round |
|---|---|---|---|
| **Panel A. IA treatments** | | | |
| IA strict | $-0.52^{***}$ | $0.03^{***}$ | $0.34^{***}$ |
| | $(0.06)$ | $(0.01)$ | $(0.03)$ |
| IA probabilistic | $-0.45^{***}$ | $0.08^{***}$ | $0.23^{***}$ |
| | $(0.06)$ | $(0.01)$ | $(0.04)$ |
| **Panel B. DA treatments** | | | |
| DA strict | — | — | — |
| DA probabilistic | $0.31^{***}$ | $0.78^{***}$ | $-0.33^{***}$ |
| | $(0.05)$ | $(0.09)$ | $(0.04)$ |

# Summary

We find that:

R1 Appeals increase truth-telling in IA, not clear for DA.

R2 Appeals widen the IA-DA efficiency gap, making IA significantly more efficient. Surprisingly (or not so much), DA is already less efficient than IA without appeals.

R3 Appeals in IA significantly increase stability: some increase in waste, largely compensated by fewer blocking pairs.

# Conclusions

# Conclusion and Discussion

- Standard school choice mechanisms have been remarkably useful.
- But assignment mechanisms should be evaluated jointly with the institutions that follow them.
- A growing literature studies the gap between initial assignments and eventual enrollment (Kapor et al., 2024, JPE; De Groote et al., 2025, R&R JPE).
- Unlike off-platform offers and waitlists, appeals provide a formal review process. Anticipating this review changes preference reports and can reverse the classical welfare comparison between IA and DA.

Thank you.

www.josueortega.com