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

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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)

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?

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?

Motivation

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- 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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- 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

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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  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

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  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

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 (0.04-0.09σ increase on a variety of indices)
8. Cognitive outcomes (test scores) do not improve

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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   Contributions:

   → Collect information about beliefs and randomize *two* measures of quality

   → Decompose treatment effects into salience and information updating channels

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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

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

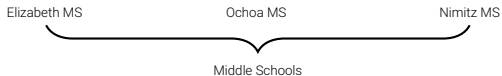
Setting

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

▸ ZOC Map ▸ ZOC Descriptives

Zone of Choice Market Structure Example



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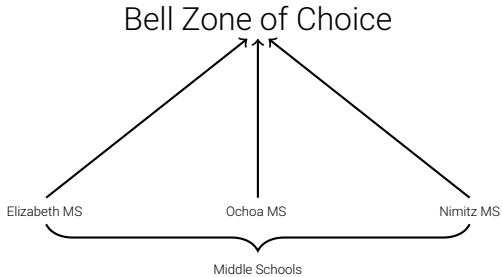

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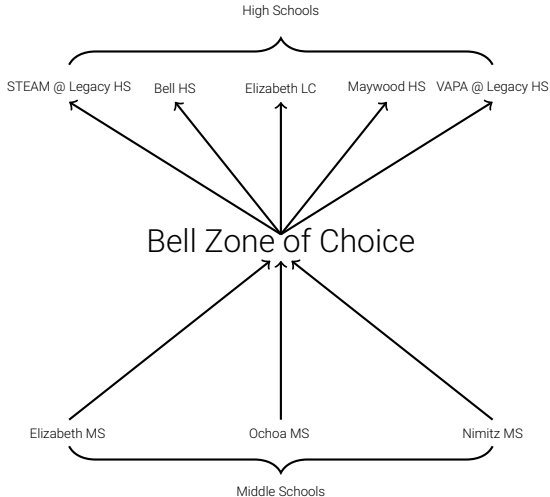

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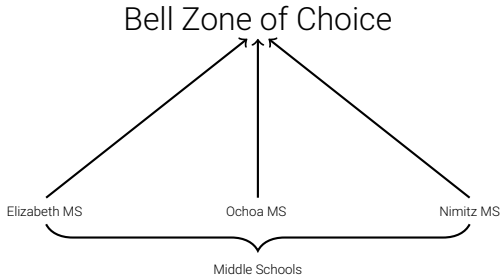
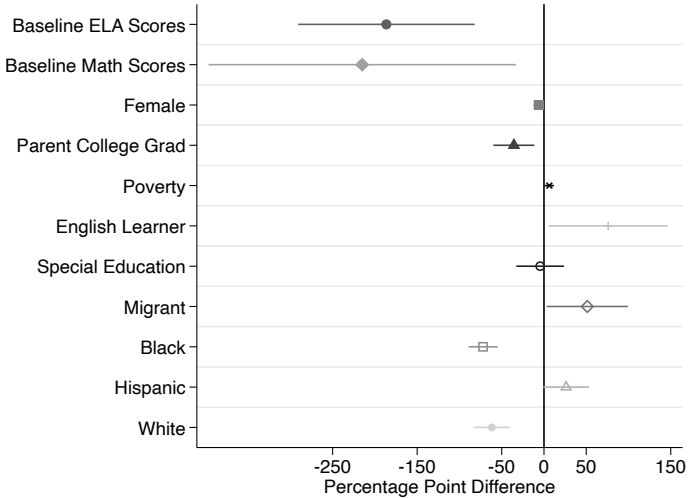
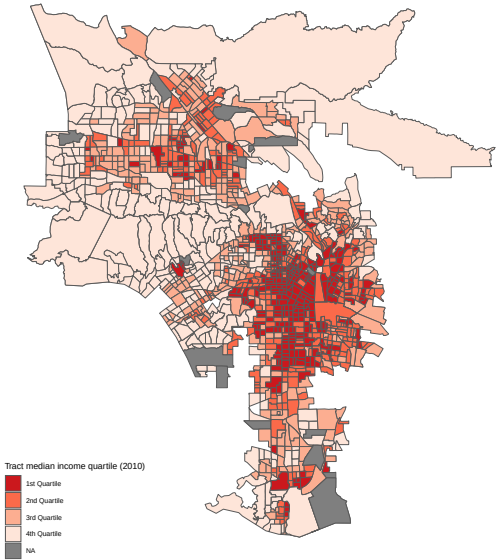


ZOC and Non-ZOC Student Differences



- ZOC Achievement Gap: 0.22σ
- Hispanic Share: 0.90
- Poverty Share: 0.94
- College Graduate Share: 0.12
- ZOC students represent roughly 30-40 percent of LAUSD high school students

ZOC markets located in disadvantaged neighborhoods of LA County



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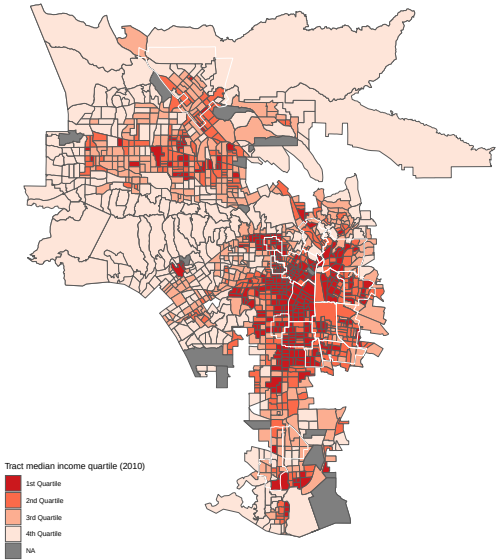

Experiment Design

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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   - → Treatment-specific videos that help parents understand the information

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3. Applications submitted: October-November

Baseline Survey

Survey Goals:

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

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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)

