

Social Interactions, Information, and Preferences for Schools: Experimental Evidence from Los Angeles

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Motivation
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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Motivation

- Parents' choices govern the success of school choice initiatives
 - In a variety of settings, without additional information, consumers tend not to always respond to quality variation
(Abaluck et al. 2021; Ainsworth et al. 2023)
 - In education markets, it's not obvious that parents should only care about school effectiveness
(MacLeod and Urquiola 2019, Beurmann et al. 2023;)
 - Evidence is mixed about parents' valuation of school effectiveness
(Rothstein 2006; Abdulkadiroğlu et al. 2020, Beurmann et al. 2023; Campos and Kearns 2022)

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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Motivation

- Parents' choices govern the success of school choice initiatives
- Imperfect information makes it challenging to infer preferences from observed choices
 - A large body of evidence suggests information disparities loom large
(Hastings and Weinstein 2008; Andrabi et al. 2017; Corcoran et al. 2018; Ainsworth et al. 2023)
 - Imperfect information introduces identification challenges
(Abaluck, Compiani, and Zhang 2022)
 - **Open Question:** What do parents value?

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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Motivation

- Parents' choices govern the success of school choice initiatives
- Imperfect information makes it challenging to infer preferences from observed choices
- We know very little about what parents actually know
 - Are they aware of school and peer quality?
 - Are their beliefs biased?
 - **Open Question:** What do parents know?

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Impacts on Outcomes
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Motivation

- Parents' choices govern the success of school choice initiatives
- Imperfect information makes it challenging to infer preferences from observed choices
- We know very little about what parents actually know
- We know even less about factors mediating choices and their implications
 - Social interactions are important for learning, engagement with information, and subsequent choices
(Conley and Udry 2010; Cai, De Janvry, and Sadoulet 2015; Banerjee et al. 2021, Cohodes et al. 2022)
 - Social interactions and networks potentially mediate enrollment-based school quality gaps
(Hahm and Park 2023)
 - **Newer Question:** How important are social interactions in the school choice process?

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Impacts on Outcomes
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- Parents' choices govern the success of school choice initiatives
- Imperfect information makes it challenging to infer preferences from observed choices
- We know very little about what parents actually know
- We know even less about factors mediating choices and their implications
- **This paper:** Jointly study how information, preferences, and social interactions shape choices in education markets and provide evidence on these open questions

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This paper

- I organize the questions and objectives around four themes
 1. **What parents know:** What are parents' beliefs about school and peer quality?
 2. **What parents value:** What do parents value when informed about *both* peer and school quality?
 3. **Factors mediating choices:** Do social interactions matter in the school choice process?
 4. **Information campaign mechanisms:** How do information interventions work? Can we differentiate between a salience and information channel?

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- I organize the questions and objectives around four themes
 1. **What parents know:** What are parents' beliefs about school and peer quality?
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 3. **Factors mediating choices:** Do social interactions matter in the school choice process?
 4. **Information campaign mechanisms:** How do information interventions work? Can we differentiate between a salience and information channel?
- Setting: Los Angeles
 - 106 middle schools feed into Zones of Choice (ZOC) markets
 - ~23,000 students part of the experimental sample
 - Two experimental waves, 2019 and 2021

This paper

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 1. **What parents know:** What are parents' beliefs about school and peer quality?
 2. **What parents value:** What do parents value when informed about *both* peer and school quality?
 3. **Factors mediating choices:** Do social interactions matter in the school choice process?
 4. **Information campaign mechanisms:** How do information interventions work? Can we differentiate between a salience and information channel?
- Setting: Los Angeles
- Design: Information provision experiment with a few additional features
 - Elicit beliefs about peer and school quality at baseline
 - Distribute information about peer quality and school quality
 - Spillover design allows us to infer the empirical relevance of social interactions

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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Preview of Results

What parents know

1. Parents tend to underestimate school quality and overestimate peer quality
2. Substantial variation in school and peer quality bias

What parents value and mechanisms

3. Parents systematically shift their choices toward more effective (higher VA) schools in response to treatment
4. Decomposition: Salience impacts account for most of the changes in choices

Evidence of Social Interactions Shaping Demand

5. Indirectly treated families respond in the same way as treated parents
6. Effects are similar at the mean and across the distribution

Impacts on Outcomes

7. Non-cognitive outcomes improve ($0.4\text{-}0.9\sigma$ increase on a variety of indices)
8. Cognitive outcomes (test scores) do not improve

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Impacts on Outcomes
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Conclusion
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Related Literature

1. Parents' Preferences

Rothstein 2006; Cullen et al. 2006; Hastings, Kane, and Staiger 2009; Harris 2015; Burgess et al. 2015; Imberman and Lovenheim 2016; Abdulkadiroglu et al. 2020; Ainsworth et al. 2023; Beuermann et al. 2023

Contribution: Use information provision to isolate changes in preferences

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Impacts on Outcomes
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Conclusion
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Contribution: Use information provision to isolate changes in preferences

2. Information in education markets and the role of salience

Hastings and Weinstein 2008; Bordalo et al. 2013; Mizala and Urquiola 2015; Wiswall and Zafar 2015; Andrabi et al. 2017; Corcoran et al. 2018; Allende et al. 2019; Haaland et al. 2021; Arteaga et al. 2022; Bordalo et al. 2022; Cohodes et al. 2022

Contributions:

- Collect information about beliefs and randomize two measures of quality
- Decompose treatment effects into salience and information updating channels

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Conclusion
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Contribution: Use information provision to isolate changes in preferences

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Contributions:

- Collect information about beliefs and randomize two measures of quality
- Decompose treatment effects into salience and information updating channels

3. Social interactions

Banerjee 1992; Bertrand et al. 2000; Manski 2000; Brock and Durlauf 2002; Duflo and Saez 2003; Durlauf 2004; Jackson 2008; Allende 2019; Billings et al. 2019; Breza and Chandrasekhar 2019; Banerjee et al. 2021; Cox et al. 2021; Leshno 2021

Contribution: Empirical relevance of externality occurring at the preference formation stage

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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Roadmap

1. Setting and Experiment Design
2. Reduced Form Evidence
3. Survey Evidence: AG and IA Bias
4. Discrete Choice Framework
 - Utility weight impacts
 - Decomposition of utility weight impacts
5. Impacts on Outcomes
 - Enrollment
 - Cognitive and non-cognitive outcomes
6. Concluding Thoughts

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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Setting

Setting: Zones of Choice

- ZOC is a neighborhood-based public school choice program
- Sixteen mutually exclusive high school markets within Los Angeles
 - Parents' choice sets are fixed and specific to their neighborhood
 - Schools and neighborhoods are segregated in terms of race/ethnicity and SES
- Students apply to high schools in the Fall of Grade 8
 - Middle schools feed into particular markets
 - Students enrolled in feeder middle schools in 2019 and 2021 are the experimental sample
 - Families are required to rank all options in their zone of choice in their application

Motivation
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Reduced Form Results
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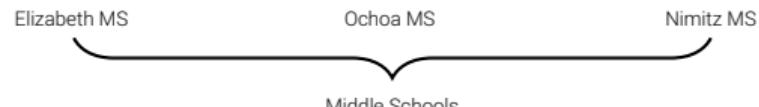
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Zone of Choice Market Structure Example



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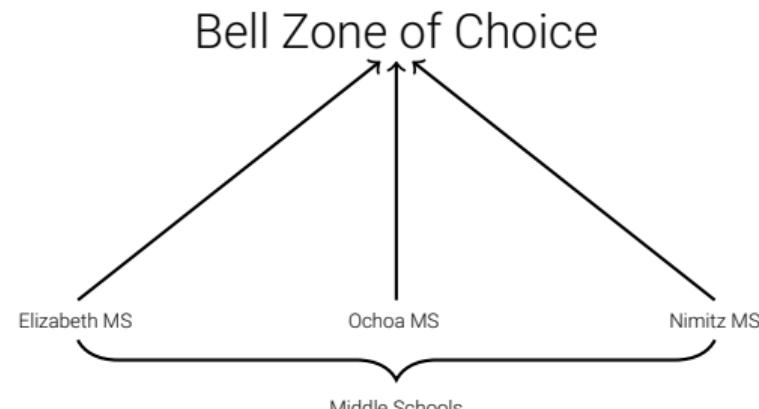
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Zone of Choice Market Structure Example



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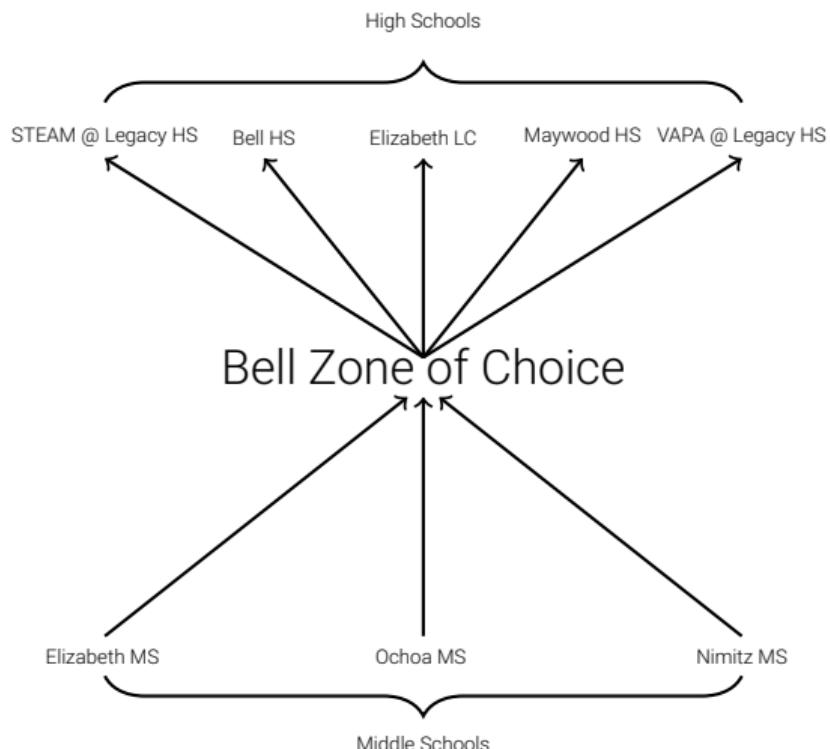
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Zone of Choice Market Structure Example



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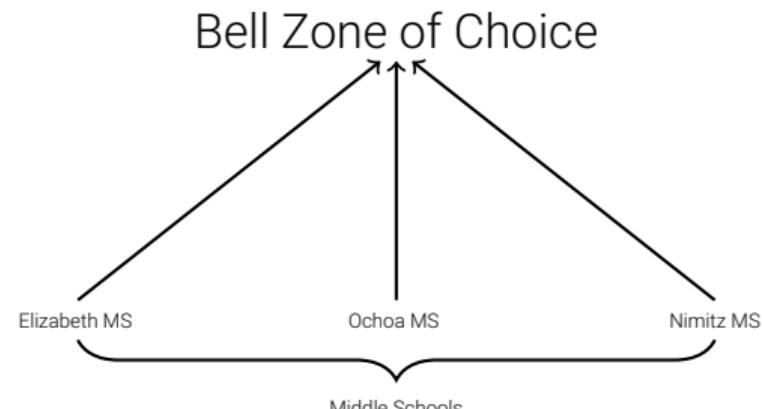
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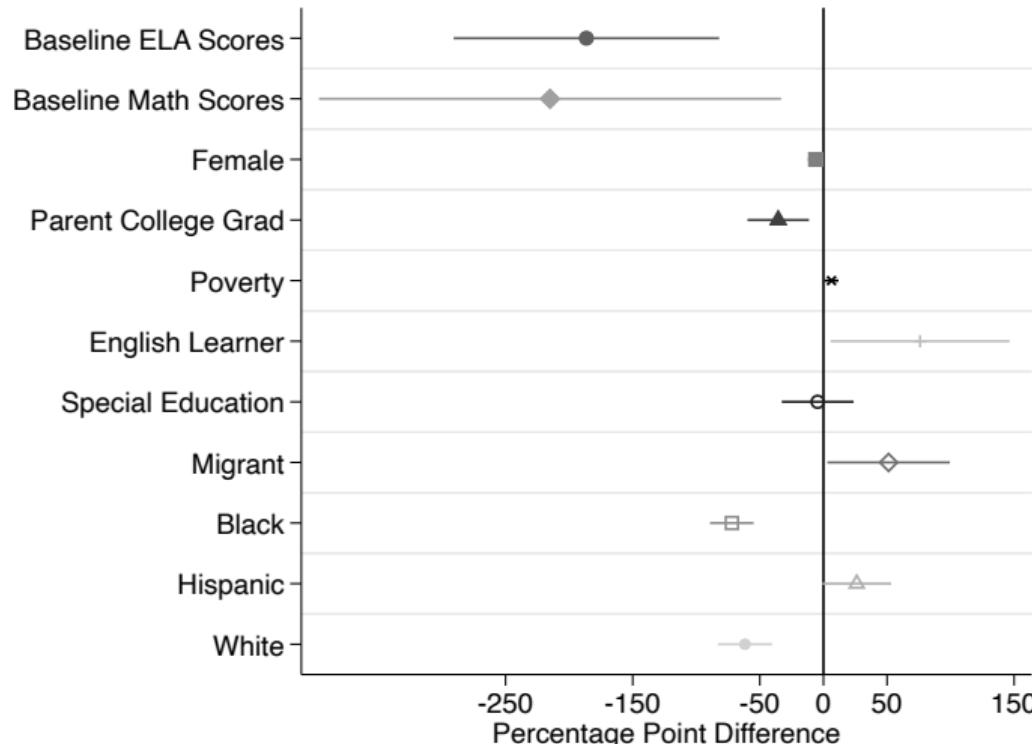
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Zone of Choice Market Structure Example



ZOC and Non-ZOC Student Differences



- ZOC Achievement Gap: $0.21\text{-}0.25\sigma$
- Hispanic Share: 0.86
- Poverty Share: 0.97
- College Graduate Share: 0.065
- ZOC students represent roughly 30-40 percent of LAUSD high school students

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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Timeline

1. Baseline Survey: Early September

- Distributed in the classroom and via text message
- Include a video that teaches parents about the differences between school and peer quality
- Collect baseline beliefs

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Discrete Choice Results
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Conclusion
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Timeline

1. Baseline Survey: Early September

- Distributed in the classroom and via text message
- Include a video that teaches parents about the differences between school and peer quality
- Collect baseline beliefs

2. Information provision: Late September

- Cross-randomize school *and* peer quality
- Treatment-specific videos that help parents understand the information

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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Timeline

1. Baseline Survey: Early September

- Distributed in the classroom and via text message
- Include a video that teaches parents about the differences between school and peer quality
- Collect baseline beliefs

2. Information provision: Late September

- Cross-randomize school *and* peer quality
- Treatment-specific videos that help parents understand the information

3. Applications submitted: October-November

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Survey Evidence
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Discrete Choice Results
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Baseline Survey

Survey Goals:

- Collect information on parents' school and peer quality beliefs
- Collect a pre-intervention rank-ordered list

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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Baseline Survey

Survey Goals:

- Collect information on parents' school and peer quality beliefs
- Collect a pre-intervention rank-ordered list

Challenges:

1. How do you define school and peer quality? ▶ Details

Researcher definition of school and peer quality:

- School quality is estimated school value-added
- Peer quality is analogous to school average test scores
- School quality validated using lotteries (Angrist et al. 2017)

Definition for parents:

- School quality is referred to as Achievement Growth (AG)
- Peer quality is referred to as Incoming Achievement (IA)

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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Baseline Survey

Survey Goals:

- Collect information on parents' school and peer quality beliefs
- Collect a pre-intervention rank-ordered list

Challenges:

1. How do you define school and peer quality? ▶ Details
2. Many degrees of freedom in eliciting beliefs

- Ask parents to assess where schools in their choice set rank across all other schools in the district
- For example: For AG (or IA), is School A in the Top 10%, 80-90%, ...?
- I collect beliefs about the decile parents think their schools belong to

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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Baseline Survey

Survey Goals:

- Collect information on parents' school and peer quality beliefs
- Collect a pre-intervention rank-ordered list

Challenges:

1. How do you define school and peer quality? ▶ Details
2. Many degrees of freedom in eliciting beliefs
3. Explaining the difference between test score value-added and test score levels is challenging. What I do:
 - Survey includes a video that helps explain the differences between school and peer quality
 - Use visual aids to explain the differences

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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Video

Watch Video

English

Spanish

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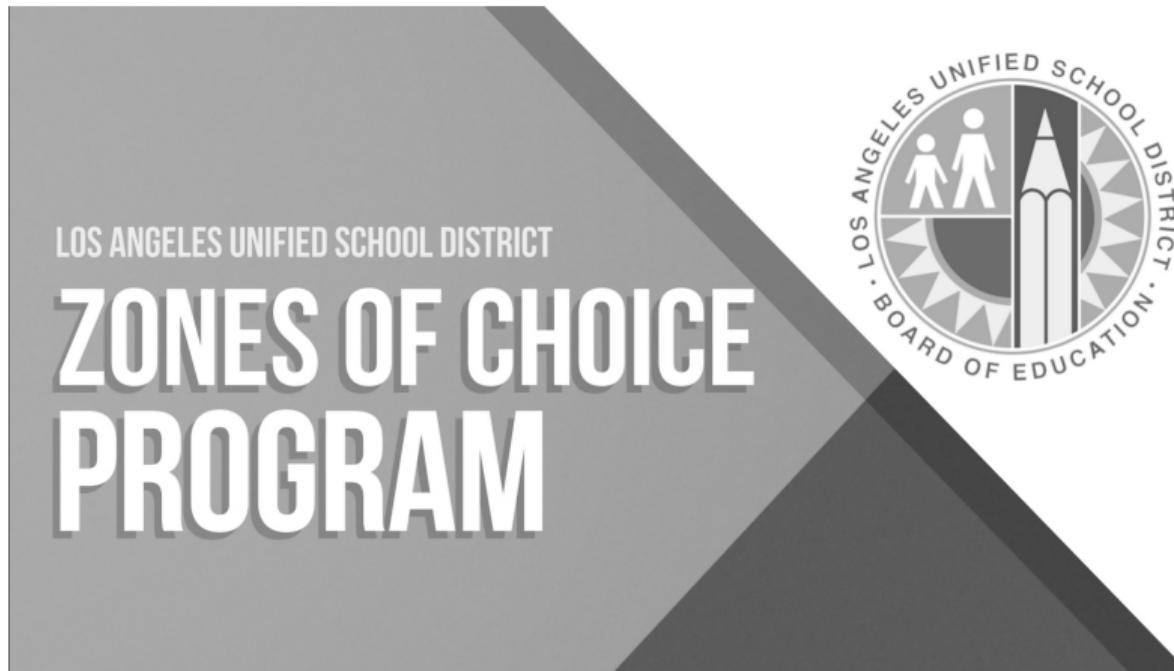
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Signal the information is on behalf of the school district



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Impacts on Outcomes
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Introduce the two concepts



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Reduced Form Results
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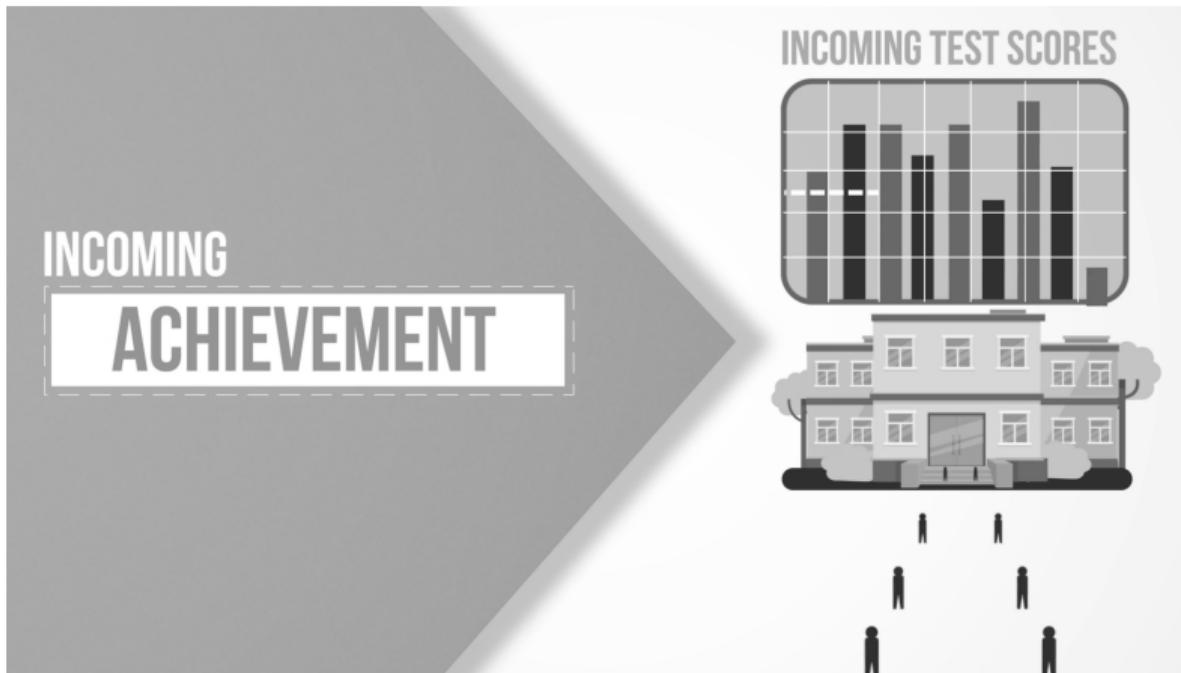
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Use visual aid to describe IA



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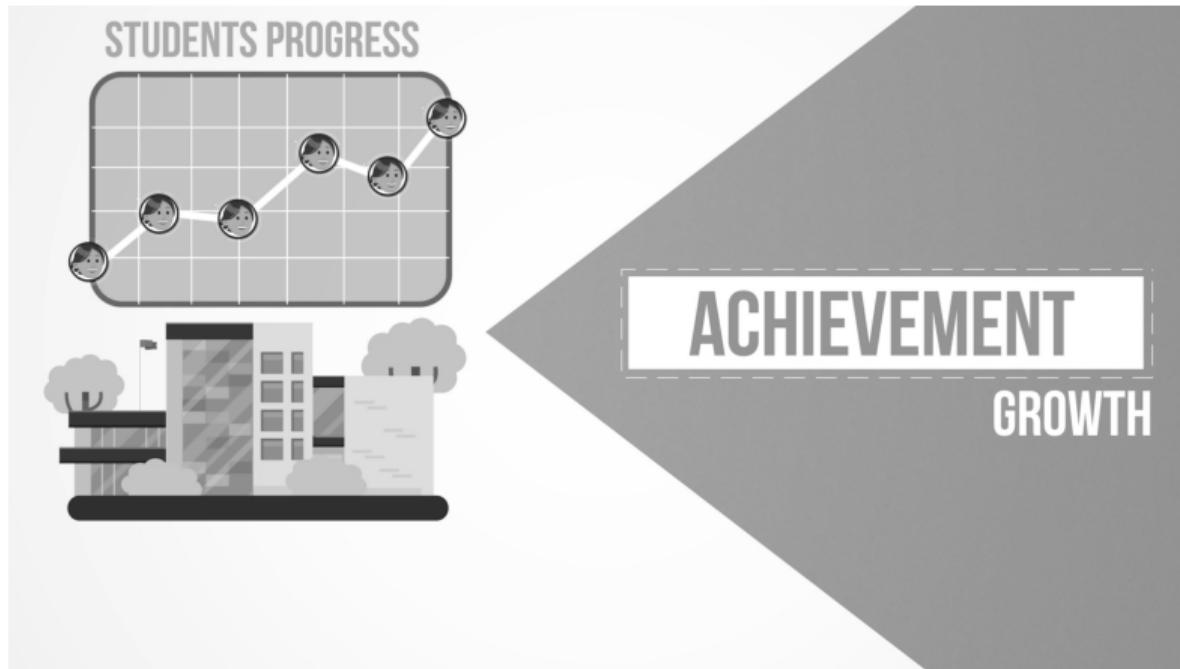
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Use visual aid to describe AG



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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Describe some differences but remain agnostic about which is better



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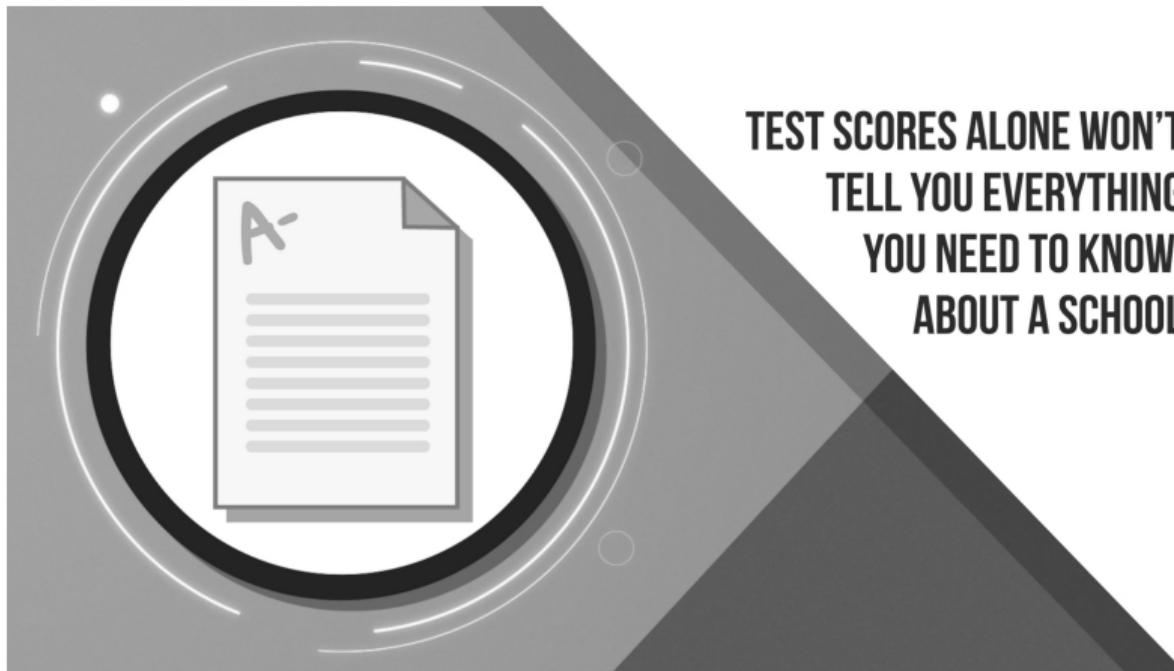
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Impacts on Outcomes
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Remind parents that test scores are not all they should consider



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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Experiment Design

Goals:

1. Better understand parents' valuations of peer and school quality
 - Cross-randomize peer and school quality
2. Identify social interactions
 - Two-stage randomization (Philipson 2000; Crepon et al. 2013)

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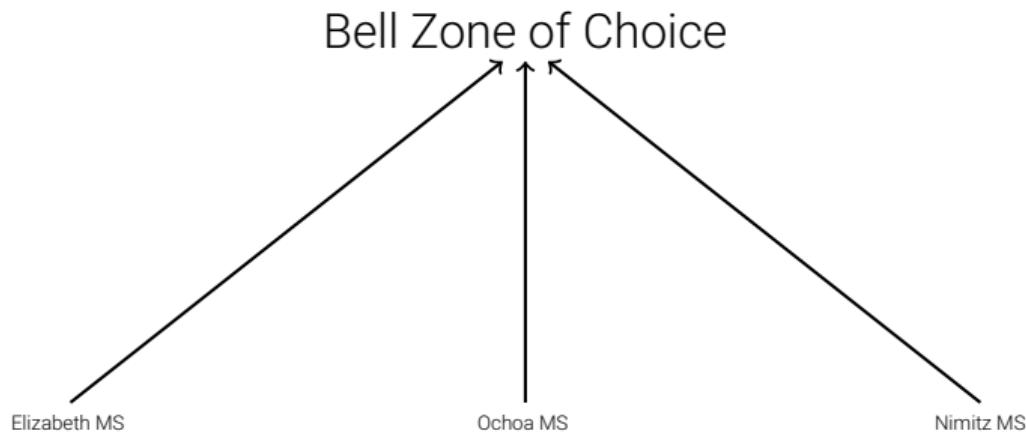
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Bell Zone of Choice



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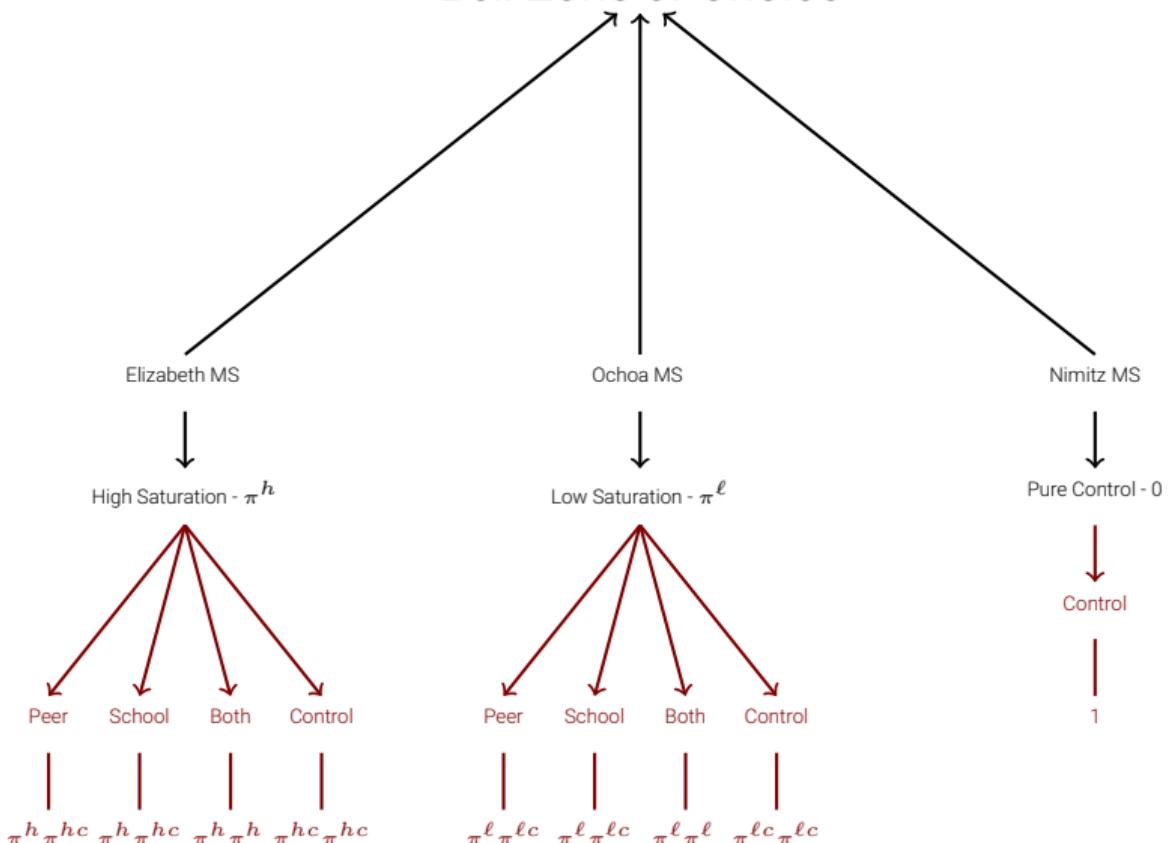
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Impacts on Outcomes
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Conclusion
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Bell Zone of Choice



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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Data

- LAUSD administrative student data 2015-2021
 - Demographics, Test Scores, Addresses
- LAUSD School Experience Survey (SES)
 - Student-level socio-emotional and non-cognitive outcome data
- Zones of Choice data 2015-2021
 - Applications containing rank-ordered lists
- Survey data
 - Baseline beliefs
 - Baseline rank-ordered list

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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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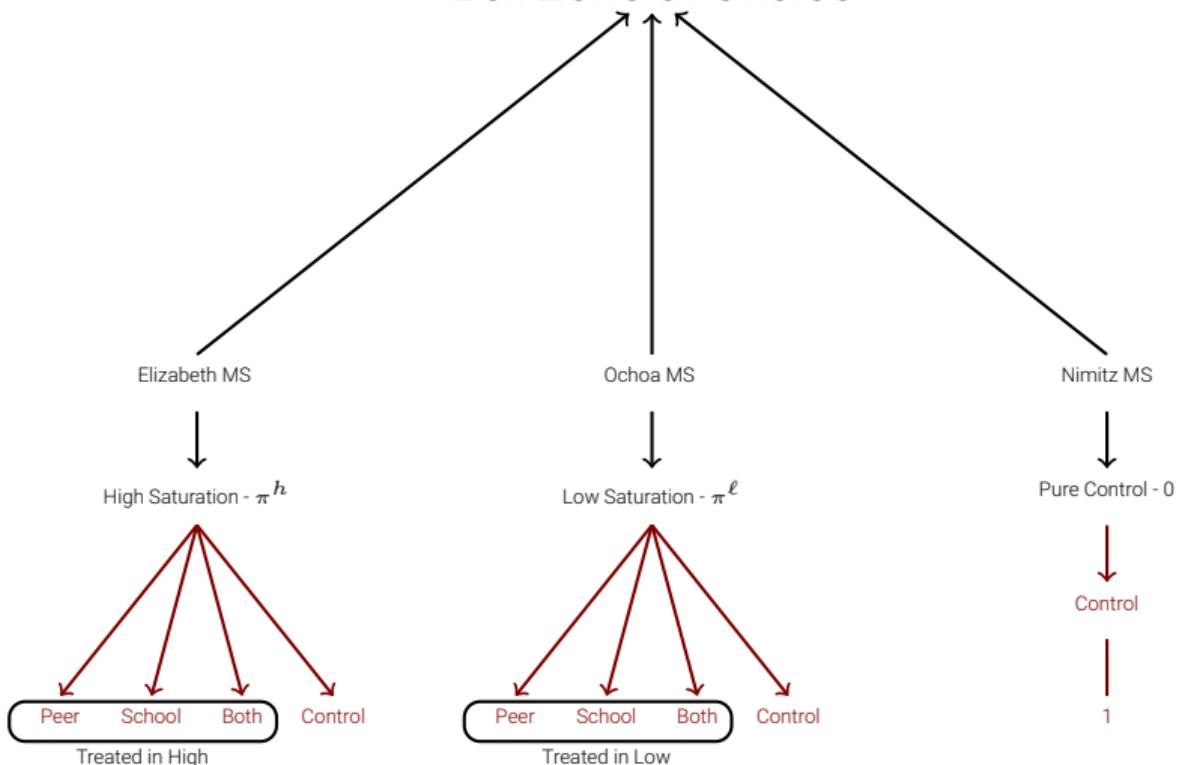
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Bell Zone of Choice



Motivation
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○●○○○Survey Evidence
○○○○Discrete Choice Results
○○○○○Impacts on Outcomes
○○○○Conclusion
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Difference-in-differences

$$Y_i = \alpha_{z(i)t(i)} + \alpha_{g(i)} + \sum_{k \neq -1} \left(\underbrace{\beta_{Lk} D_{L(i)} \times Post_{k(i)} + \beta_{Hk} D_{H(i)} \times Post_{k(i)}}_{\text{High and Low Treatment Groups}} \right. \\ \left. + \underbrace{\psi_{Lk} C_{L(i)} \times Post_{k(i)} + \psi_{Lk} C_{H(i)} \times Post_{k(i)}}_{\text{High and Low Spillover Groups}} \right) + u_i$$

- Y_i : parent i 's top-ranked school attributes (achievement growth and incoming achievement)
- $D_{L(i)}, D_{H(i)}$: treatment indicators for parents in low- and high-saturation schools
- $C_{L(i)}, C_{H(i)}$: spillover indicators for parents in low- and high-saturation schools
- $Post_{k(i)}$: indicator for treated cohorts
- $\beta_{Hk}, \beta_{Lk}, \psi_{Hk}$, and ψ_{Lk} are treatment-group-specific difference-in-difference estimates

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Experiment Design
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Reduced Form Results
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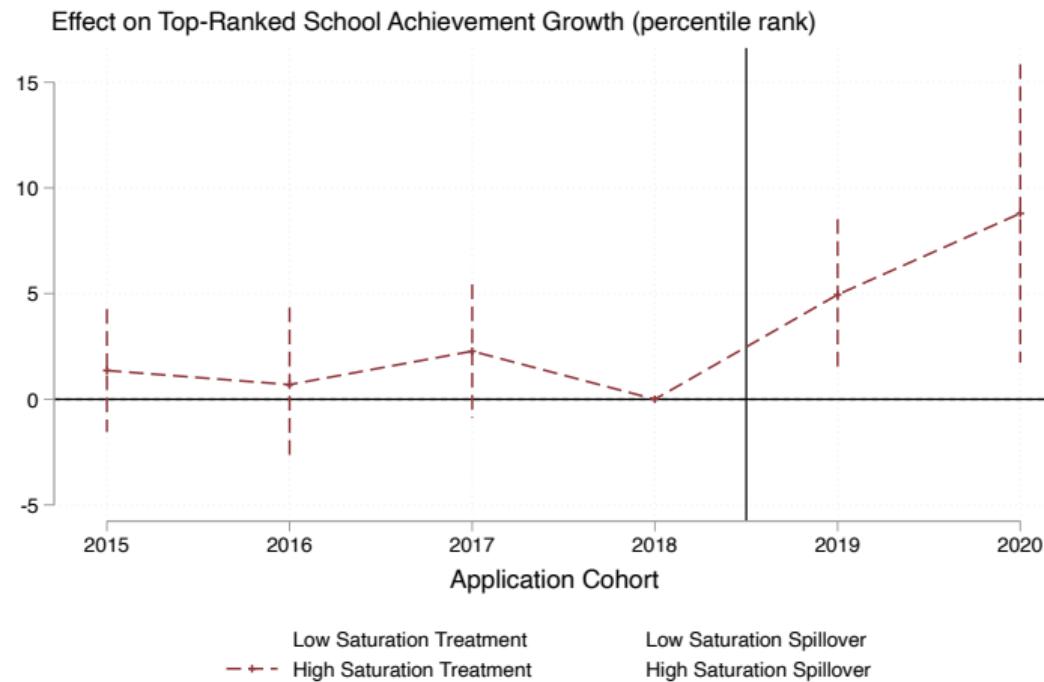
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Increased demand for AG among treated in high saturation schools