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

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

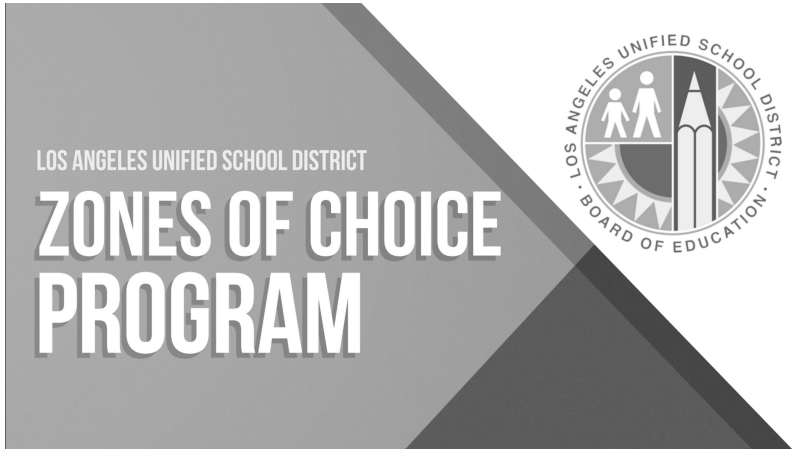
Video

Watch Video

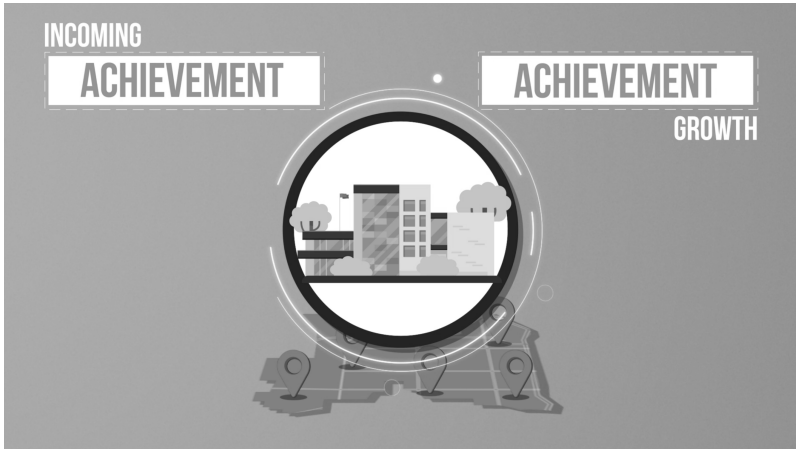
English

Spanish

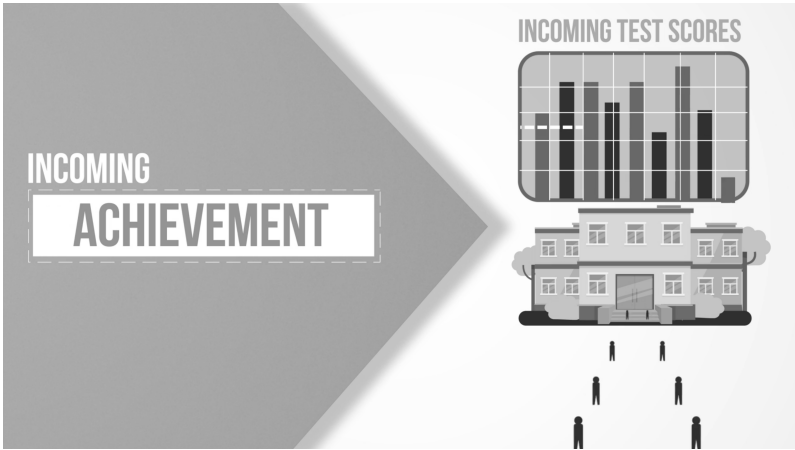
Signal the information is on behalf of the school district