Pre-intervention mean: 64

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Experiment Design
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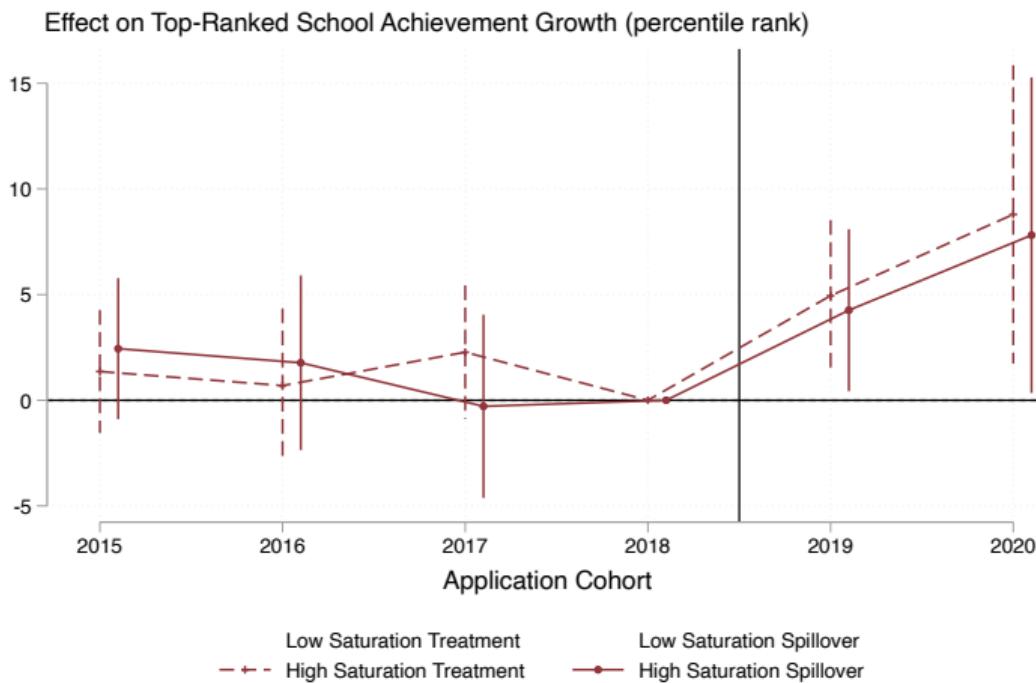
Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Similar effects among indirectly treated in high saturation schools



Pre-intervention mean: 64

Motivation
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Setting
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Experiment Design
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Reduced Form Results
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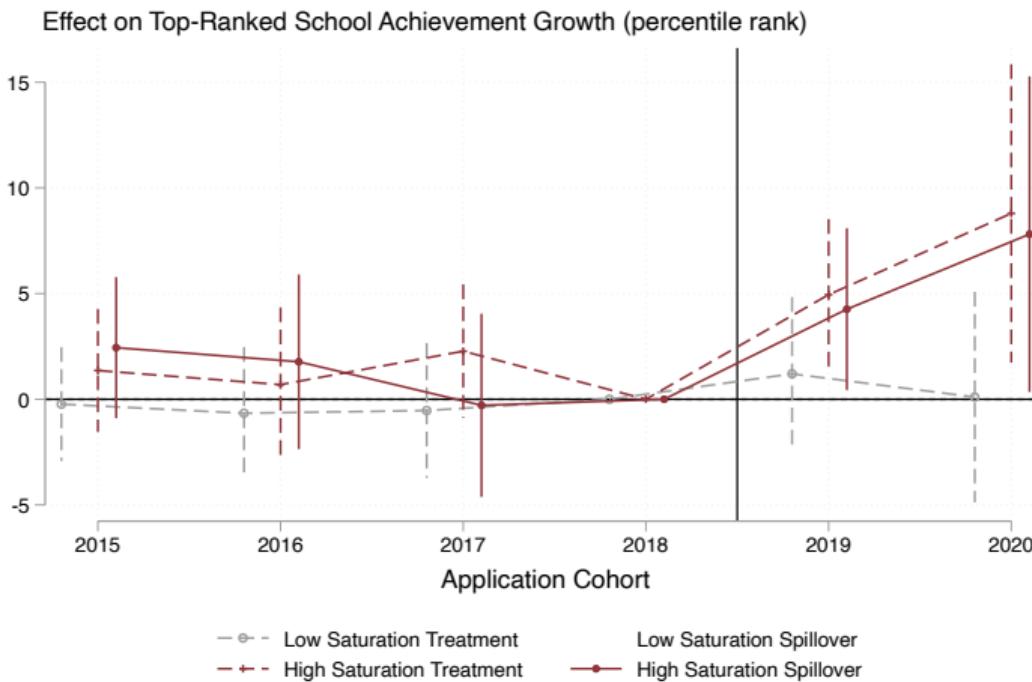
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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No effect on demand for AG among treated in low saturation schools



Pre-intervention mean: 64

Motivation
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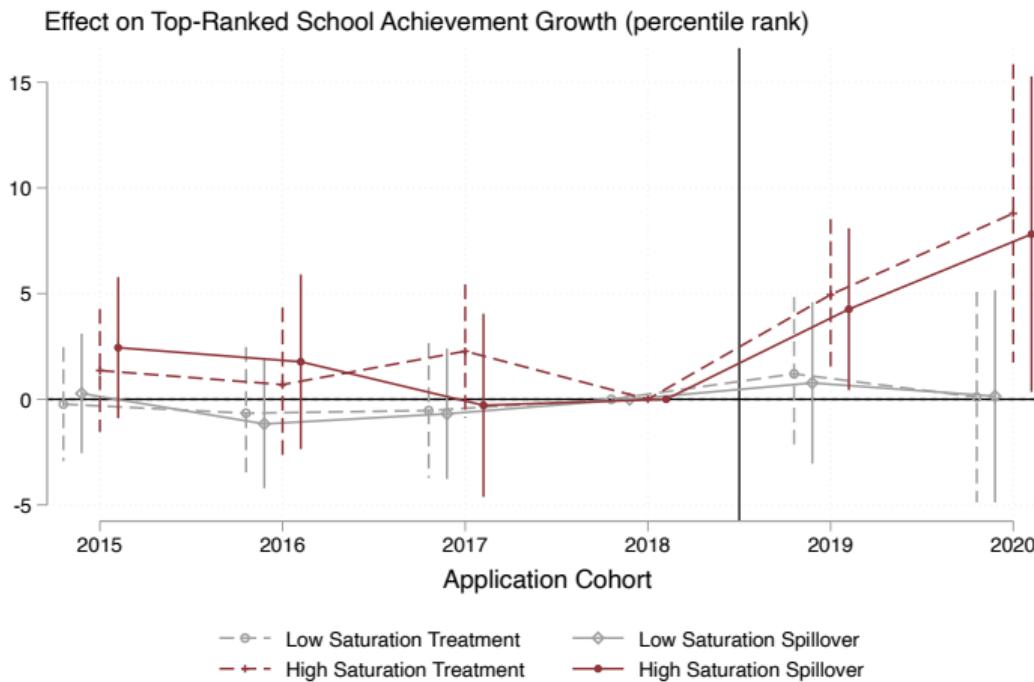
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Impacts on Outcomes
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Conclusion
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Similar effects among indirectly treated in low saturation schools



Pre-intervention mean: 64

Motivation
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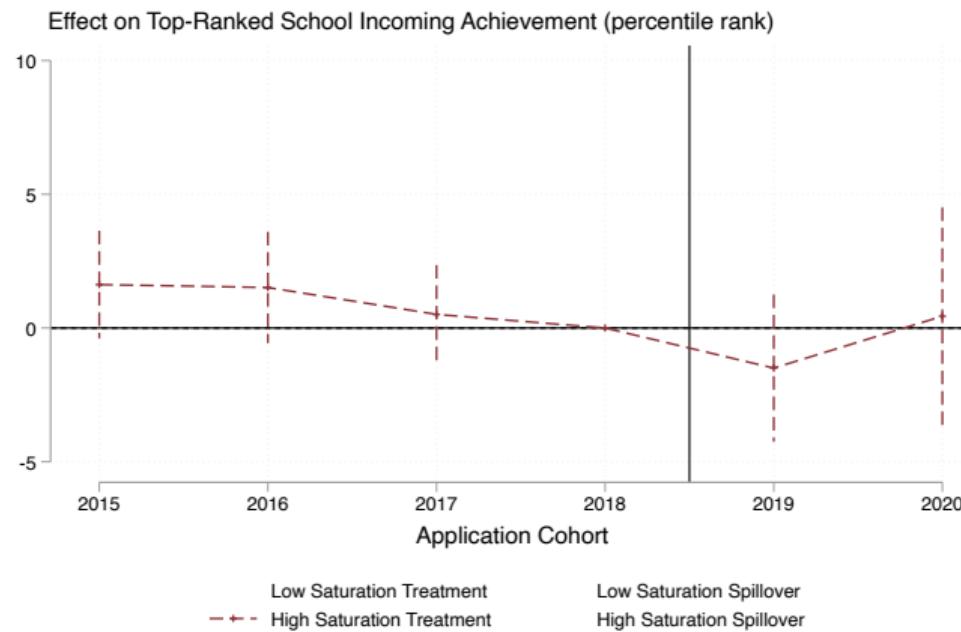
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Impacts on Outcomes
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Conclusion
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No detectable impacts on demand for IA for all treatment groups



Pre-intervention mean: 39

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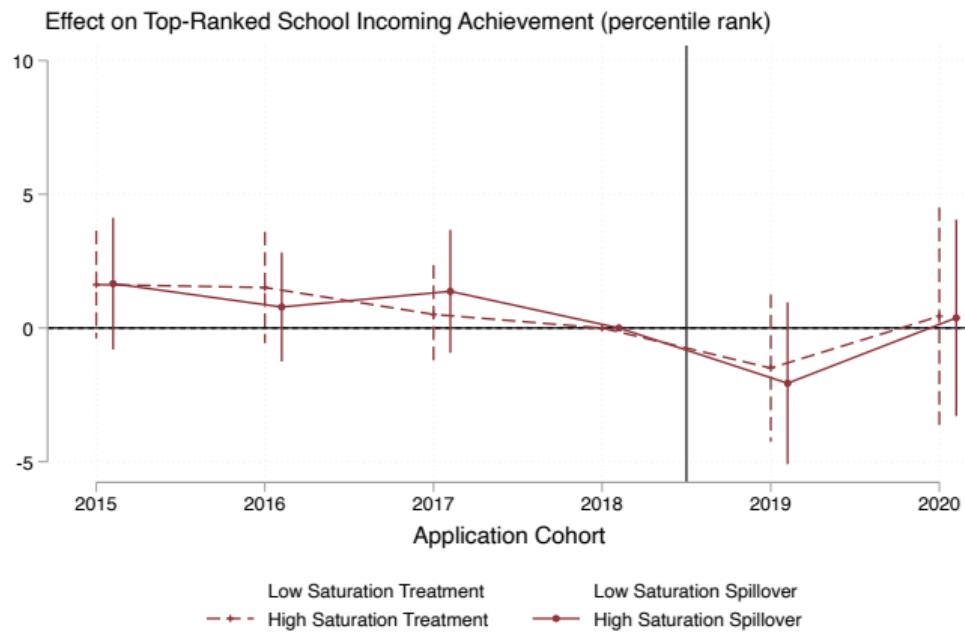
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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No detectable impacts on demand for IA across all treatment groups



Pre-intervention mean: 39

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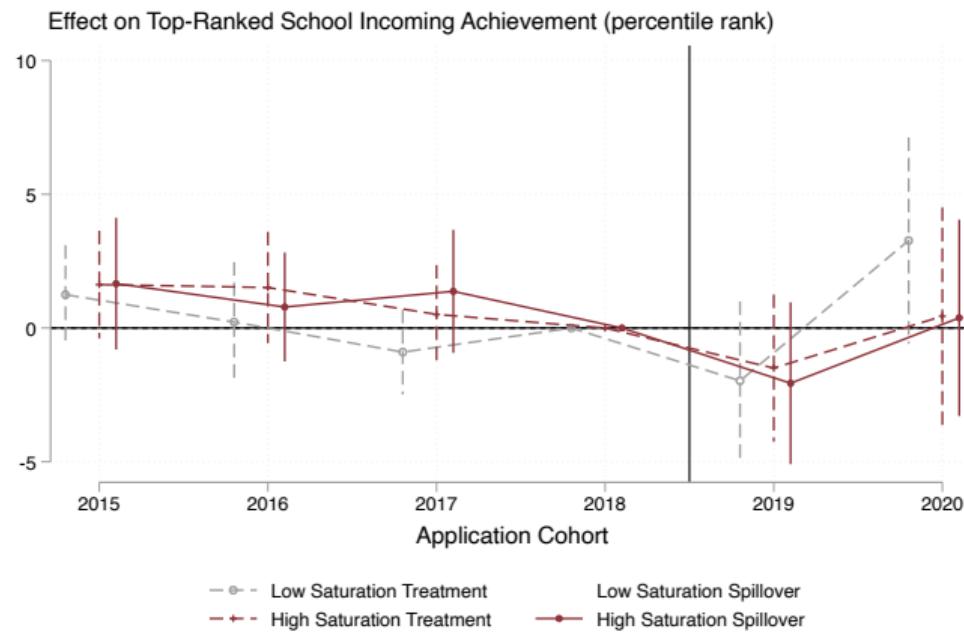
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Impacts on Outcomes
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Conclusion
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No detectable impacts on demand for IA across all treatment groups



Pre-intervention mean: 39

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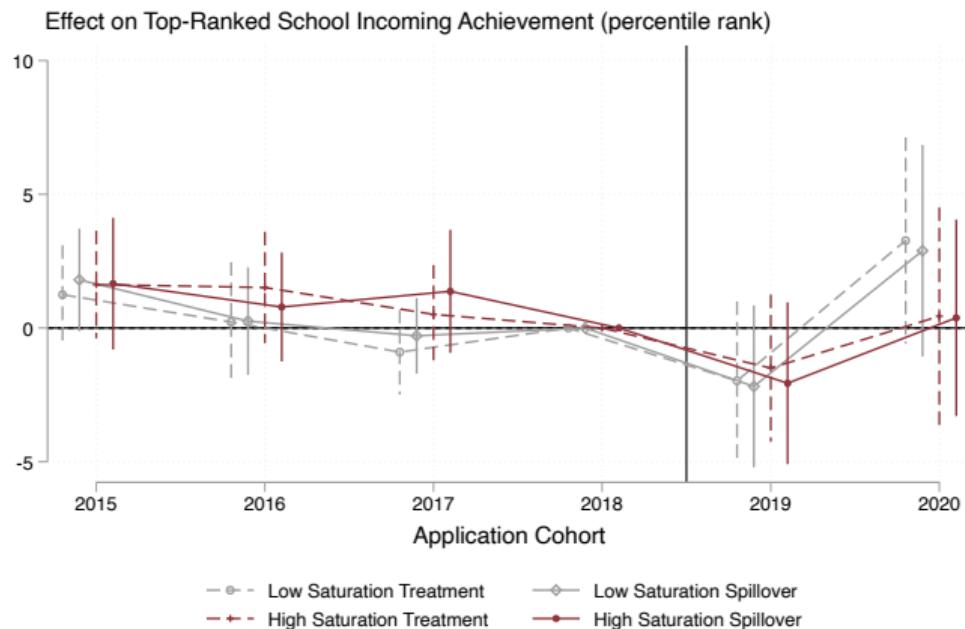
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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No detectable impacts on demand for IA across all treatment groups



Motivation
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○○○○Discrete Choice Results
○○○○○○Impacts on Outcomes
○○○○Conclusion
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Distributional Impacts

$$\mathbf{1}\{Y_i \leq a\} = \alpha_{z(i)t(i)} + \alpha_{g(i)} + \gamma' X_i + \beta_P D_{it(i)}^P + \beta_S D_{it(i)}^S + \beta_B D_{it(i)}^B + \beta_C C_{it(i)} + u_i,$$

- $\mathbf{1}\{Y_i \leq a\}$ as an outcome recovers effects on the CDF of Y at different points of support $a \in [\underline{a}, \bar{a}]$
- Report estimates from 100 separate regressions at different points of support

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
ooo●oSurvey Evidence
ooooDiscrete Choice Results
ooooooImpacts on Outcomes
ooooConclusion
o

Distributional Impacts

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- $\mathbf{1}\{Y_i \leq a\}$ as an outcome recovers effects on the CDF of Y at different points of support $a \in [\underline{a}, \bar{a}]$
- Report estimates from 100 separate regressions at different points of support
- $D_{it(i)}^X$: individual i treatment X indicator for cohort t
- $C_{it(i)}$: individual i spillover indicator for cohort t
- Consider treatment-specific effects, ignoring saturation groups: $\beta_P, \beta_S, \beta_B, \beta_{Spill}$

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
ooo●oSurvey Evidence
ooooDiscrete Choice Results
oooooImpacts on Outcomes
ooooConclusion
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Distributional Impacts

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- $D_{it(i)}^X$: individual i treatment X indicator for cohort t
- $C_{it(i)}$: individual i spillover indicator for cohort t
- Consider treatment-specific effects, ignoring saturation groups: $\beta_P, \beta_S, \beta_B, \beta_{Spill}$
- Distributional estimates demonstrate that demand moved uniformly across the distribution, regardless of individual treatment status

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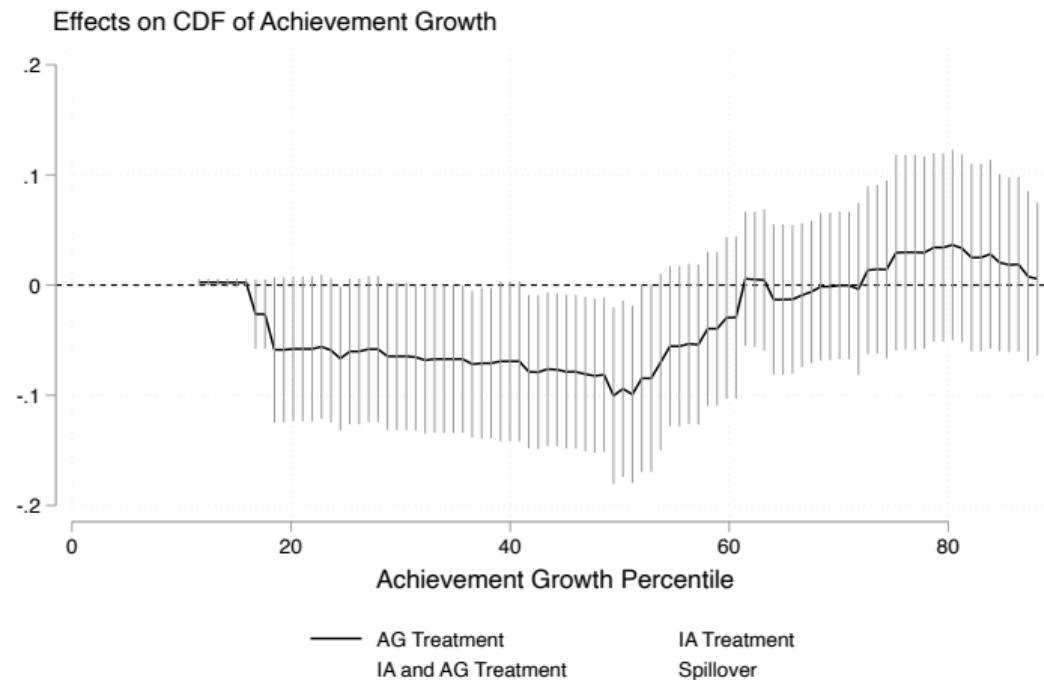
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Distributional effects show increased demand for higher AG schools



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Setting
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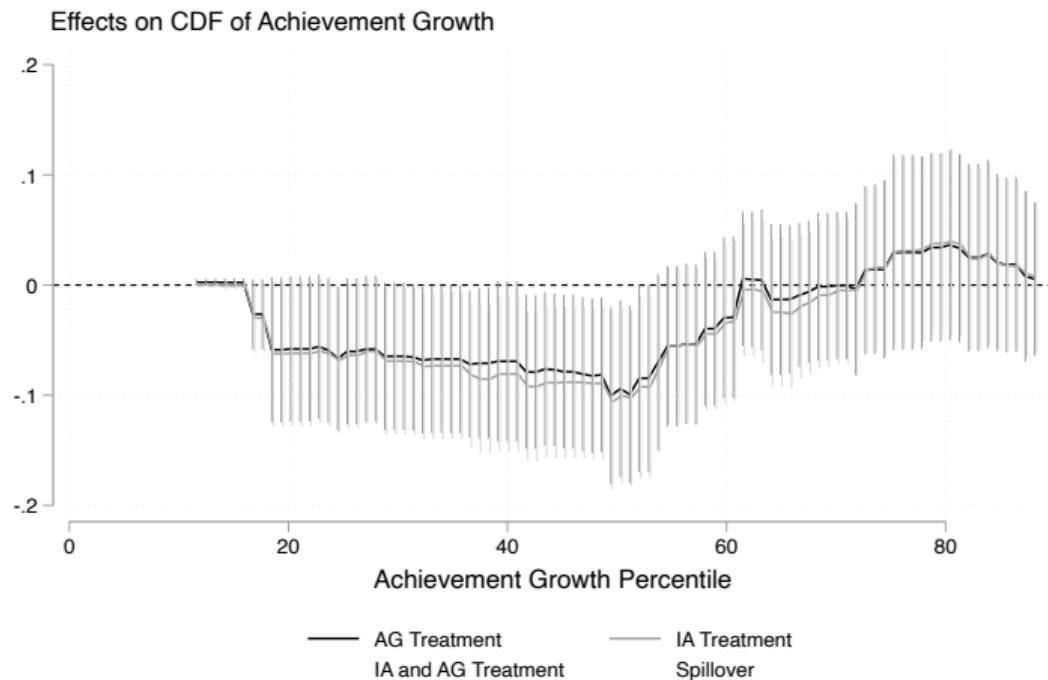
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Distributional effects show an increased demand for higher AG schools



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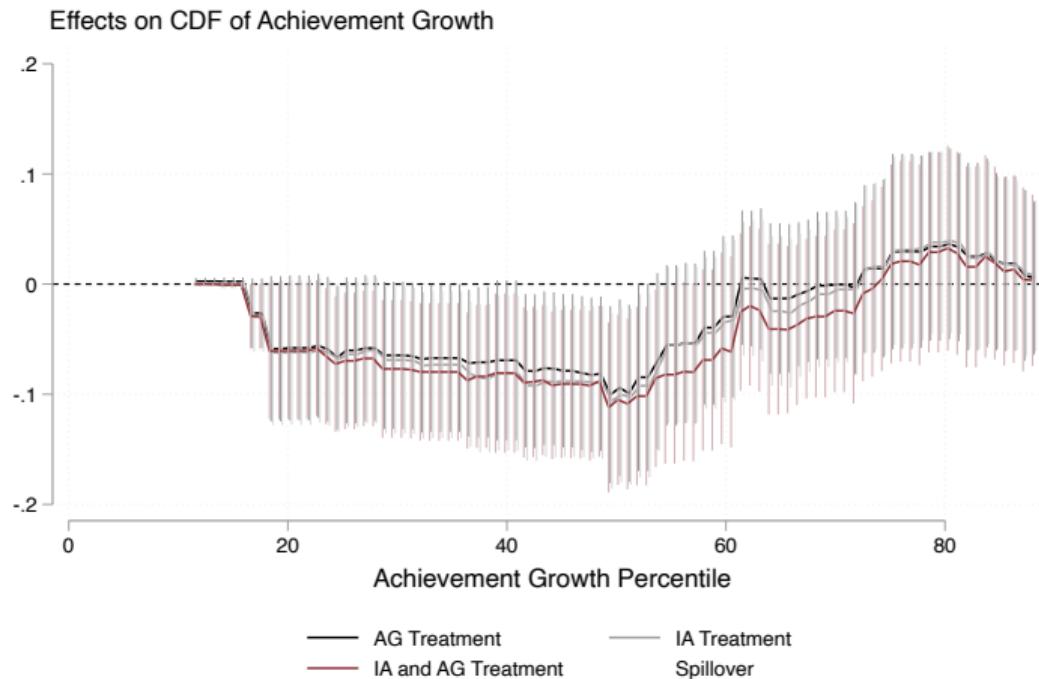
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Distributional Effects show an increased demand for higher AG schools



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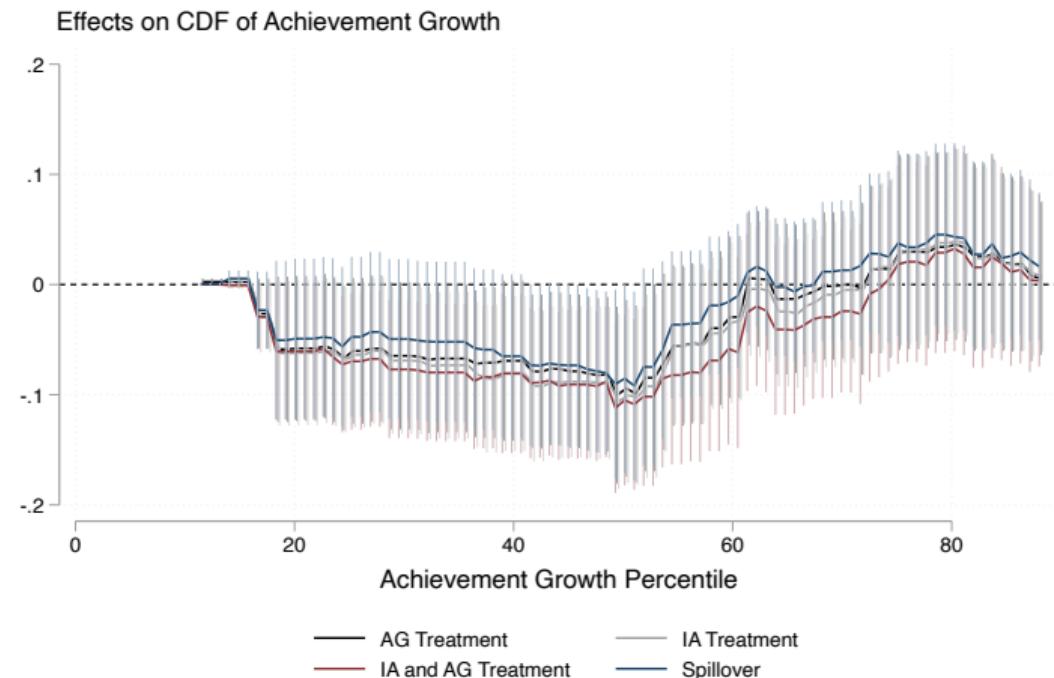
Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Spillover effects identical to treatment effects across the distribution



Motivation
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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Survey Evidence

Motivation
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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Survey Evidence

- Survey evidence for the 2021 cohort
- Response rate is roughly 50 percent

Today:

- Beliefs elicited in decile units
- Bias defined terms of pessimism (in decile units)
- Parent i 's bias for attribute x at school j is:

$$b_{ji}^x \equiv Q_j^x - \tilde{Q}_{ji}^x \quad x \in \{IA, AG\}$$

with Q_j^x referring to researcher-generated quality and \tilde{Q}_{ji}^x referring to beliefs

Motivation
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Setting
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Experiment Design
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Reduced Form Results
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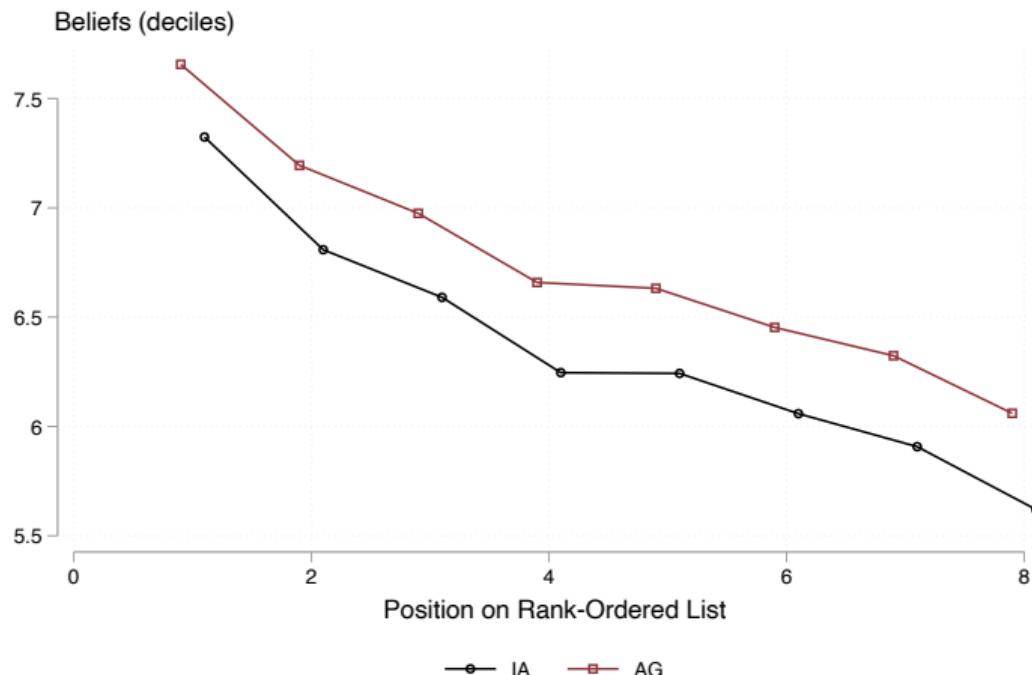
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Beliefs by Position of the Rank-Ordered List



- Parents tend to think their schools have higher AG rankings than IA rankings; this is true
- Parents tend to think schools in their choice set are above average in terms of IA and AG; this is not always true for IA
- A steep gradient in beliefs moving down the ROL is indicative of signal in beliefs

Motivation
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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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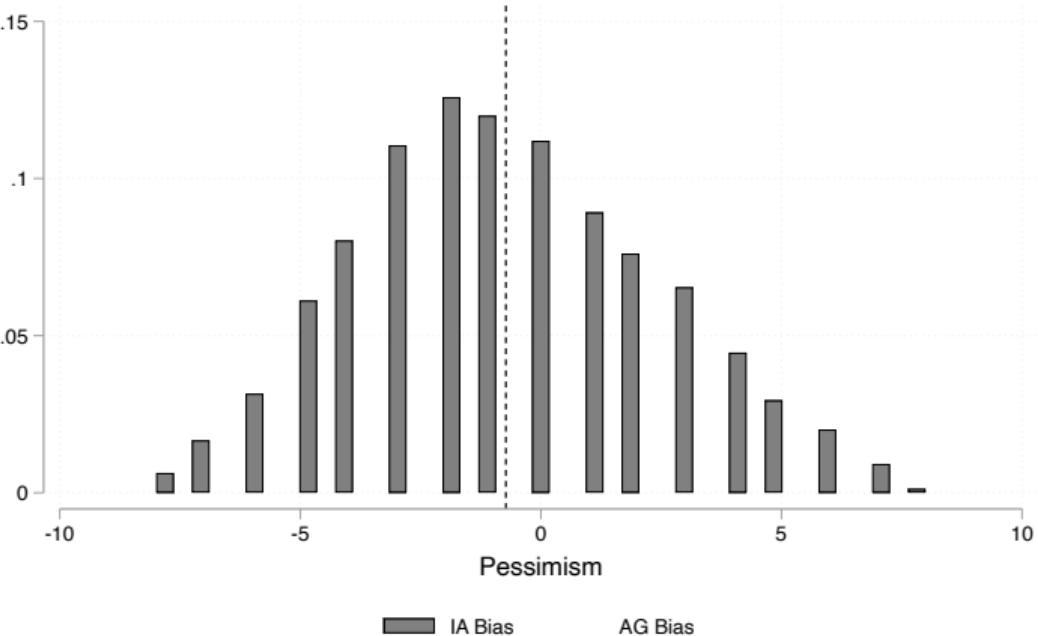
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Impacts on Outcomes
ooo

Conclusion
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IA and AG Bias Distribution

Fraction

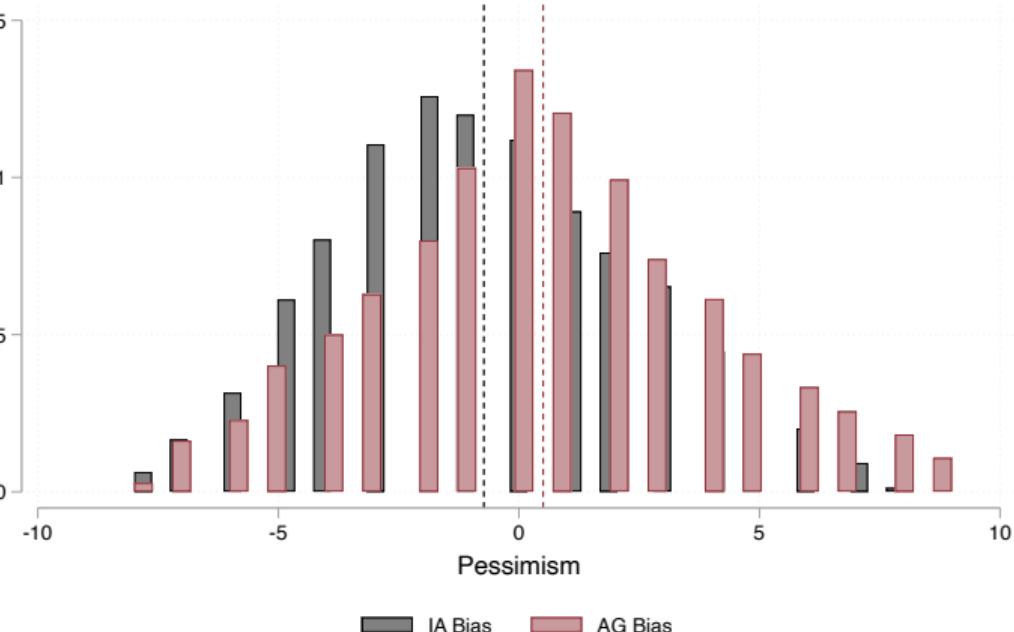


- Parents tend to overestimate IA by roughly 0.7 deciles
- IA overestimated by roughly 14 percent on average ($SD=0.46$)

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooo●Discrete Choice Results
oooooImpacts on Outcomes
ooooConclusion
○

IA and AG Bias Distribution

Fraction



- Parents tend to overestimate IA by roughly 0.7 deciles
- IA overestimated by roughly 14 percent on average ($SD=0.46$)
- Parents tend to underestimate AG by roughly 0.5 deciles
- AG underestimated by roughly 2 percent on average ($SD=0.34$)

Motivation
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Setting
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Experiment Design
oooooooo

Reduced Form Results
ooooo

Survey Evidence
oooo

Discrete Choice Results
●ooooo

Impacts on Outcomes
oooo

Conclusion
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Discrete Choice Results

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
ooooSurvey Evidence
ooooDiscrete Choice Results
○●ooooImpacts on Outcomes
ooooConclusion
○

The Information Campaign Viewed Through a Discrete Choice Lens

Student i 's indirect utility of being assigned school j is

$$U_{ij} = \gamma_P Q_j^P + \gamma_S Q_j^S - \lambda d_{ij} + \varepsilon_{ij}$$

- Q_j^P, Q_j^S : peer and school quality, respectively
- d_{ij} : distance to school j for parent i
- ε_{ij} : unobserved preference heterogeneity

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
ooooSurvey Evidence
oooDiscrete Choice Results
o●oooImpacts on Outcomes
oooConclusion
o

The Information Campaign Viewed Through a Discrete Choice Lens

The information campaign's effects are summarized by changes in utility weights

$$\begin{aligned} U_{ij} = & -\lambda d_{ij} + \underbrace{\gamma_P Q_j^P + \gamma_S Q_j^S}_{Control} \\ & + \sum_{t \in \{P, S, B, Sp\}} \beta_{Pt} Q_j^P \times \mathbf{1}\{i \in \mathcal{I}_t\} + \beta_{St} Q_j^S \times \mathbf{1}\{i \in \mathcal{I}_t\} + \varepsilon_{ij} \end{aligned}$$

- $\mathbf{1}\{i \in \mathcal{I}_t\}$ correspond to treatment $t \in \{Peer, School, Both, Spillover\}$ indicators

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
ooooSurvey Evidence
oooDiscrete Choice Results
o●oooImpacts on Outcomes
oooConclusion
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 \end{aligned}$$

- $\mathbf{1}\{i \in \mathcal{I}_t\}$ correspond to treatment $t \in \{Peer, School, Both, Spillover\}$ indicators
- $E[MWTT_{i0}^P] \equiv \frac{\gamma_P}{\lambda}$: marginal willingness to travel for peer quality among pure control group
- $E[\Delta MWTT_{iP}^P] \equiv E[MWTT_{iP}^P] - E[MWTT_{i0}^P] = \frac{\beta_{PP}}{\lambda}$: summarizes impact on MWTT for peer quality among those in treatment group P

The Information Campaign Viewed Through a Discrete Choice Lens

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 \end{aligned}$$

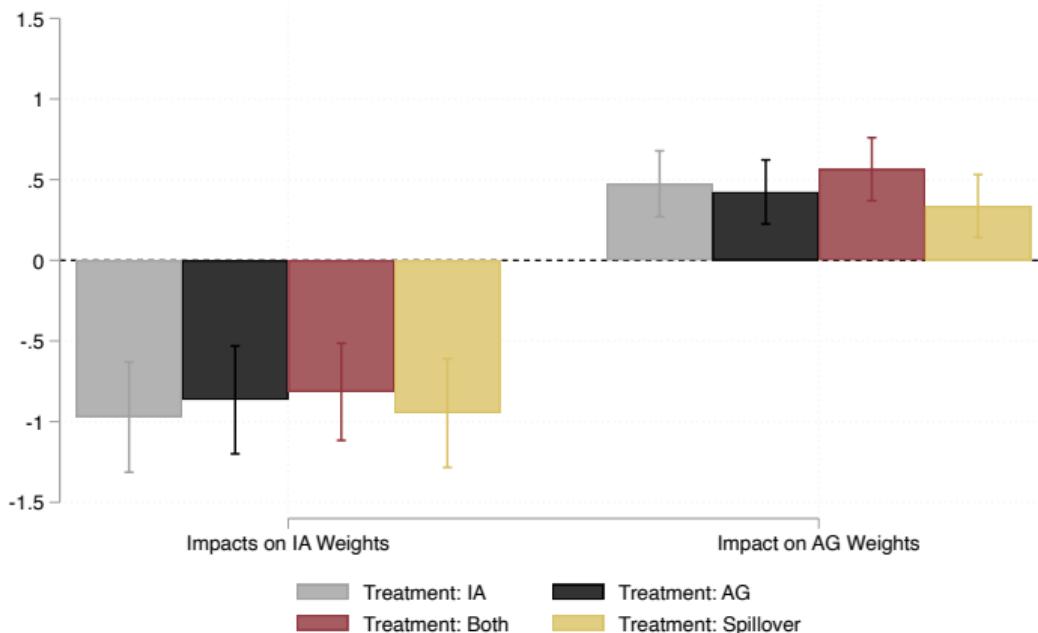
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- Assumptions for estimation: EVT1 errors and truthful reporting

▶ Evidence on truthful reporting

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooooDiscrete Choice Results
○○●○○○Impacts on Outcomes
ooooConclusion
○

Information Campaign Effects

Effects on Willingness to Travel (km)



- Decrease in MWTT for 10 rank increase in IA: $\sim -1\text{km}$
- Increase in MWTT for 10 rank increase in AG: $\sim 0.5\text{km}$
- Treatment effects similar regardless of individual treatment status; mirrors reduced form evidence
- Utility weight impacts are a summary measure, nesting both information and salience effects

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
ooooSurvey Evidence
ooooDiscrete Choice Results
ooo●ooImpacts on Outcomes
ooooConclusion
o