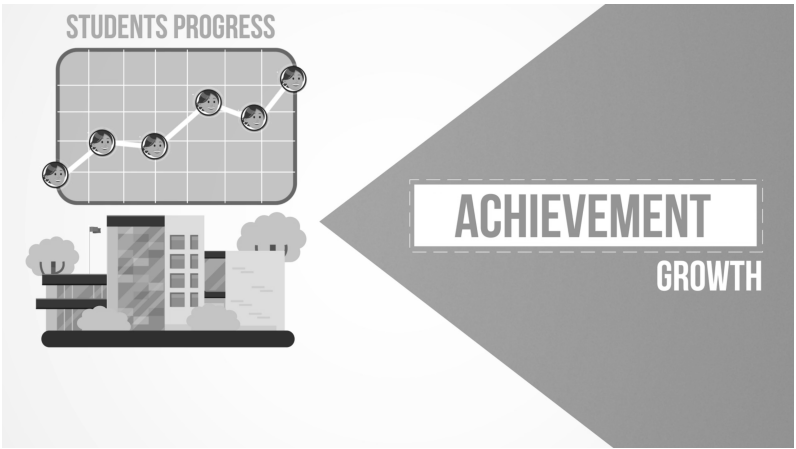
Introduce the two concepts



Use visual aid to describe IA

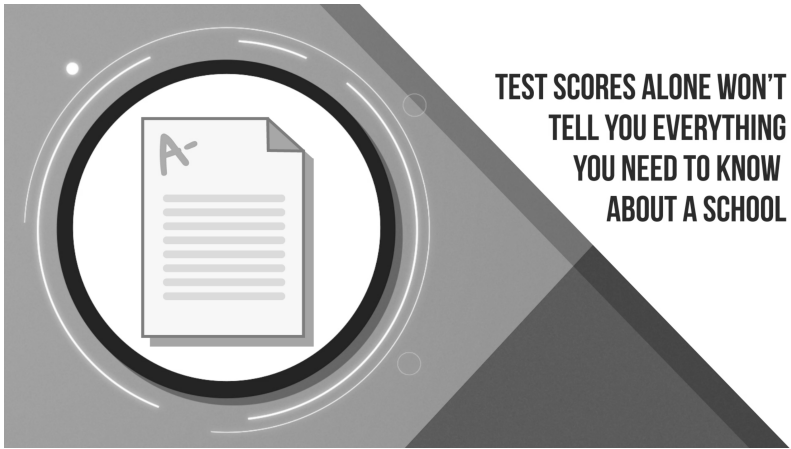


Use visual aid to describe AG



Describe some differences but remain agnostic about which is better

Remind parents that test scores are not all they should consider



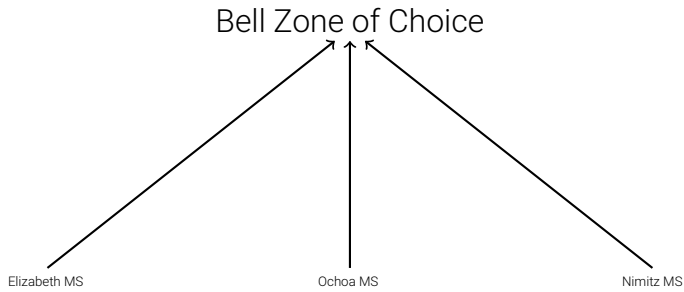
Goals:

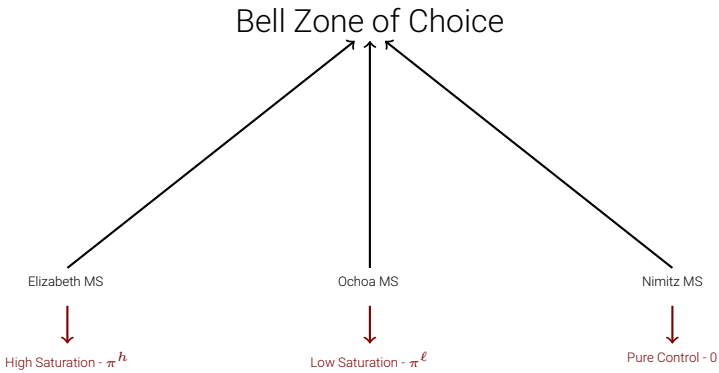
1. Better understand parents' valuations of peer and school quality

2. Cross-randomize peer and school quality

Identify social interactions

- Two-stage randomization (Philipson 2000; Crepon et al. 2013)


Bell Zone of Choice
Elizabeth MS
Ochoa MS
Nimitz MS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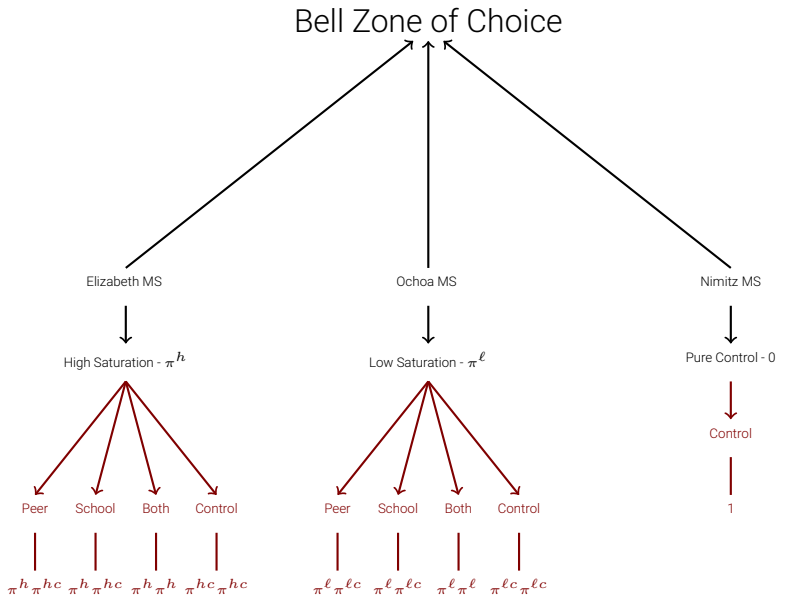
Low Saturation - π^ℓ
Pure Control - 0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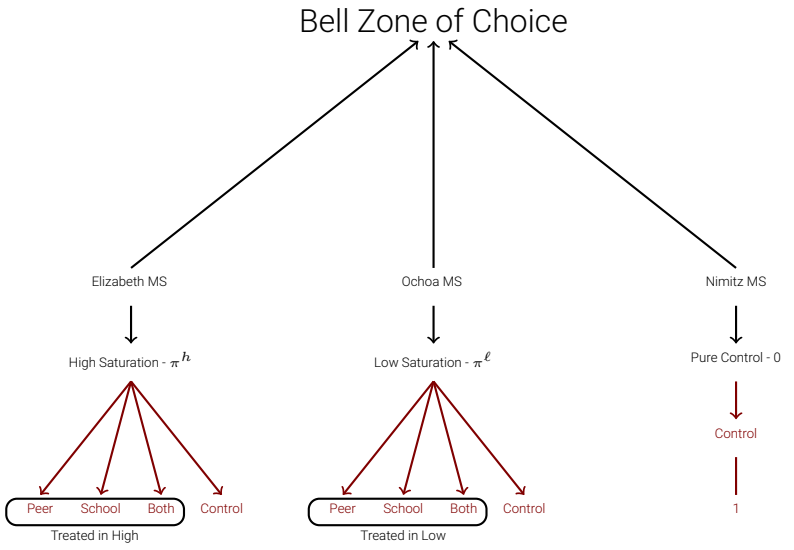
Data

- 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

▸ Descriptive Statistics ▸ School-level Balance ▸ Student-level Balance ▸ Survey Respondents ▸ Treatment Letters

Reduced Form Evidence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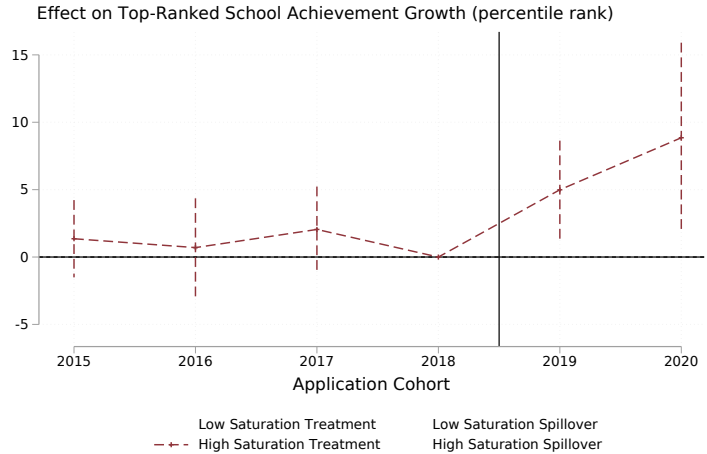
Difference-in-differences

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

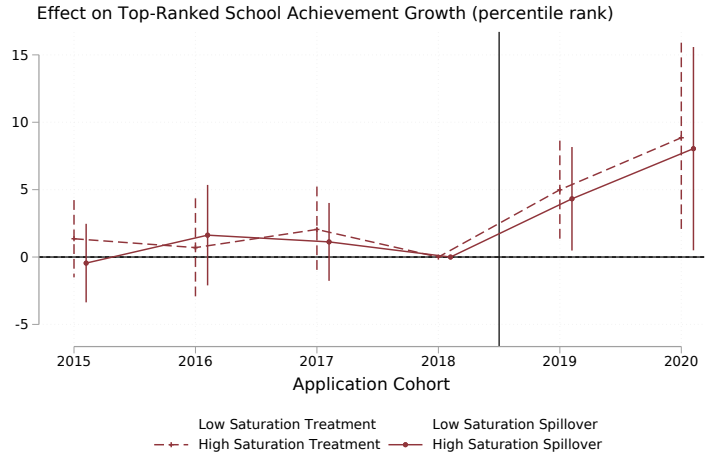
- Y_i: parent i's top-ranked school attributes (achievement growth and incoming achievement)
- $D_{L(i)}$, $D_{H(i)}$: treatment indicators for parents in low- and high-saturation schools
- $C_{L(i)}, C_{H(i)}$: spillover indicators for parents in low- and high-saturation schools
- $Post_{k(i)}$: indicator for treated cohorts

Increased demand for AG among treated in high saturation schools



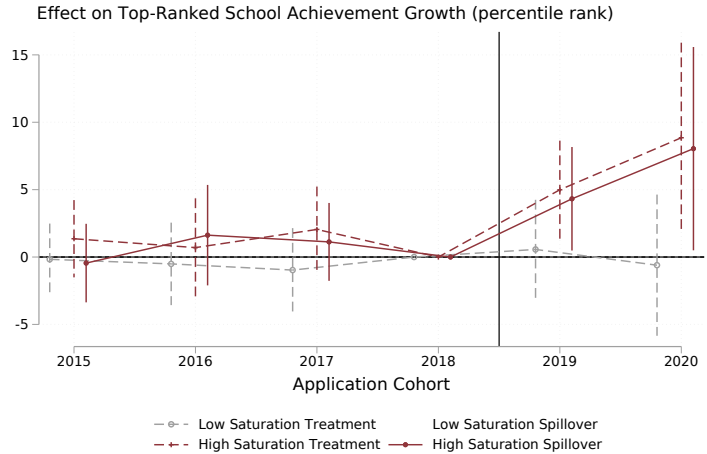
Pre-intervention mean: 64

Similar effects among indirectly treated in high saturation schools



Pre-intervention mean: 64

No effect on demand for AG among treated in low saturation schools



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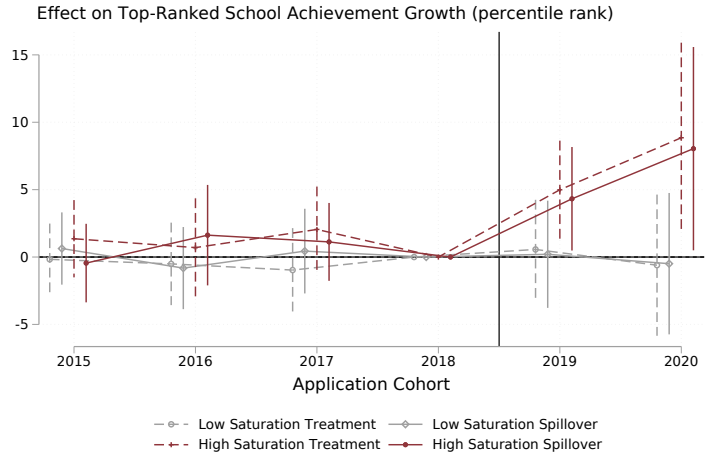
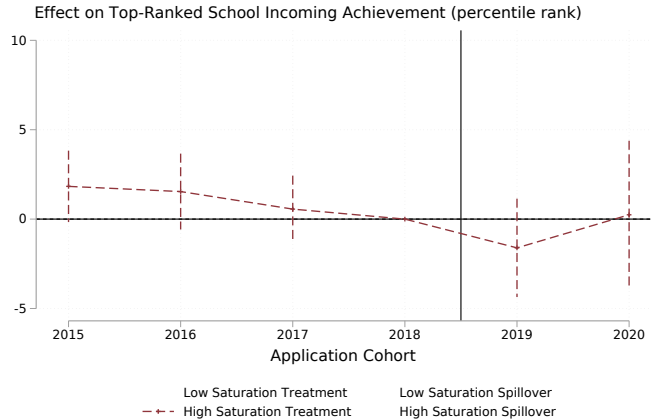