Introducing Imperfect Information

- Define beliefs about Q_j^P and Q_j^S as

$$\tilde{Q}_{ji}^P = (1 + b_{Pi})Q_j^P$$
$$\tilde{Q}_{ji}^S = (1 + b_{Si})Q_j^S$$

where biases (b_{Pi}, b_{Si}) are jointly normal

$$\begin{pmatrix} b_{Pi} \\ b_{Si} \end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix} \mu_P \\ \mu_S \end{pmatrix}, \begin{pmatrix} \sigma_{Pb}^2 & \rho_b \sigma_{Pb} \sigma_{Sb} \\ \rho_b \sigma_{Pb} \sigma_{Sb} & \sigma_{Sb}^2 \end{pmatrix}\right)$$

- The biases (b_{Pi}, b_{Si}) are proportional deviations away from the researcher-generated measures

Introducing Imperfect Information

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- The biases (b_{Pi}, b_{Si}) are proportional deviations away from the researcher-generated measures
- Key assumption:** In a model with imperfect information, assume treated parents choose schools with Q_j^P and/or Q_j^S and pure control parents choose with their beliefs

Decomposing treatment effects

- Observed average MWTT for Q_j^P among those in the pure control group:

$$E[MWTT_{i0}^P] = \frac{\gamma_P(1 + \mu_P)}{\lambda}$$

- Observed average MWTT among those receiving treatment P :

$$E[MWTT_{i1}^P] = \frac{\gamma_P + \beta_{PP}}{\lambda}$$

- The observed average change in MWTT is

$$E[\Delta MWTT_i^P] \equiv E[MWTT_{iP}] - E[MWTT_{i0}^P] = \frac{\beta_{PP} - \gamma_P \mu_P}{\lambda}$$

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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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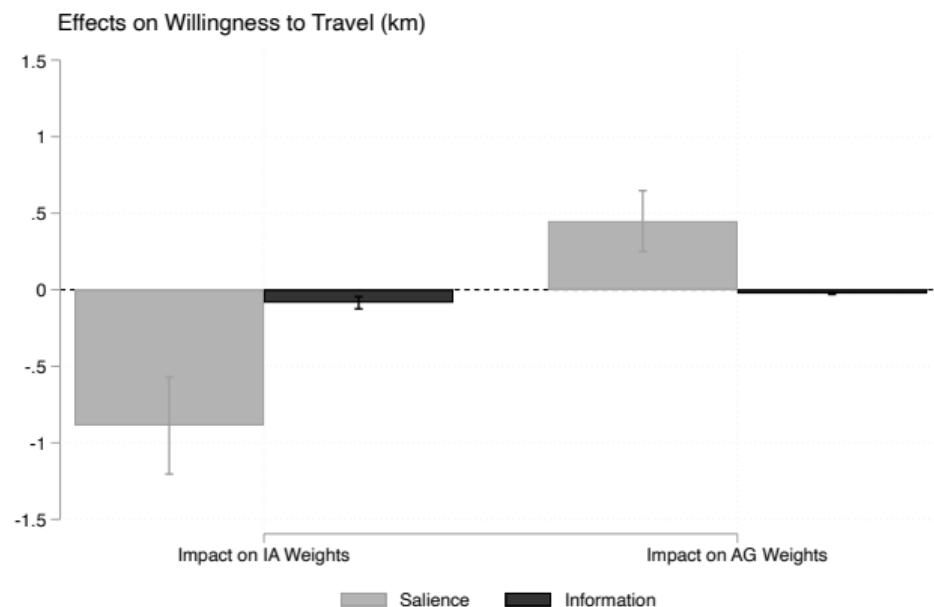
Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Decomposition Results

Salience accounts for most of the impacts for both IA and AG



Motivation
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Setting
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Experiment Design
oooooooo

Reduced Form Results
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Survey Evidence
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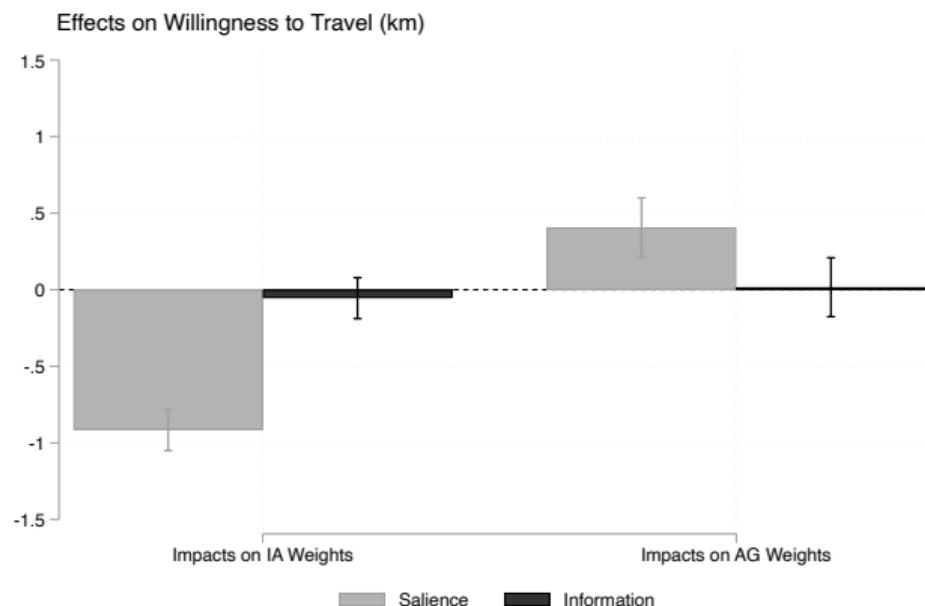
Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Decomposition Results

Range of estimates for $\hat{\mu}_P \in [\mu_P - \sigma_{Pb}, \mu_P + \sigma_{Pb}]$ and $\hat{\mu}_S \in [\mu_S - \sigma_{Sb}, \mu_S + \sigma_{Sb}]$



Motivation
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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
●ooo

Conclusion
○

Impacts on Outcomes

Motivation
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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
ooooo

Impacts on Outcomes
o●oo

Conclusion
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Outcomes of Interest

1. Enrollment

- Previous evidence relates to application behavior but congestion potentially attenuates enrollment impacts

2. Test Scores

- Observed in eleventh-grade
- Only available for 2019 cohort

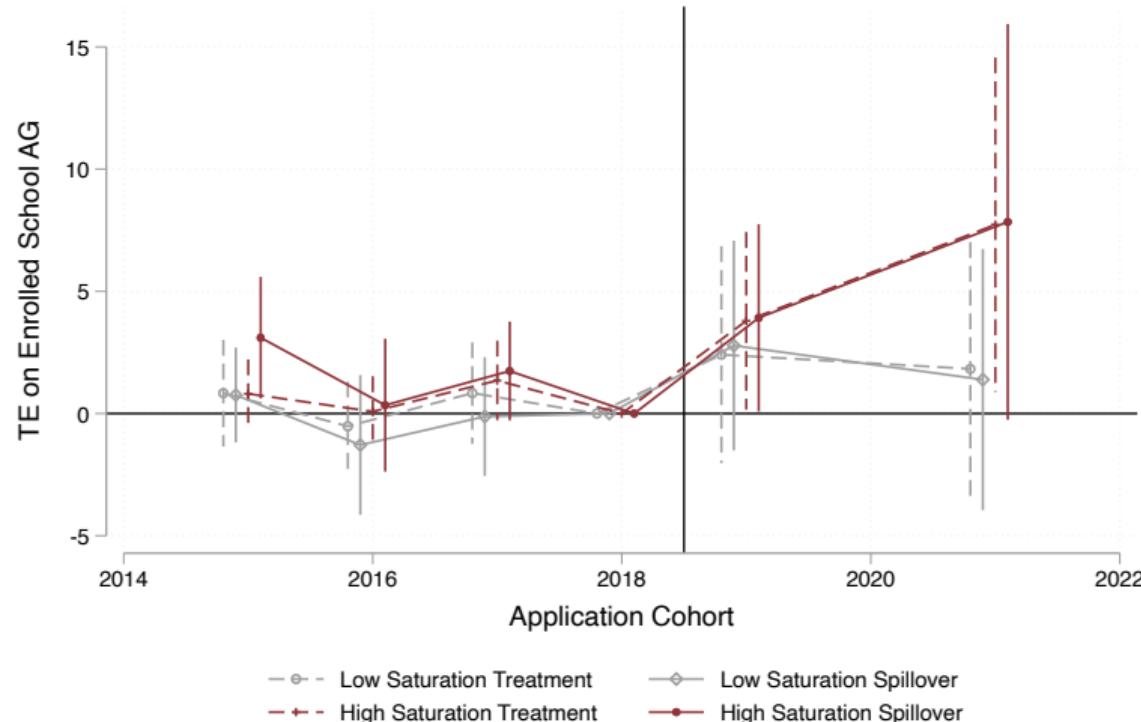
3. Non-cognitive outcomes collected in School Experience Survey

- Following Jackson et al. 2023, I organize non-cognitive outcome data into five standardized indices (Kling, Liebman, and Katz 2007):

- 3.1 Happiness
- 3.2 Interpersonal Skills
- 3.3 School Connectedness
- 3.4 Academic Effort
- 3.5 Bullying

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooooDiscrete Choice Results
oooooImpacts on Outcomes
oo•oConclusion
o

Students *enroll* in higher quality schools



Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooooDiscrete Choice Results
ooooooImpacts on Outcomes
ooo●Conclusion
○

Non-cognitive outcomes improve but not test scores

	(1)	(2)	(3)	(4)	(5)
	Control Mean	2019	2021	2019	2021
Panel A: School Experience Survey					
Happiness Index	0.048	-0.038 (0.027) [0.117]	-0.006 (0.030) [0.445]	0.028 (0.027) [0.223]	0.072** (0.028) [0.028]
Interpersonal Skills Index	0.030	-0.060** (0.024) [0.035]	-0.004 (0.021) [0.412]	-0.019 (0.026) [0.248]	0.056** (0.028) [0.055]
School Connectedness Index	0.514	-0.014 (0.015) [0.213]	0.000 (0.017) [0.477]	0.004 (0.015) [0.423]	0.039** (0.016) [0.025]
Academic Effort Index	0.053	-0.048 (0.031) [0.068]	-0.006 (0.029) [0.393]	-0.002 (0.022) [0.453]	0.046** (0.022) [0.085]
Bullying Index	0.175	0.048 (0.033) [0.148]	0.029 (0.026) [0.228]	0.099*** (0.036) [0.020]	0.094*** (0.028) [0.010]
Observations			23792		
Panel B: Eleventh Grade Test Scores					
Math Score	-0.020	-0.039 (0.037)	-	-0.031 (0.040)	-
ELA Score	0.069	-0.007 (0.036)	-	-0.001 (0.036)	-
Observations			16145		

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooooDiscrete Choice Results
ooooooImpacts on Outcomes
oooo●Conclusion
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Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooooDiscrete Choice Results
ooooooImpacts on Outcomes
ooo●Conclusion
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Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooooDiscrete Choice Results
ooooooImpacts on Outcomes
oooo●Conclusion
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Non-cognitive outcomes improve but not test scores

	(1)	(2)	(3)	(4)	(5)
	Control Mean	2019	2021	2019	2021
Panel A: School Experience Survey					
Happiness Index	0.048	-0.038 (0.027) [0.117]	-0.006 (0.030) [0.445]	0.028 (0.027) [0.223]	0.072** (0.028) [0.028]
Interpersonal Skills Index	0.030	-0.060** (0.024) [0.035]	-0.004 (0.021) [0.412]	-0.019 (0.026) [0.248]	0.056** (0.028) [0.055]
School Connectedness Index	0.514	-0.014 (0.015) [0.213]	0.000 (0.017) [0.477]	0.004 (0.015) [0.423]	0.039** (0.016) [0.025]
Academic Effort Index	0.053	-0.048 (0.031) [0.068]	-0.006 (0.029) [0.393]	-0.002 (0.022) [0.453]	0.046** (0.022) [0.085]
Bullying Index	0.175	0.048 (0.033) [0.148]	0.029 (0.026) [0.228]	0.099*** (0.036) [0.020]	0.094*** (0.028) [0.010]
Observations	23792				
Panel B: Eleventh Grade Test Scores					
Math Score	-0.020	-0.039 (0.037)	-	-0.031 (0.040)	-
ELA Score	0.069	-0.007 (0.036)	-	-0.001 (0.036)	-
Observations	16145				

Motivation
oooooSetting
ooooExperiment Design
ooooooooReduced Form Results
oooooSurvey Evidence
ooooDiscrete Choice Results
ooooooImpacts on Outcomes
oooo●Conclusion
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Motivation
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Setting
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Experiment Design
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Reduced Form Results
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Survey Evidence
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Discrete Choice Results
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Impacts on Outcomes
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Conclusion
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Concluding Thoughts

What Parents Know and Value

- What parents know: Parents' bias not large on average but there is substantial dispersion in beliefs
- What parents value: Parents respond more to variation and information about school than peer quality
- VA-oriented campaigns have the potential to affect demand for effective schools and school enrollment segregation

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Social interactions and their implications

- This paper documents evidence of an externality at the preference formation stage
- Information interventions that encourage social interactions (Banerjee et al. 2022) can potentially address network-based disparities in accessing effective schools

Concluding Thoughts

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Social interactions and their implications

- This paper documents evidence of an externality at the preference formation stage
- Information interventions that encourage social interactions (Banerjee et al. 2022) can potentially address network-based disparities in accessing effective schools

The role of salience

- Information campaigns potentially operate by addressing information disparities but also by re-orienting demand

Motivating Evidence
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Quality Definition and Validation
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Reduced Form Results
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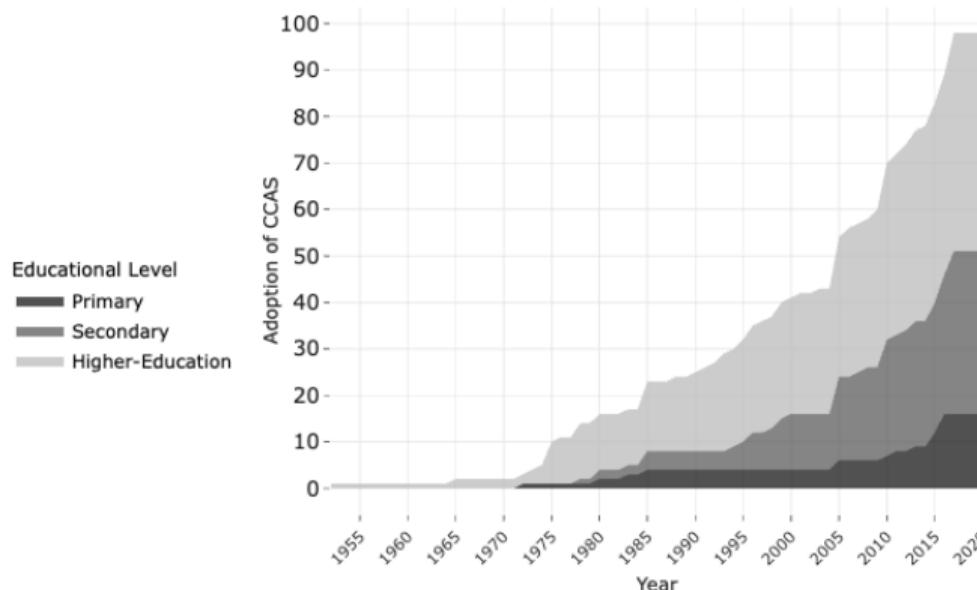
Evidence of Strategic Behavior
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Thank you!

Christopher.Campos@chicagobooth.edu

Motivation: Rise of Centralized Choice in Public Education Systems

Adoption of Centralized Choice and Assignment System



Motivating Evidence



Data



Design



Quality Definition and Validation



Reduced Form Results



Survey Evidence



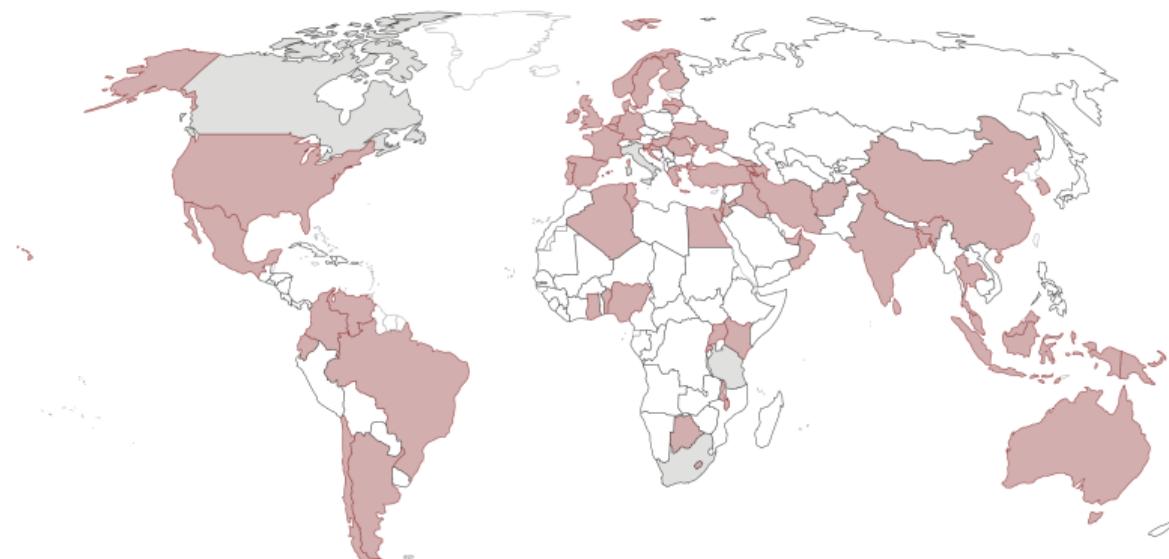
Discrete Choice



Evidence of Strategic Behavior



Motivation: Rise of Centralized Choice in Public Education Systems



Source: Neilson 2021

Motivating Evidence
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Quality Definition and Validation
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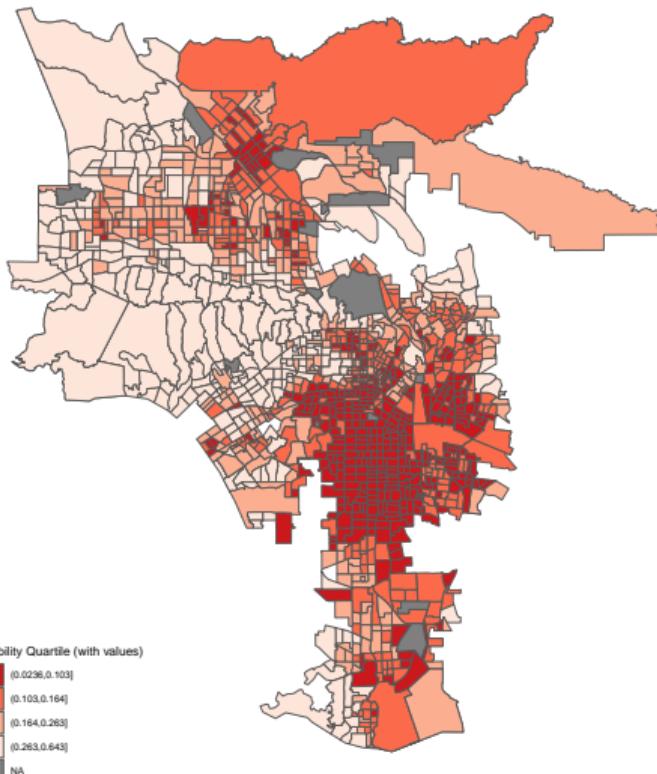
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Survey Evidence
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Evidence of Strategic Behavior
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Most ZOC neighborhoods classified as low mobility by Chetty et al. (2018)



Motivating Evidence
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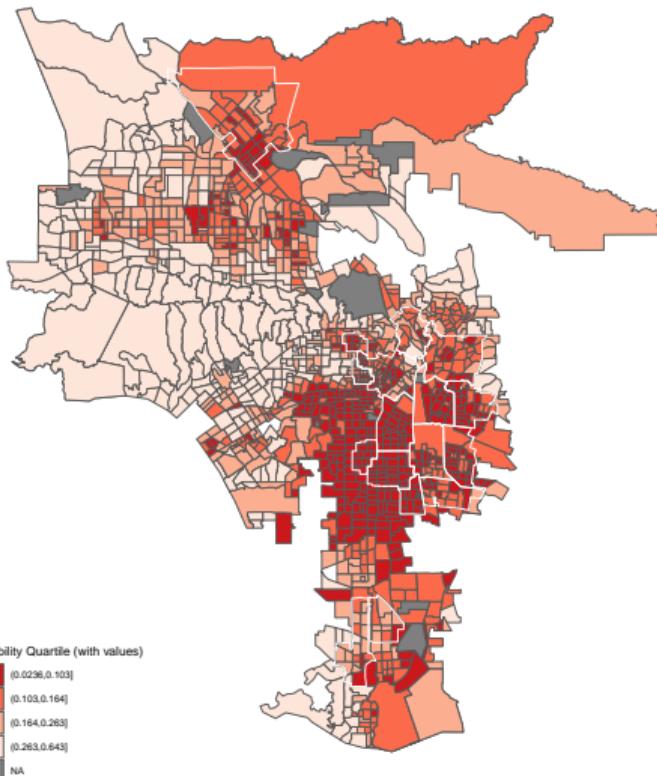
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Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Descriptive Statistics

	Non-ZOC (1)	ZOC (2)	Difference (3)
Reading Scores	0.135	-0.117	-0.252 (0.081)
Math Scores	0.099	-0.114	-0.213 (0.081)
College	0.1	0.065	-0.036 (0.017)
Migrant	0.036	0.054	0.018 (0.007)
Female	0.513	0.481	-0.032 (0.016)
Poverty	0.909	0.967	0.058 (0.024)
Special Education	0.148	0.141	-0.007 (0.022)
English Learners	0.076	0.134	0.058 (0.017)
Black	0.107	0.03	-0.077 (0.027)
Hispanic	0.683	0.862	0.179 (0.075)
White	0.038	0.015	-0.024 (0.009)
N	26,517	13,015	

Motivating Evidence
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Quality Definition and Validation
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Quality Definition and Validation
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Evidence of Strategic Behavior
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Evidence of Strategic Behavior
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Motivating Evidence
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Design
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Quality Definition and Validation
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Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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	(1)	(2)	(3)
	No Survey	Partial	Complete
Reading Z-Score	-0.199 (0.032)	0.011 (0.025)	0.151*** (0.025)
Math Z-Score	-0.187 (0.044)	0.010 (0.022)	0.162*** (0.022)
Female	0.495 (0.013)	-0.011 (0.009)	-0.018** (0.009)
Migrant	0.002 (0.002)	0.002 (0.001)	0.000 (0.001)
Poverty	0.901 (0.009)	0.004 (0.008)	-0.012 (0.008)
Special Education	0.144 (0.010)	0.012 (0.008)	-0.008 (0.008)
English Learner	0.179 (0.009)	0.009 (0.008)	-0.028*** (0.008)
College	0.081 (0.010)	-0.010 (0.010)	0.023** (0.010)
Black	0.032 (0.003)	-0.010*** (0.002)	0.000 (0.002)
Hispanic	0.911 (0.009)	-0.001 (0.010)	-0.017* (0.010)
White	0.016 (0.003)	0.001 (0.002)	0.001 (0.002)
N	5,154	1,355	4,132

▶ Go Back

Motivating Evidence
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Data
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Design
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Quality Definition and Validation
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Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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School-level Balance

	Control (1)	Low - Control (2)	High - Control (3)
ELA	-.116	.021 (.102)	.028 (.103)
Math	-.109	-.005 (.1)	.029 (.116)
College	.081	.006 (.022)	-.005 (.024)
Migrants	.063	-.009 (.008)	-.005 (.008)
Female	.486	0 (.014)	.015 (.01)
Poverty	.947	.011 (.026)	.005 (.027)
Special Education	.126	.016 (.011)	.008 (.009)
English Learner	.121	.005 (.015)	.022 (.02)
Black	.04	-.009 (.015)	-.011 (.014)
Hispanic	.846	.008 (.037)	-.014 (.024)
White	.017	0 (.007)	-.002 (.008)
Size of Cohort	239,639	16,212 (44,856)	18,399 (42,92)
Number of Schools	40	32	32

▶ Go Back

Student-level Balance (within treated schools)

	Pure Control (1)	Control (2)	Peer - Control (3)	School - Control (4)	Both - Control (5)	P-value (6)
ELA Scores	-.121	-.124	-.005 (.026)	-.027 (.02)	-.016 (.023)	.531
Math Scores	-.124	-.122	.004 (.023)	-.021 (.017)	-.016 (.019)	.475
Parents College	.08	.074	0 (.008)	0 (.005)	-.001 (.007)	.999
Migrant	.037	.032	.008 (.004)	-.001 (.004)	.01 (.007)	.172
Female	.485	.488	-.008 (.01)	-.002 (.013)	-.01 (.017)	.85
Poverty	.945	.933	.002 (.004)	.001 (.004)	-.003 (.004)	.476
Special Education		.14	-.001 (.008)	.009 (.008)	.006 (.008)	.531
English Learners	.153	.154	.001 (.006)	0 (.007)	.014 (.009)	.406
Black	.039	.027	.004 (.004)	-.002 (.004)	-.002 (.003)	.526
Hispanic	.902	.908	-.005 (.006)	.003 (.007)	-.001 (.006)	.744
White	.018	.015	-.002 (.003)	0 (.003)	-.002 (.003)	.81
Joint Test P-value				.883	.979	.987
Number of Students	8,610	5,344	3,329	3,351	2,534	

Student-level Balance (within treated schools)

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We are providing information about schools within your Zone of Choice to ensure you have the best information available prior to your upcoming decision.



Bell Zone of Choice

We determine the quality of a school based on students' average scores on state exams

This measure has two parts you should consider, one which measures the school's ability of attracting high scoring students, and the second is the school's impact on test score growth.

Therefore, a school's observed quality is a combination of both their students' incoming achievement and the achievement growth they obtain while at the school. Some parents may prefer schools with high incoming achievement, and others may prefer schools with high achievement growth. The table below provides each school's district-wide ranking.

We hope you use this information when choosing the right school for your student.

School	Incoming Achievement*	Achievement Growth*	Campus Location	Type of School
Science, Technology, Engineering, Arts & Math (STEAM) High School	76	94	Legacy HS	Small School
Visual & Performing Arts (VAPA) High School	74	67	Legacy HS	Small School
Health Academy	58	58	Elizabeth LC	Small Learning Community
Multilingual Teacher Academy	63	50	Bell HS	Linked Learning Academy
STEAM	47	82	Maywood Academy	Small Learning Community
Information Technology Academy	49	53	Elizabeth LC	Small Learning Community
Arts Language & Performance Humanities Academy	63	50	Bell HS	Linked Learning Academy
9th Grade Academy	47	82	Maywood Academy	Small Learning Community
Bell Global Studies	63	50	Bell HS	Small Learning Community

Incoming Achievement

Incoming achievement is the average test scores of school's incoming students at the time they enter school.



Achievement Growth

We measure a school's ability improve test scores by measuring the growth of their students' test scores between entry into the school and eleventh grade.



Estamos proporcionando información sobre las escuelas dentro de su Zona de Opción, para asegurarnos de que tenga la mejor información disponible antes de su próxima decisión.



Zona de Opción Bell

Determinaremos la calidad de una escuela en función de los puntajes promedio de los estudiantes en los exámenes estatales

Esta medida tiene dos partes que debe considerar, una que mide la capacidad de la escuela para atrar a estudiantes con altas calificaciones, y la segunda es el impacto de la escuela en el crecimiento de las calificaciones de las pruebas.

Por tanto, la calidad observada de una escuela es una combinación tanto del rendimiento entrante de sus estudiantes como del crecimiento de logros o crecimiento del rendimiento que obtienen mientras están en la escuela. Algunos padres pueden preferir escuelas con alto rendimiento entrante, y otros pueden preferir escuelas con alto crecimiento de logros. A continuación, proporcionamos la clasificación de cada escuela comparado a todas escuelas en el distrito.

Esperamos que utilice esta información al elegir la escuela adecuada para su estudiante.

Escuela	Rendimiento Entrante*	Crecimiento de logros*	Ubicación del campus	Tipo de escuela
Preparatoria de Ciencia, Tecnología, Ingeniería, Artes y Matemáticas (STEAM)	76	94	Legacy HS	Escuela Pequeña
Preparatoria de Artes Visuales y Técnicas (VAPA)	74	67	Legacy HS	Escuela Pequeña
Academia de Salud	58	58	Elizabeth LC	Comunidad Educativa Pequeña (SLC)
Academia de Aprendizaje Enlazado/ Carrera de Profesores Multilingües	63	50	Bell HS	Academia de Aprendizaje Enlazado
Academia de Ciencia, Tecnología, Ingeniería, Artes y Matemáticas (STEAM)	47	82	Maywood Academy	Comunidad Educativa Pequeña (SLC)
Academia de Información Tecnológica	49	53	Elizabeth LC	Comunidad Educativa Pequeña (SLC)
Academia de Artes, Idiomas, Artes Escénicas y Humanidades	63	50	Bell HS	Academia de Aprendizaje Enlazado
Academia del 9º Grado	47	82	Maywood Academy	Comunidad Educativa Pequeña (SLC)
Estudios Globales	63	50	Bell HS	Comunidad Educativa Pequeña (SLC)

Rendimiento Entrante

El rendimiento entrante de una escuela es el puntaje promedio de sus estudiantes cuando ingresan a la escuela.



Crecimiento de logros

Medimos la capacidad de una escuela para mejorar los puntajes de los exámenes midiendo el crecimiento de los puntajes de los exámenes de sus estudiantes entre el ingreso a la escuela y el onceavo grado.



School and Peer Quality Definition

$$Y_{ij} = \mu_j + a_i$$

- Y_{ij} is student i 's potential achievement at school j
- μ_j is school j mean potential outcome
- a_i is mean-zero student ability

School and Peer Quality Definition

$$Y_{ij} = \mu_j + a_i$$

- Y_{ij} is student i 's potential achievement at school j
- μ_j is school j mean potential outcome
- a_i is mean-zero student ability

Estimation and Validation:

$$Y_i = \mu_0 + \sum_j \beta_j D_{ij} + \gamma' X_i + u_i$$

- D_{ij} are school j enrollment indicators; $\beta_j = \mu_j - \mu_0$ is school j average treatment effect
- $a_i = \gamma' X_i + u_i$ with X_i containing baseline covariates and lagged test scores

Motivating Evidence
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Reduced Form Results
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Discrete Choice
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Evidence of Strategic Behavior
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School and Peer Quality Definition

$$E[Y_i | S_i = j] = \underbrace{\beta_j}_{School\ Quality\ Component} + \underbrace{\theta' \bar{X}_j}_{E[a_i | S_i=j]:\ Peer\ Quality\ Component}$$

School and Peer Quality Definition

$$E[Y_i|S_i = j] = \underbrace{\beta_j}_{School\ Quality\ Component} + \underbrace{\theta' \bar{X}_j}_{E[a_i|S_i=j]:\ Peer\ Quality\ Component}$$

- School Quality is referred to as **Achievement Growth** and is defined as

$$Q_j^S = \text{int}\left(\frac{\text{rank}(\hat{\beta}_j)}{J} \times 100\right)$$

- Peer Quality is referred to as **Incoming Achievement** and is defined as

$$Q_j^P = \text{int}\left(\frac{\text{rank}(\hat{\theta}' \bar{X}_j)}{J} \times 100\right)$$

- Peer and school quality are positively correlated



Peer Effects: Observables do not correlate with school quality

	(1) α_j	(2) α_j	(3) α_j	(4) α_j
Poverty Share		0.457 (0.326)	0.534 (0.355)	
Black Share		-0.625* (0.365)	-0.617 (0.385)	
White Share		-0.511 (0.516)	-0.425 (0.563)	
College Share		0.464 (0.918)	0.307 (0.940)	
English Learner Share		-0.408 (0.365)	-0.349 (0.403)	
English at Home Share		0.155 (0.337)	-0.0106 (0.377)	
Spanish at Home Share		0.242 (0.249)	0.0917 (0.291)	
Special Education Share		0.244 (0.412)	0.309 (0.399)	
Female Share		0.0375 (0.139)	0.0584 (0.137)	
Migrant Share		0.289 (0.336)	0.212 (0.362)	
Lagged ELA Achievement	0.0531 (0.0472)		0.0231 (0.0841)	
School Enrollment		0.000289 (0.000414)	0.000441 (0.000338)	
R-squared	0.011	0.010	0.156	0.176

Motivating Evidence
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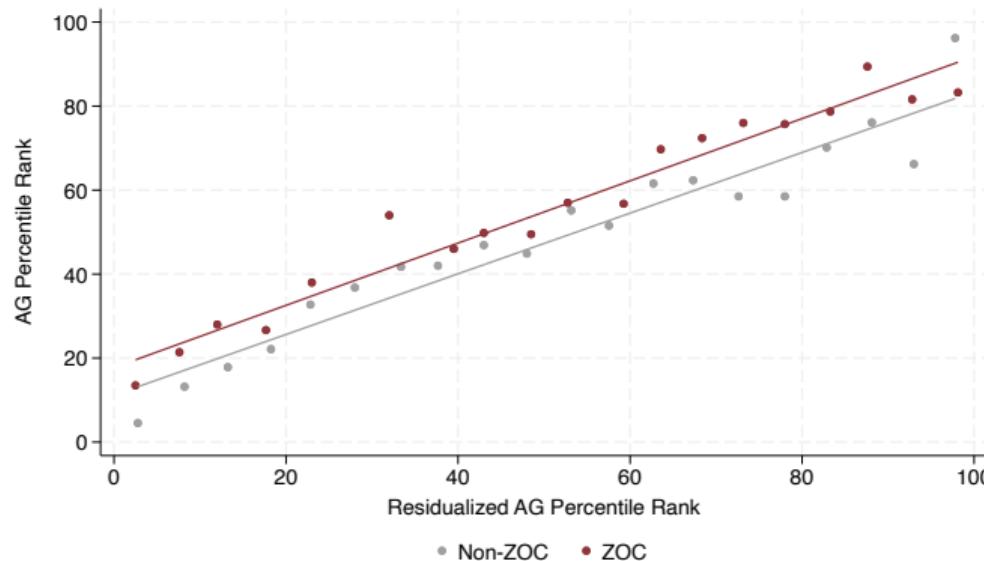
Reduced Form Results
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Discrete Choice
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Evidence of Strategic Behavior
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Peer Effects: Regression-adjusted rankings preserve ordinal rankings



VAM Validation

	(1) Uncontrolled	(2) Constant Effect
Forecast Coefficient	.63 (.105) [0]	1.111 (.134) [.41]
First-Stage F	277.507	37.016
Bias Tests:		
Forecast Bias (1 d.f.)	12.528 [0]	.683 [.409]
Overidentification (180 d.f.)	172.281 [.647]	187.744 [.331]

[▶ Go back](#)[▶ Go back to main](#)

Motivating Evidence
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Data
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Design
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Quality Definition and Validation
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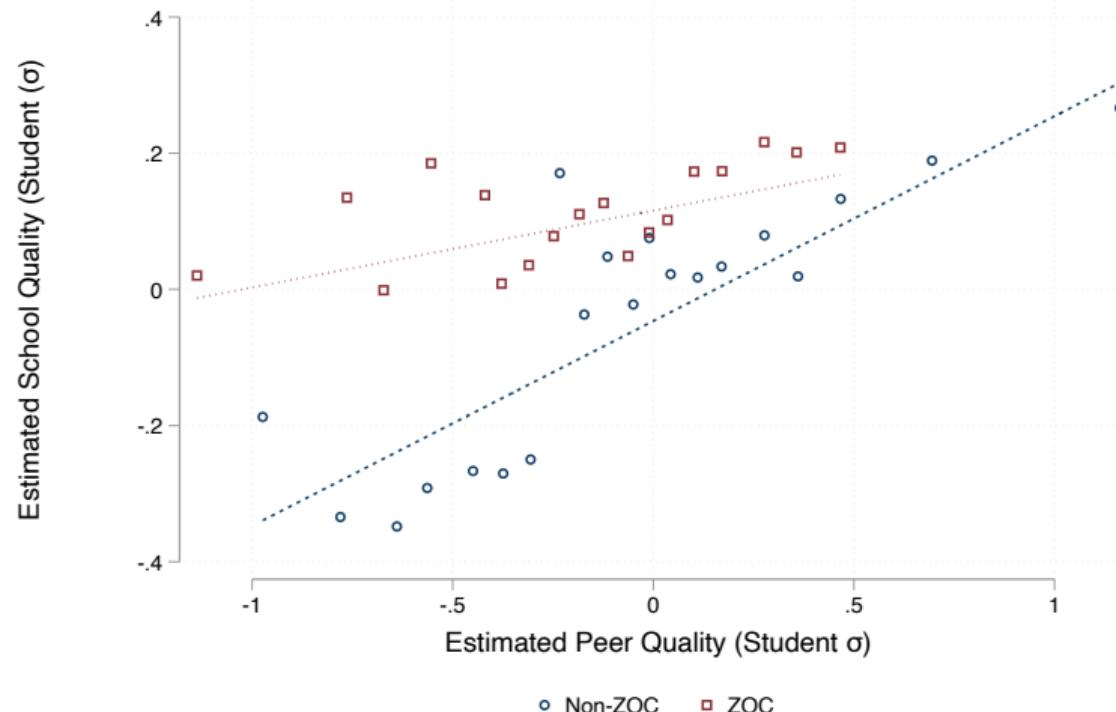
Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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IA-AG Correlation



Motivating Evidence
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Quality Definition and Validation
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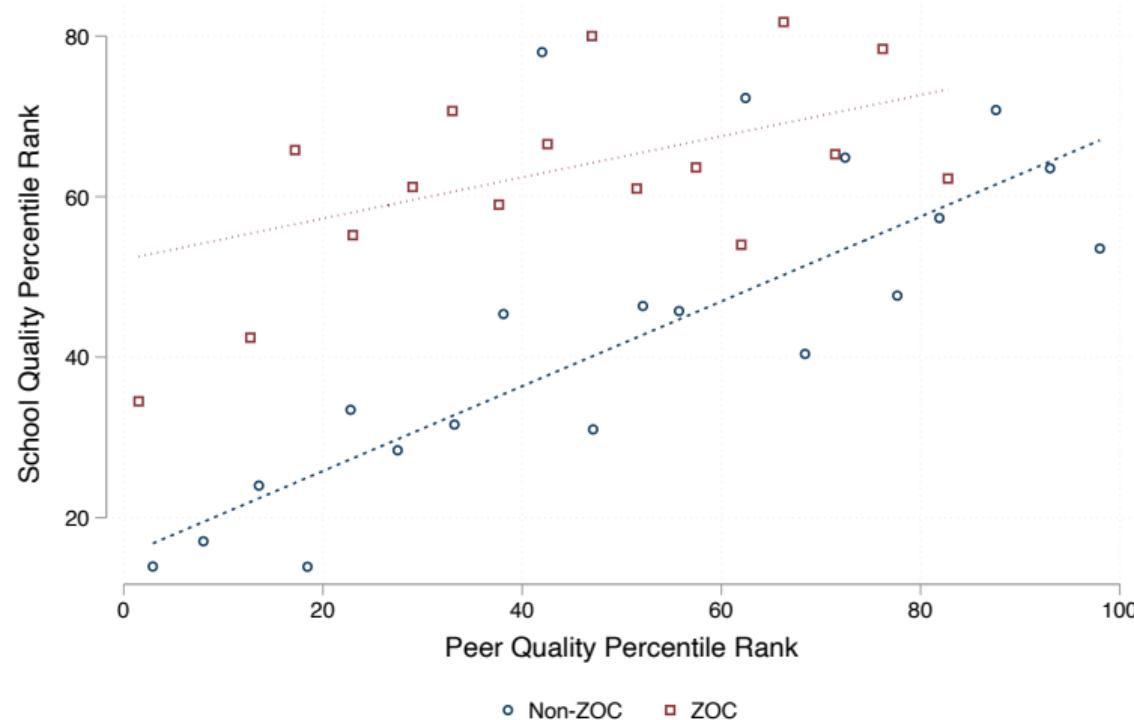
Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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IA-AG Correlation



○ Non-ZOC □ ZOC

We are providing information about schools within your Zone of Choice to ensure you have the best information available prior to your upcoming decision.