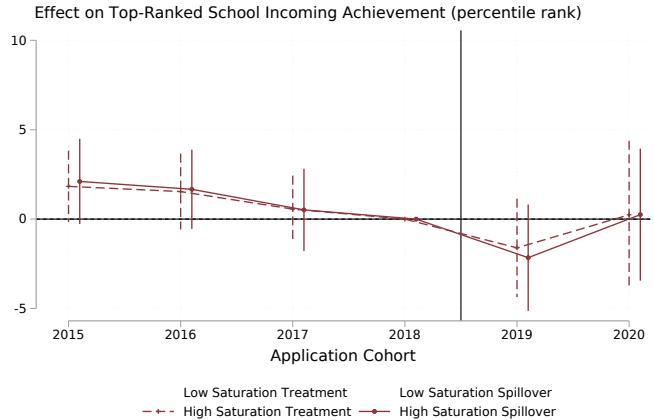
Pre-intervention mean: 64

No detectable impacts on demand for IA for all treatment groups



Pre-intervention mean: 39

No detectable impacts on demand for IA across all treatment groups



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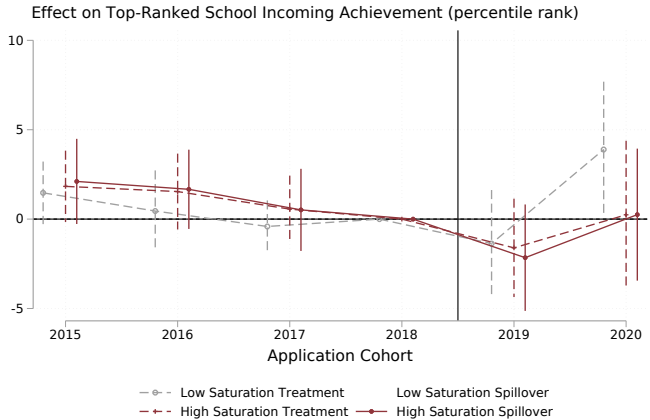

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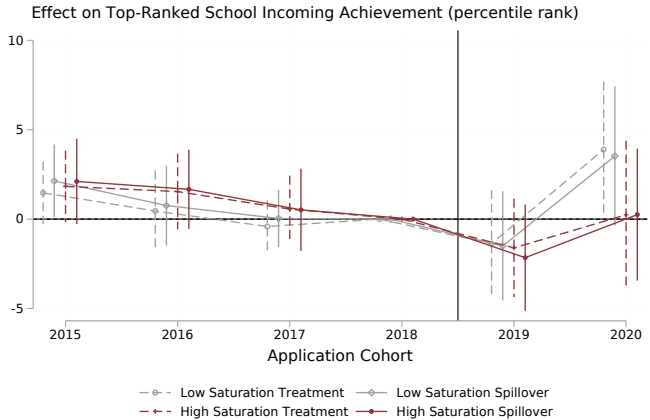

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Distributional Impacts

$$\mathbf{1}\{Y_i \leq a\} = \alpha_{z(i)t(i)} + \alpha_{g(i)} + \gamma' X_i + \beta_P D^P_{it(i)} + \beta_S D^S_{it(i)} + \beta_B D^B_{it(i)} + \beta_C C_{it(i)} + u_i,$$

- $1\{Y_i \leq a\}$ 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

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- $\beta_P, \beta_S, \beta_B, \beta_{Spill}$: Treatment-specific effects, ignoring saturation groups

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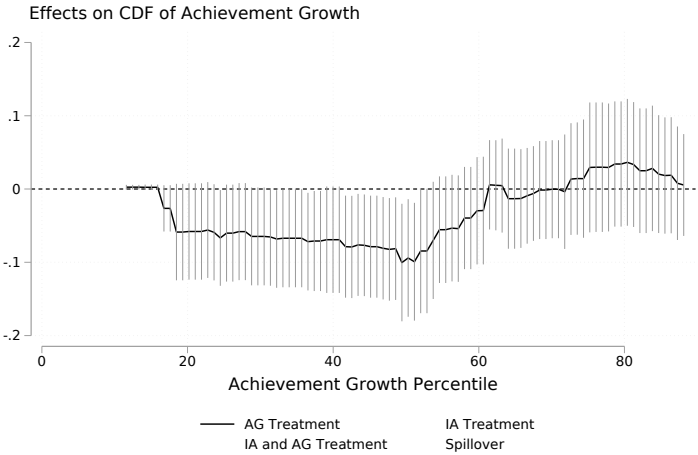
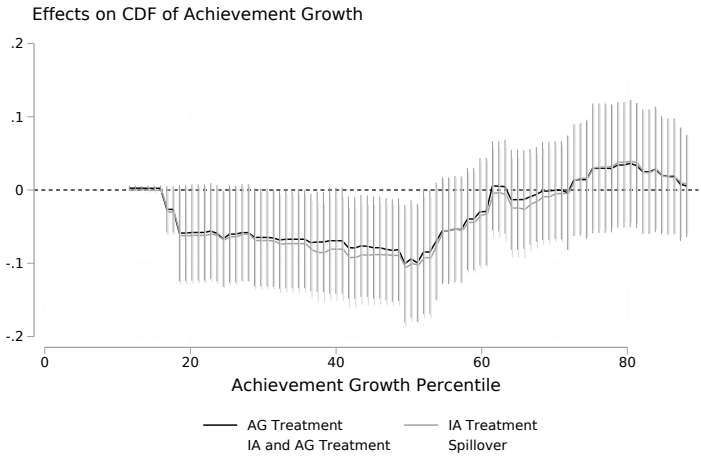
- $C_{it(i)}$: individual i spillover indicator for cohort t
- $\beta_P, \beta_S, \beta_B, \beta_{Spill}$: Treatment-specific effects, ignoring saturation groups
- Distributional estimates demonstrate that demand moved uniformly across the distribution, regardless of individual treatment status