Bell Zone of Choice

We determine the quality of a school based on students' average scores on state exams

This measure has two parts you should consider, one which measures the school's ability of attracting high scoring students, and the second is the school's impact on test score growth.

Therefore, a school's observed quality is a combination of both their students' incoming achievement and the achievement growth they obtain while at the school. Some parents may prefer schools with high incoming achievement, and others may prefer schools with high achievement growth. The table below provides each school's district-wide ranking.

We hope you use this information when choosing the right school for your student.

School	Incoming Achievement*	Achievement Growth*	Campus Location	Type of School
Science, Technology, Engineering, Arts & Math (STEAM) High School	76	94	Legacy HS	Small School
Visual & Performing Arts (VAPA) High School	74	67	Legacy HS	Small School
Health Academy	58	58	Elizabeth LC	Small Learning Community
Multilingual Teacher Academy	63	50	Bell HS	Linked Learning Academy
STEAM	47	82	Maywood Academy	Small Learning Community
Information Technology Academy	49	53	Elizabeth LC	Small Learning Community
Arts Language & Performance Humanities Academy	63	50	Bell HS	Linked Learning Academy
9th Grade Academy	47	82	Maywood Academy	Small Learning Community
Bell Global Studies	63	50	Bell HS	Small Learning Community

Incoming Achievement

Incoming achievement is the average test scores of school's incoming students at the time they enter school.



Achievement Growth

We measure a school's ability to improve test scores by measuring the growth of their students' test scores between entry into the school and eleventh grade.

Estamos proporcionando información sobre las escuelas dentro de su Zona de Opción, para asegurarnos de que tenga la mejor información disponible antes de su próxima decisión.



Zona de Opción Bell

Determinamos la calidad de una escuela en función de los puntajes promedio de los estudiantes en los exámenes estatales

Esta medida tiene dos partes que debe considerar, una que mide la capacidad de la escuela para atraer a estudiantes con altas calificaciones, y la segunda es el impacto de la escuela en el crecimiento de las calificaciones de las pruebas.

Por lo tanto, la calidad observada de una escuela es una combinación tanto del rendimiento entrante de sus estudiantes como del **crecimiento de logros** o **crecimiento del rendimiento** que obtienen mientras están en la escuela. Algunos padres pueden preferir escuelas con alto rendimiento entrante, y otros pueden preferir escuelas con alto crecimiento de logros. A continuación, proporcionamos la clasificación de cada escuela comparado a todas escuelas en el distrito.



Esperamos que utilice esta información al elegir la escuela adecuada para su estudiante.

Escuela	Rendimiento Entrante*	Crecimiento de logros*	Ubicación del campus	Tipo de escuela
Preparatoria de Ciencia, Tecnología, Ingeniería, Artes y Matemáticas (STEAM)	76	94	Legacy HS	Escuela Pequeña
Preparatoria de Artes Visuales y Técnicas (VAPA)	74	67	Legacy HS	Escuela Pequeña
Academia de Salud	58	58	Elizabeth LC	Comunidad Educativa Pequeña (SLC)
Academia de Aprendizaje Enlazado/ Carrera de Profesores Multilingües	63	50	Bell HS	Academia de Aprendizaje Enlazado
Academia de Ciencia, Tecnología, Ingeniería, Artes y Matemáticas (STEAM)	47	82	Maywood Academy	Comunidad Educativa Pequeña (SLC)
Academia de Información Tecnológica	49	53	Elizabeth LC	Comunidad Educativa Pequeña (SLC)
Academia de Artes, Idiomas, Artes Escénicas y Humanidades	63	50	Bell HS	Academia de Aprendizaje Enlazado
Academia del 9º Grado	47	82	Maywood Academy	Comunidad Educativa Pequeña (SLC)
Estudios Globales	63	50	Bell HS	Comunidad Educativa Pequeña (SLC)

Treatment effects on other school attributes

	(1) Pure Control Mean	(2) High Saturation 2019	(3) Low Saturation 2019	(4) High Saturation 2021	(5) Low Saturation 2021
Achievement Growth	65.587 (.2120) [.053]	4.896** (-.1540) (.1646) [.275]	1.033 (-.2061) (.1774) [.282]	8.775** (.482) (.2397) [.395]	0.097 (-.001) (.2962) [.373]
Incoming Achievement	34.517 (.082)	-1.540 (-.000) (.001) [.393]	-2.061 (-.002*) (.001) [.085]	0.482 (-.001) (.003) [.188]	3.122 (-.001) (.001) [.263]
Female	0.487 (.001) [.205]	0.002 (-.002*) (.001) [.188]	-0.002* (-.001) (.004)	0.005 (-.001) (.004)	-0.001 (-.002)
Migrant	0.082 (.001) [.393]	0.000 (-.001) (.001)	0.002** (-.001) (.003)	-0.001 (-.001) (.003)	0.000 (-.001)
Poverty	0.979 (.002) [.36]	0.001 (-.003) (.003)	0.006** (-.001) (.01)	0.005 (-.001) (.005)	0.002 (-.003)
Special Education	0.119 (.001) [.013]	0.003*** (-.001) (.001)	0.001 (-.001)	0.003 (-.001) (.003)	-0.001 (-.002)
English Learner	0.146 (.003) [.318]	0.001 (-.001)	0.002 (-.001)	-0.009 (-.007)	-0.001 (-.003)
College	0.054 (.001) [.477]	0.000 (-.002)	-0.003** (-.002)	0.001 (-.004)	-0.001 (-.002)
Black	0.044 (.002) [.395]	0.000 (-.001)	-0.001 (-.001)	-0.011 (-.011)	-0.002 (-.003)
Hispanic	0.908 (.002) [.195]	-0.002 (-.003)	0.004 (-.003)	0.006 (-.011)	0.001 (-.005)
White	0.019 (.001)	0.001 (-.001)	-0.002* (-.001)	0.004 (-.003)	0.000 (-.002)

Motivating Evidence
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Quality Definition and Validation
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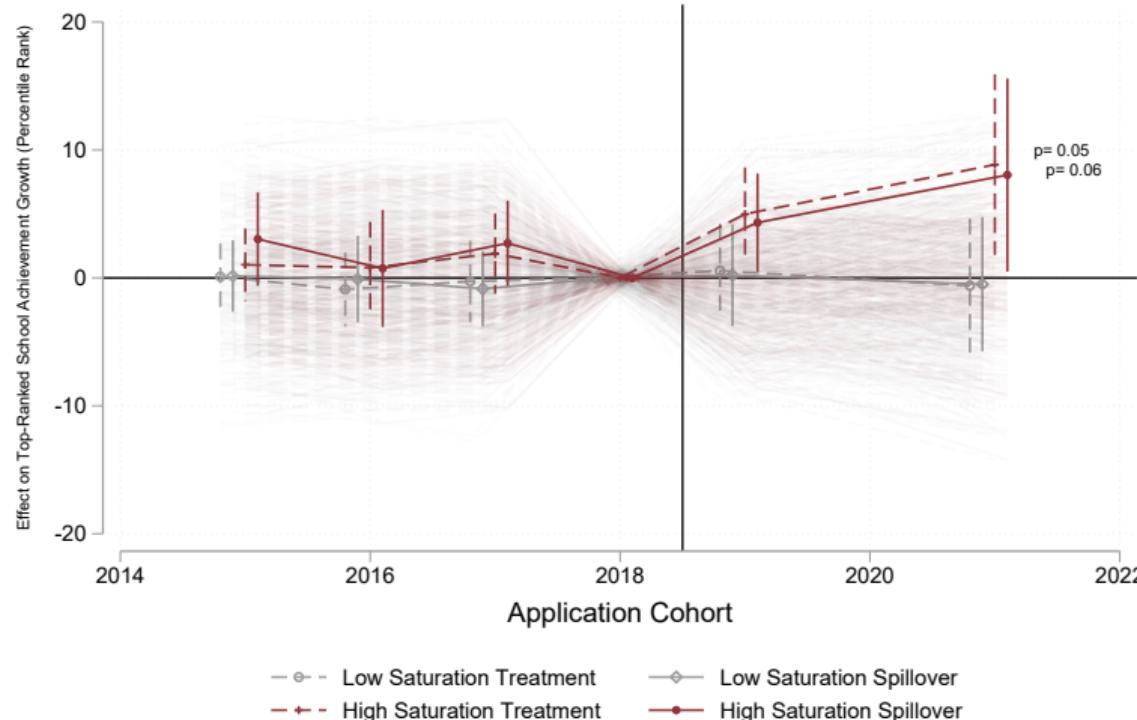
Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Impacts on AG (with Randomization Inference)



Motivating Evidence
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Quality Definition and Validation
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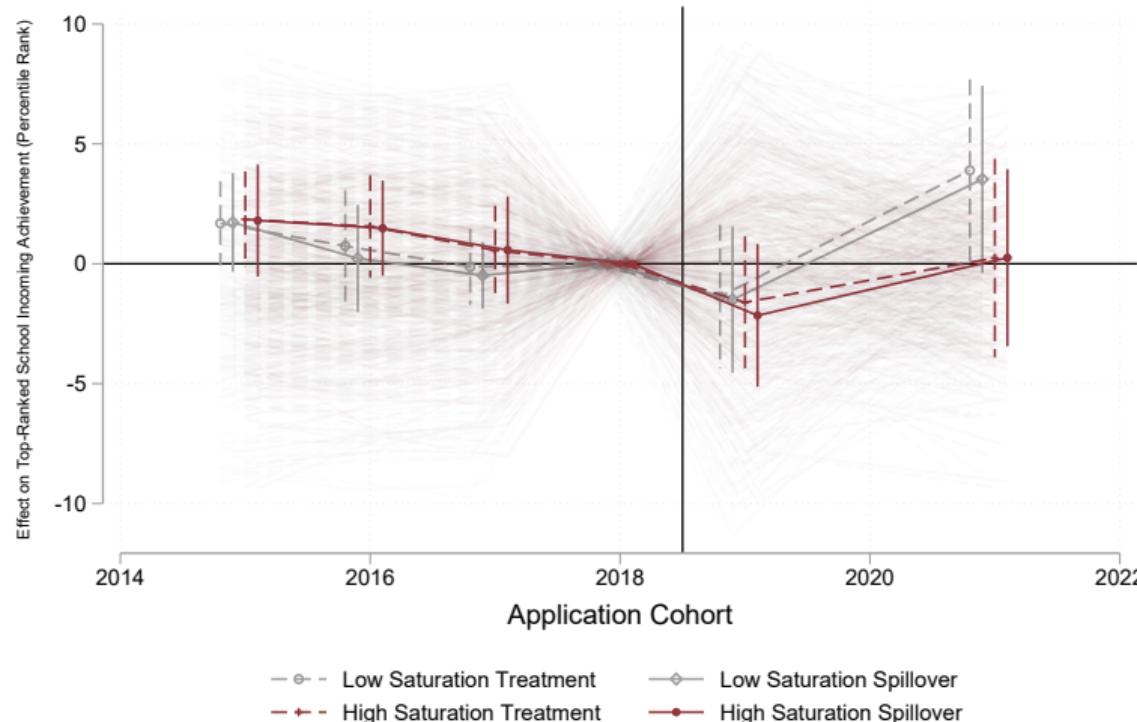
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Impacts on IA (with Randomization Inference)



Motivating Evidence
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Quality Definition and Validation
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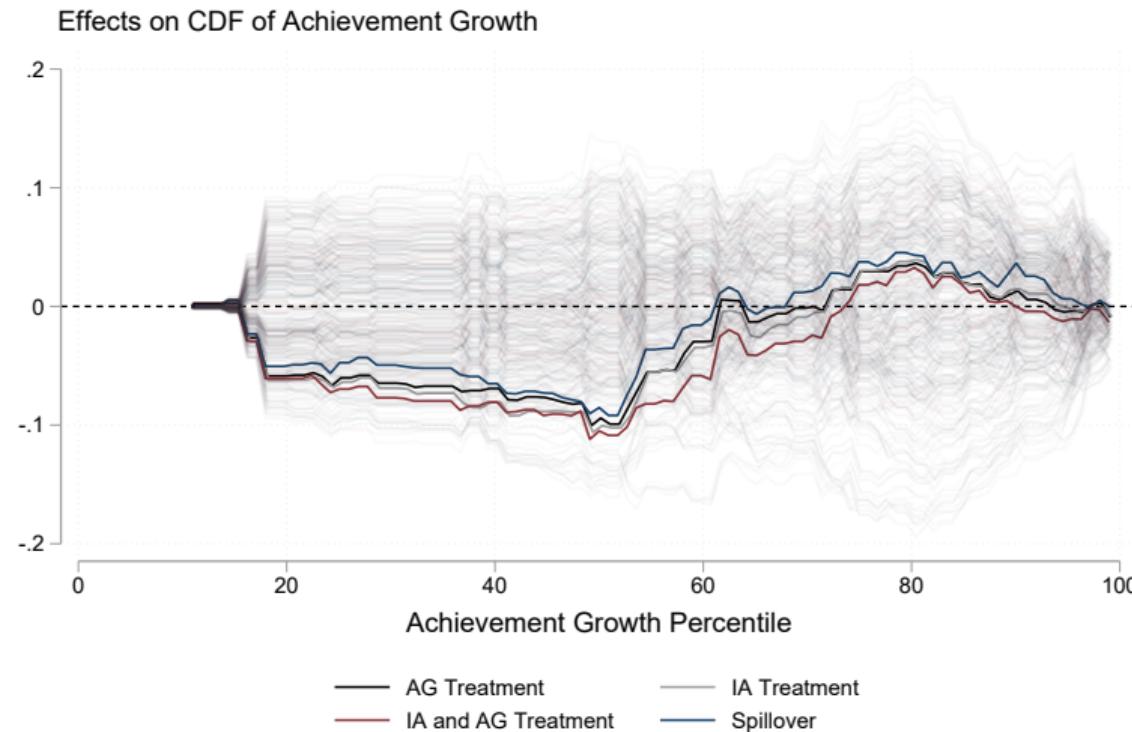
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Distributional Impacts on AG (with Randomization Inference)



Motivating Evidence
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Quality Definition and Validation
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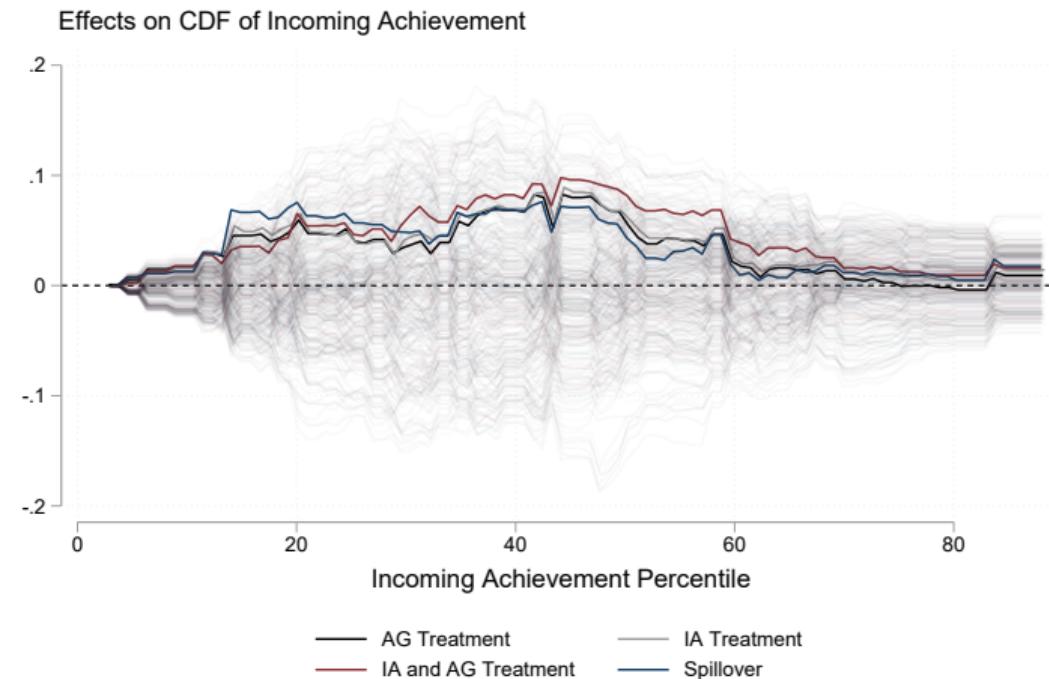
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Distributional Impacts on IA (with Randomization Inference)



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Motivating Evidence
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Quality Definition and Validation
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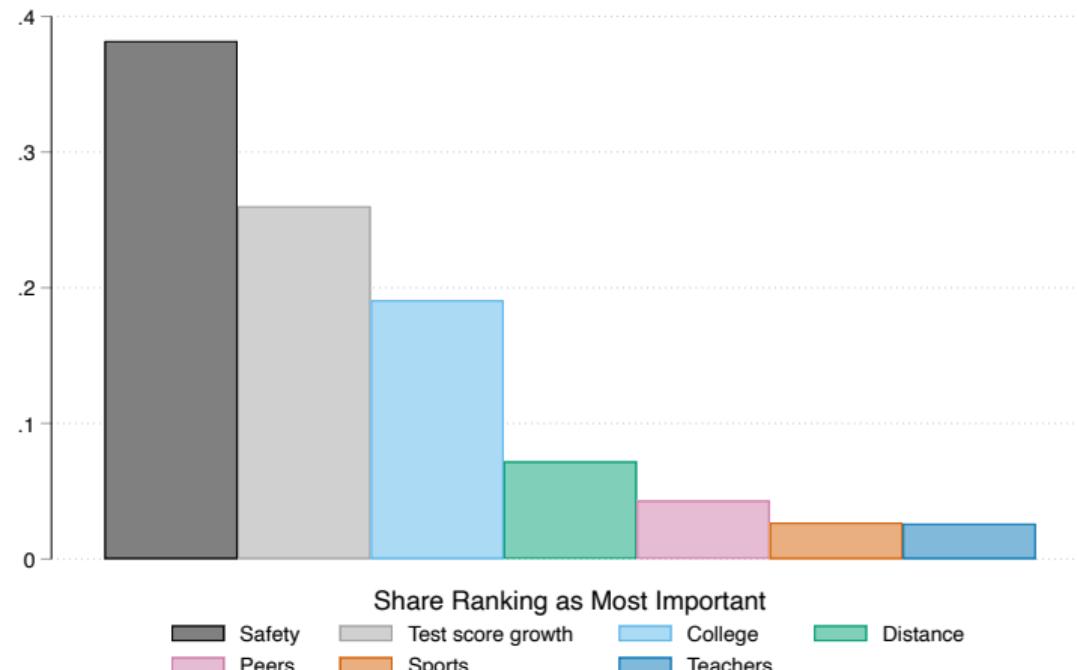
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Survey Evidence
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Discrete Choice
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Survey Summary Statistics - Rankings of desired shcool characteristics