Distributional effects show increased demand for higher AG schools



Distributional effects show an increased demand for higher AG schools



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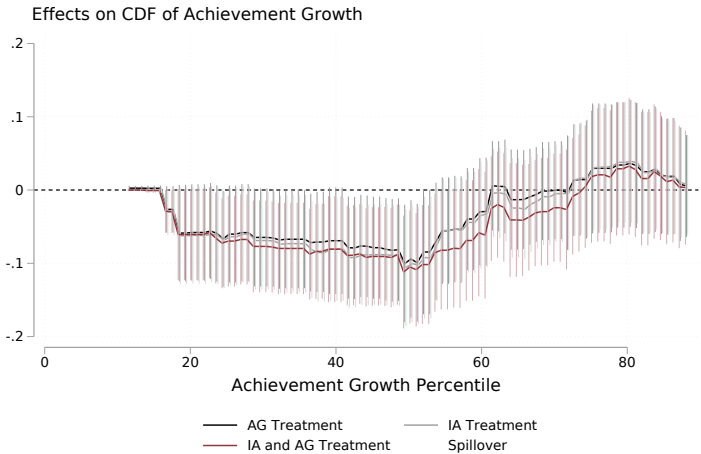
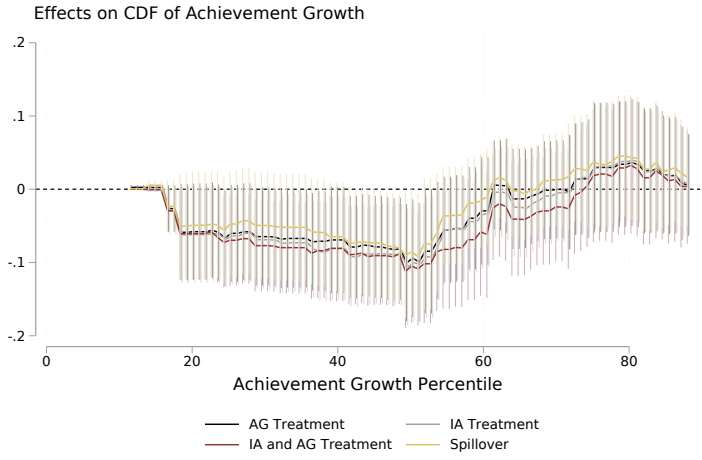


Spillover effects identical to treatment effects across the distribution



▸ IA and AG Support ▸ Impacts on Other Attributes ▸ Randomization Inference

Survey Evidence

Survey Evidence

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

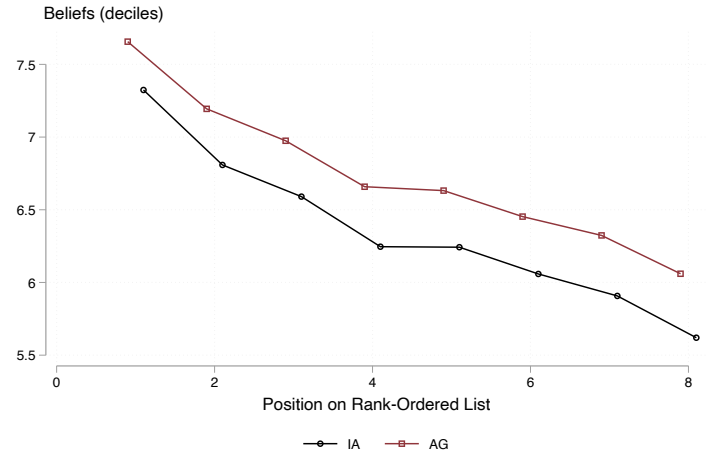
Today:

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

$$b^x_{ji} \equiv Q^x_j - \tilde{Q}^x_{ji} \quad x \in \{IA, AG\}$$

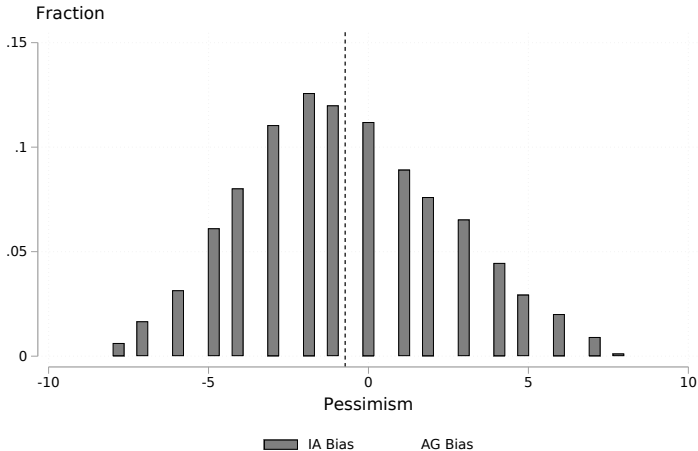
with Q^x_j referring to researcher-generated quality and $\tilde{Q}^x_{ji}$ referring to beliefs

Beliefs by Position of the Rank-Ordered List



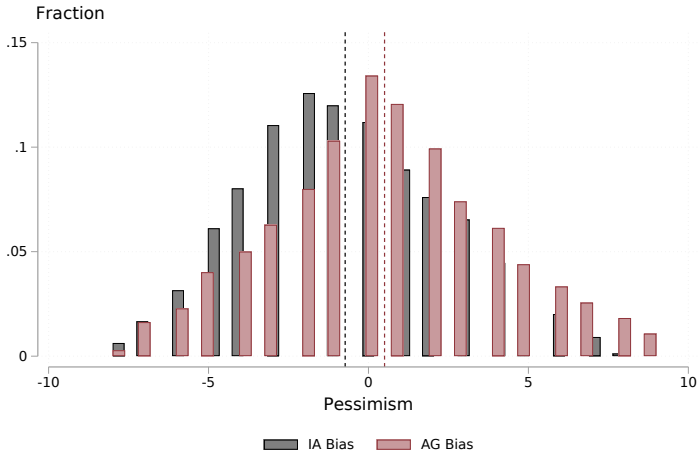
- Parents tend to think their schools have higher AG rankings than IA rankings; this is true
- Parents tend to think schools in their choice set are above average in terms of IA and AG; this is not always true for IA
- A steep gradient in beliefs moving down the ROL is indicative of signal in beliefs

IA and AG Bias Distribution



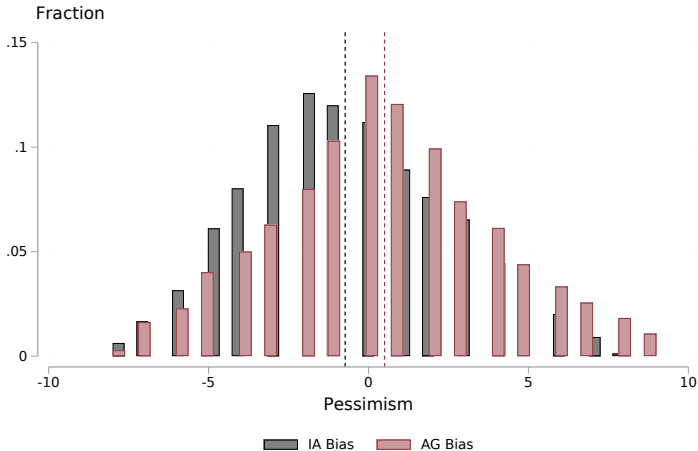
- Parents tend to overestimate IA by roughly 0.7 deciles
- IA overestimated by roughly 14 percent on average (SD=0.46)

IA and AG Bias Distribution



- 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)

IA and AG Bias Distribution



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- 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)
- Biases are choice relevant

Evidence

Discrete Choice Evidence

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}: distant to school j for parent i
- ε_{ij} : unobserved preference heterogeneity

The Information Campaign Viewed Through a Discrete Choice Lens

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

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

- $\mathbf{1}\{i \in \mathcal{I}_t\}$ correspond to treatment $t \in \{IA(P), AG(S), IA\ and\ AG(B), Spillover(Sp)\}$ indicators

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- $\mathbf{1}\{i \in \mathcal{I}_t\}$ correspond to treatment $t \in \{IA(P), AG(S), IA\ and\ AG(B), Spillover(Sp)\}$ 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

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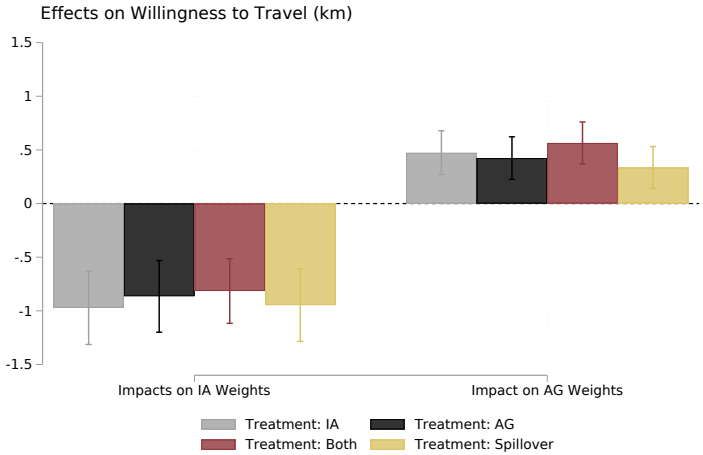
- Assumptions for estimation: EVT1 errors and truthful reporting ▸ Evidence on truthful reporting

Information Campaign Effects



- Δ MWTT IA: $\sim$ -1km/Decile
- Δ MWTT AG: $\sim$ 0.5km/Decile
- Treatment effects similar for all treatments; mirrors reduced form evidence
- Structural model replicates reduced form effects ▸ Evidence
- Utility weight impacts are a summary measure, nesting both information and salience effects

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} and b_{Si} have mean μ_P and μ_S, respectively

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

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  where biases b_{Pi} and b_{Si} have mean μ_P and μ_S, respectively

- 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

- Interested in decomposing the following estimand:

$$E[\Delta MWTT_i^P] \equiv E[MWTT_{iP}^P - MWTT_{i0}^P]$$

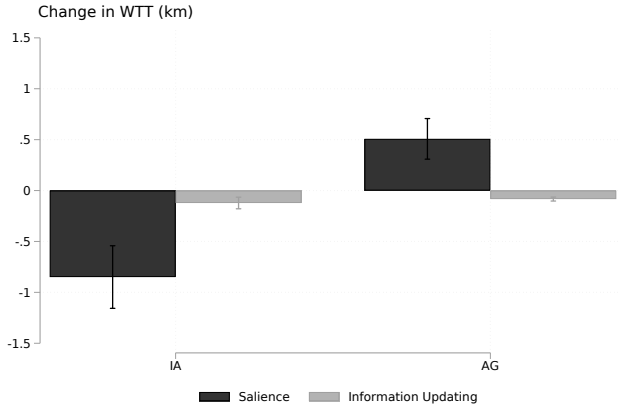
- Observed average MWTT for Q_j^P among those in the pure control group: $E[MWTT_{i0}^P] = \frac{\gamma_P(1+\mu_P)}{\lambda}$
- Observed average MWTT among those receiving treatment P: $E[MWTT_{iP}^P] = \frac{\gamma_P+\beta_{PP}}{\lambda}$
- Therefore,