Motivating Evidence
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Quality Definition and Validation
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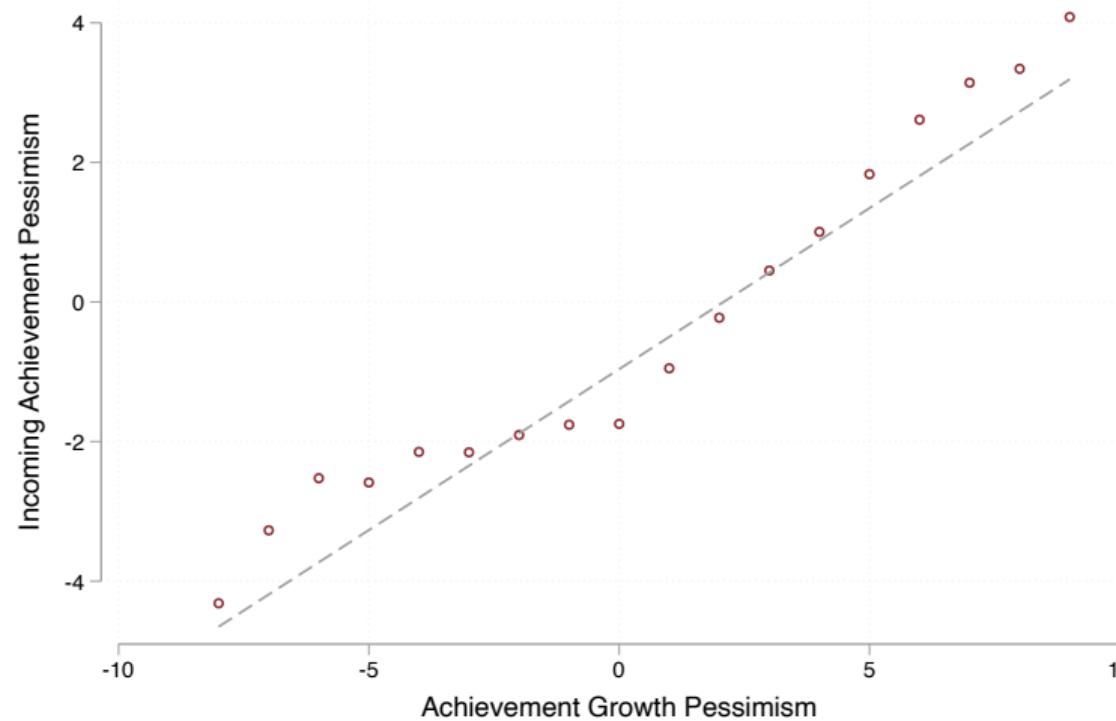
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Bias is positively correlated ($\rho \approx 0.45$)



Pessimism Correlates

	IA Pessimism		AG Pessimism	
	(1) Bivariate		(3) Bivariate	
	(2) Multivariate		(4) Multivariate	
Parents College +	1.085 *** (0.179)	0.627 *** (0.197)	-0.009 (0.197)	0.126 (0.220)
Hispanic	-0.883 *** (0.178)	-0.243 (0.196)	0.844 *** (0.258)	1.045 *** (0.288)
English Learner	-0.365 ** (0.152)	-0.146 (0.167)	-0.064 (0.189)	-0.247 (0.210)
Special Education	0.202 (0.157)	0.354 * (0.171)	0.202 (0.182)	0.211 (0.201)
Black	0.723 ** (0.323)	0.499 (0.359)	-0.882 ** (0.437)	0.288 (0.490)
White	0.924 ** (0.410)	0.279 (0.449)	-0.024 (0.525)	0.781 (0.584)
Female	-0.091 (0.107)	-0.141 (0.118)	-0.094 (0.114)	-0.091 (0.127)
Poverty	-1.708 *** (0.171)	-1.572 *** (0.190)	0.086 (0.197)	-0.154 (0.220)
Math Z-Score	0.161 *** (0.060)	-0.043 (0.066)	-0.040 (0.098)	-0.043 (0.110)
Reading Z-Score	0.194 *** (0.061)	0.158 (0.067)	-0.026 (0.102)	0.010 (0.114)
Migrant	-1.265 (1.026)	-1.019 (1.123)	-1.484 (1.006)	-1.533 (1.118)
Mean		-1.63		-0.52
SD		3.07		3.36

▶ Go Back

Pessimism Correlates

	(1) Bivariate	(2) Multivariate	(3) Bivariate	(4) Multivariate
Parents College +	1.085 *** (0.179)	0.627 *** (0.197)	-0.009 (0.197)	0.126 (0.220)
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Motivating Evidence
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Quality Definition and Validation
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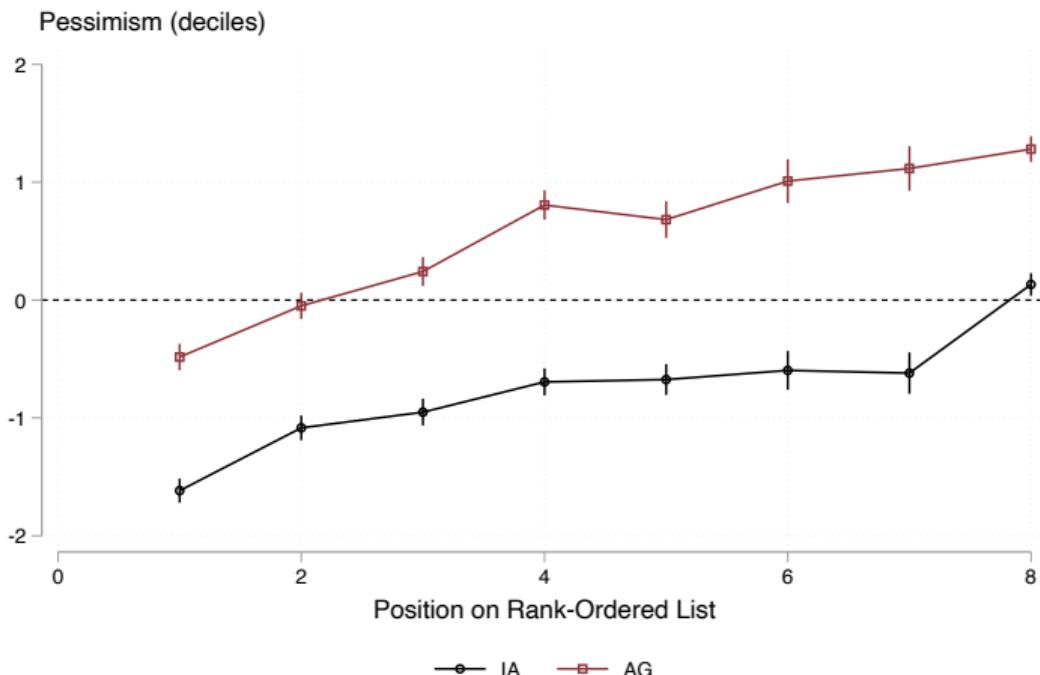
Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Bias by Position of the Rank-Ordered List



- Parents overestimate most-preferred AG and IA by 32 and 13 percent, respectively
- Parents more optimistic about AG than IA across the entire list
- Modest gradient indicating parents are more pessimistic about options they prefer less

Motivating Evidence
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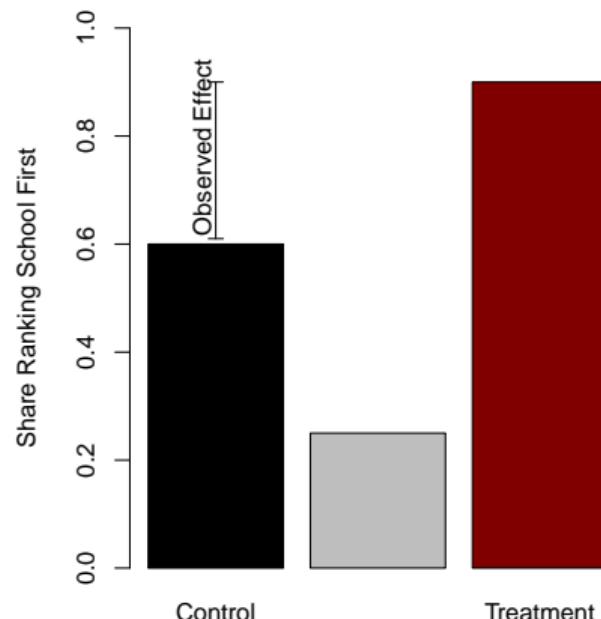
Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Intuition

The RCT identifies the difference between the maroon and black bar, the observed effect



Motivating Evidence
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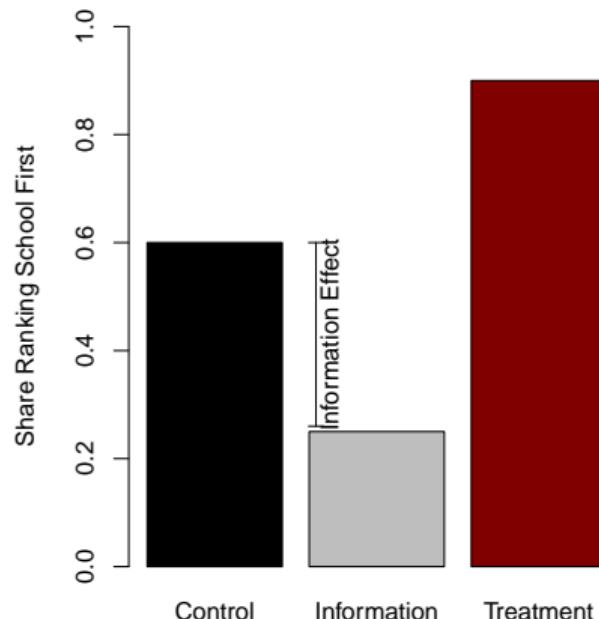
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Discrete Choice
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Evidence of Strategic Behavior
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Intuition

There is an intermediate de-biasing step, with magnitude equal to the difference between gray and black bar



Motivating Evidence
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Quality Definition and Validation
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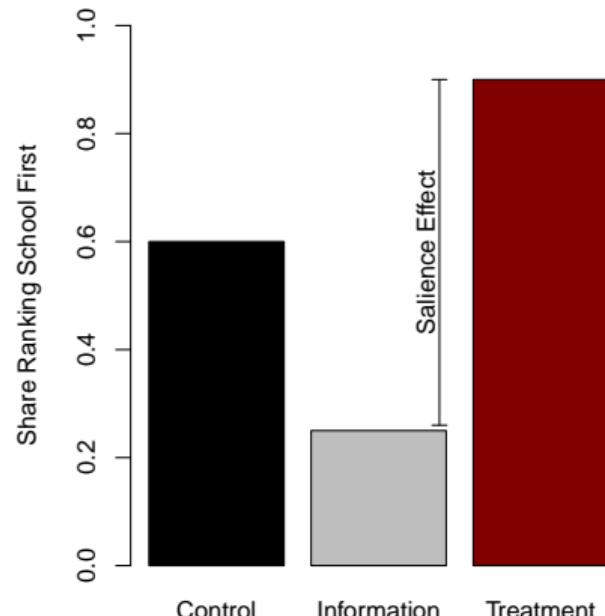
Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Intuition

The intervention makes IA and AG more prominent to families, generating a salience effect



Motivating Evidence
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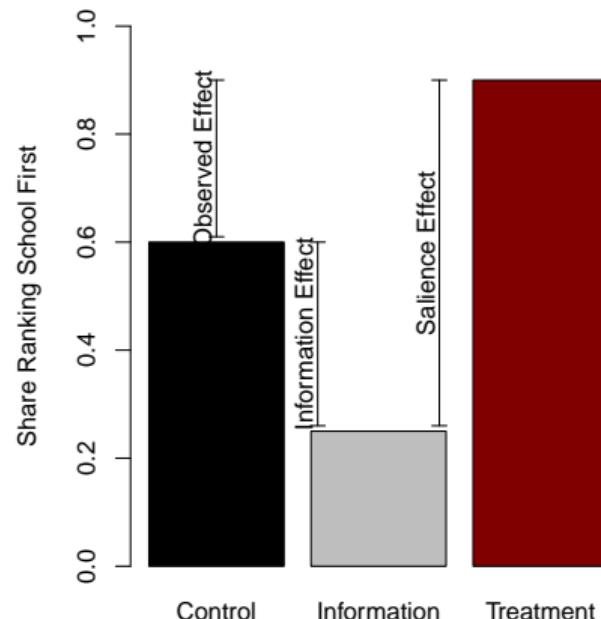
Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Intuition

Observed Effect = Salience Effect - Information Effect



Motivating Evidence
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Reduced Form Results
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Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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Many Applicants Face No Admission Risk

	Mean (1)	SD (2)	Share Zero (3)	Share One (4)
Bell	.885	.318	0	.713
Belmont	.999	.001	0	.27
Boyle Heights	1	0	0	.673
Carson	.999	0	0	.26
Eastside	.876	.33	.124	.876
Fremont	.948	.221	.052	.948
Hawkins	.999	0	0	.463
Huntington Park	.999	0	0	.394
Jefferson	1	0	0	.854
Jordan	1	0	0	1
Narbonne	1	0	0	1
North East	1	0	0	1
North Valley	1	0	0	1
RFK	1	0	0	.68
South Gate	.971	.168	.029	.971
All Zones	.968	.176	.019	.734

Motivating Evidence
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Reduced Form Results
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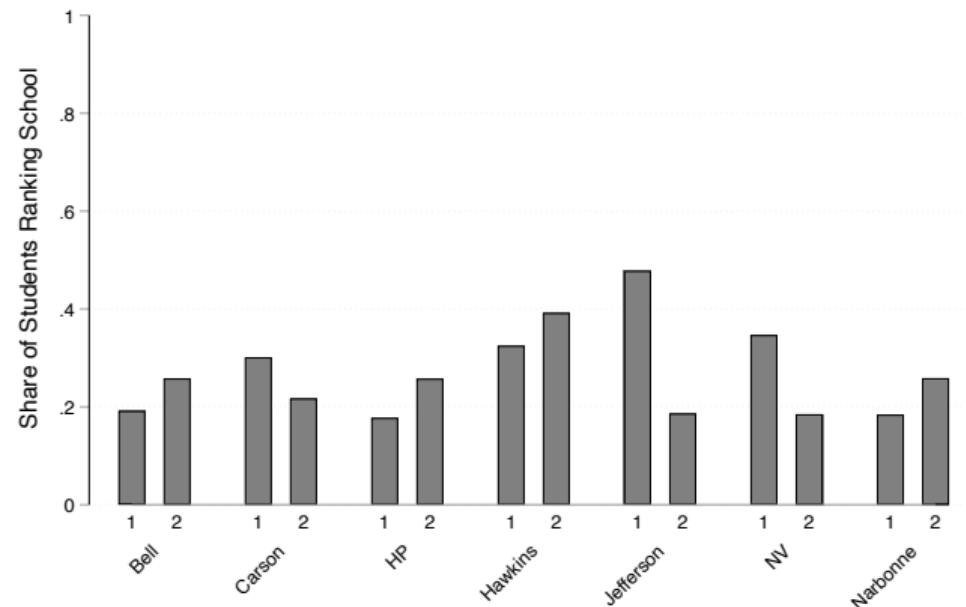
Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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No Descriptive Evidence of Strategic Behavior

Before Intervention



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Motivating Evidence
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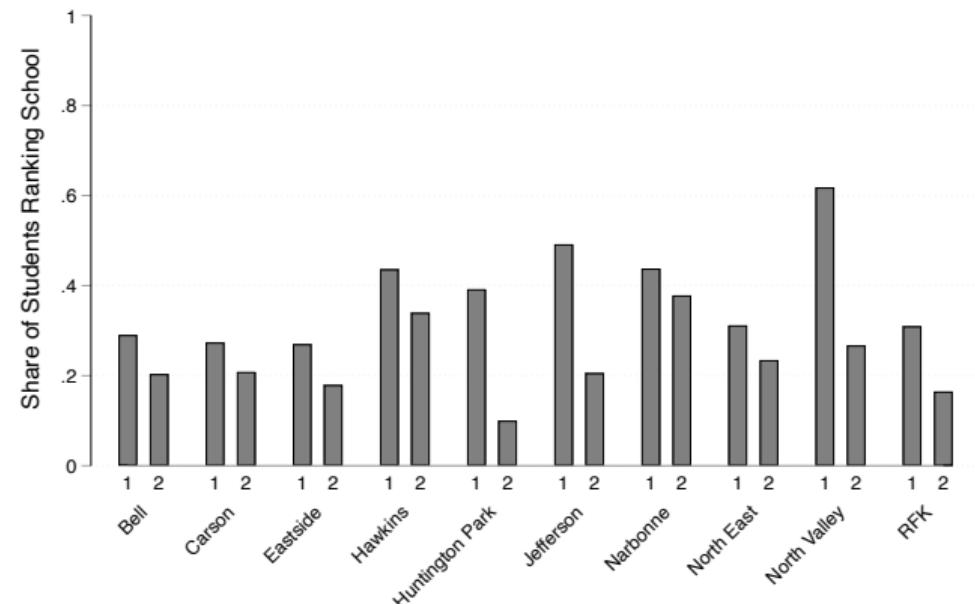
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Discrete Choice
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Evidence of Strategic Behavior
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No Descriptive Evidence of Strategic Behavior

2019



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Motivating Evidence
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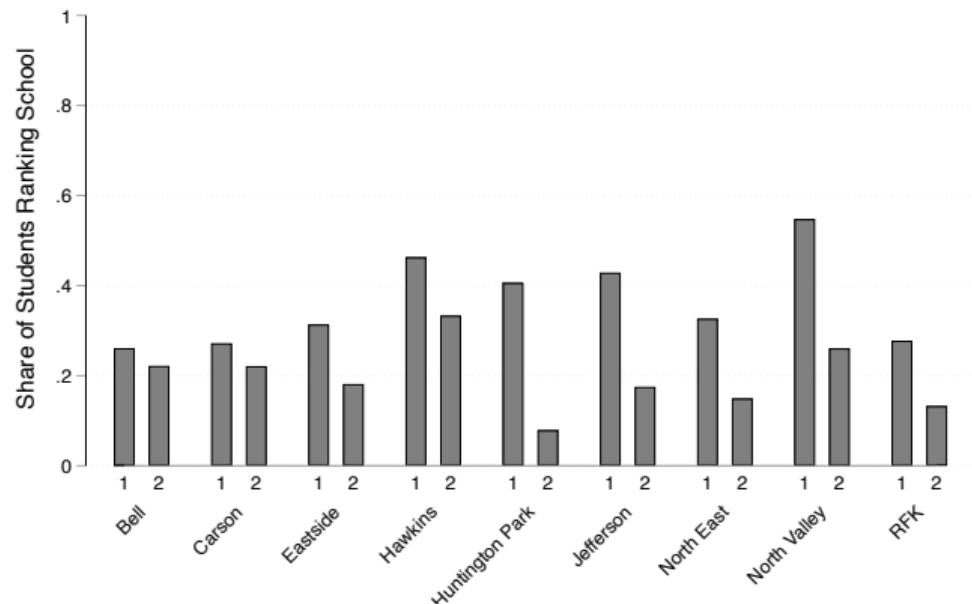
Survey Evidence
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Discrete Choice
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Evidence of Strategic Behavior
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No Descriptive Evidence of Strategic Behavior

2021



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