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

▸ Intuition

Decomposition Results

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



Impacts on Outcomes

Outcomes of Interest

1. Enrollment

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

2. Test Scores

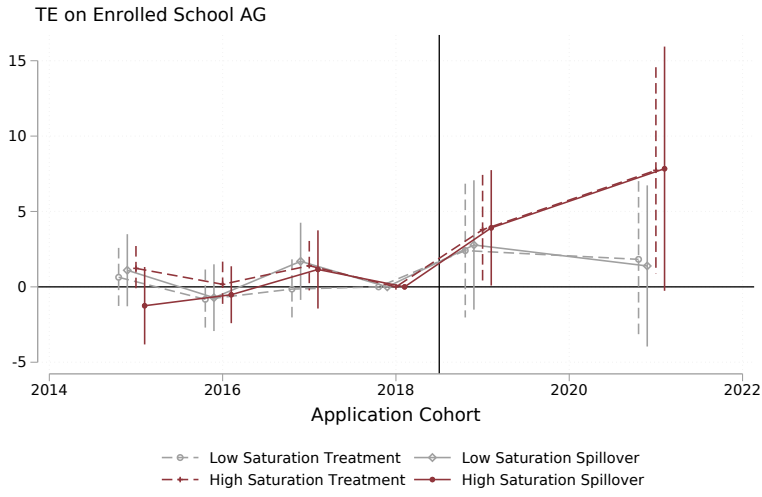
   → Observed in eleventh-grade and only available for 2019 cohort

3. Non-cognitive outcomes collected in School Experience Survey

   → Following Jackson et al. 2020, I organize non-cognitive outcome data into five standardized indices (Kling, Liebman, and Katz 2007):

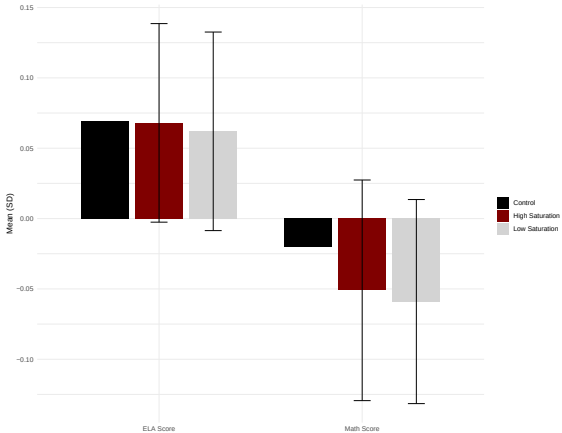
   3.1 Happiness
   3.2 Interpersonal Skills
   3.3 School Connectedness
   3.4 Academic Effort
   3.5 Bullying

Students *enroll* in higher quality schools



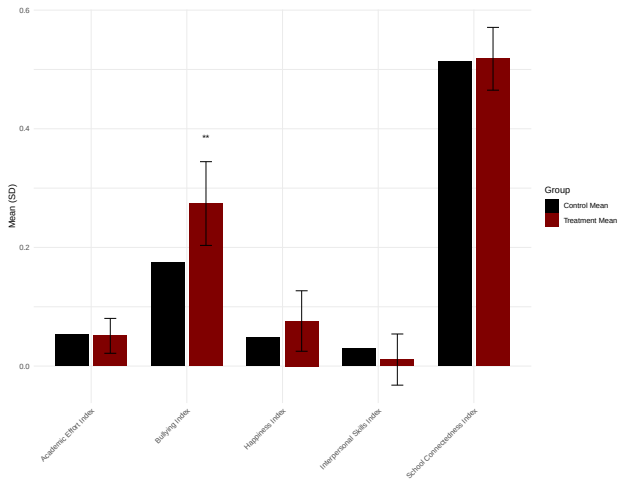
No Test Score Impacts

The pandemic interfered with educational trajectories of 2019 cohort



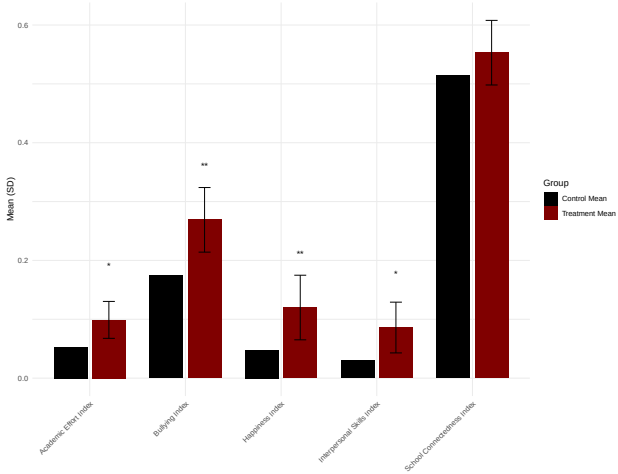
Non-cognitive outcomes improve

Only bullying-related outcomes improve for 2019 cohort



Non-cognitive outcomes improve

All non-cognitive outcomes improve for 2021 cohort



Concluding Thoughts

What Parents Know and Value

- What parents know: Parents' bias is not severe 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

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- Information interventions that encourage social interactions (Banerjee et al. 2022) can potentially address network-based disparities in accessing effective schools

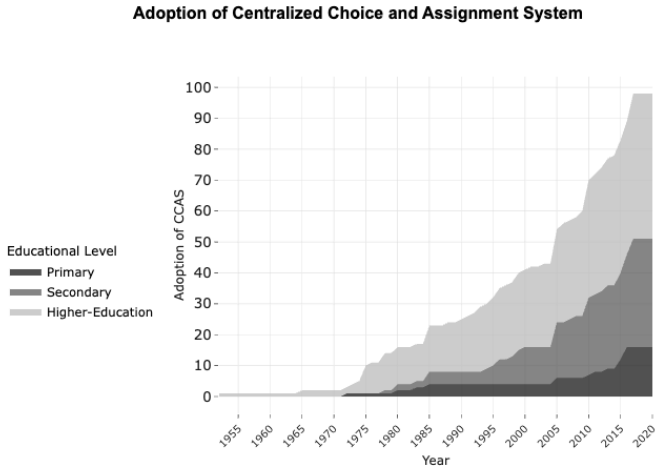
The role of salience

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

Thank you!

Christopher.Campos@chicagobooth.edu

Motivation: Rise of Centralized Choice in Public Education Systems



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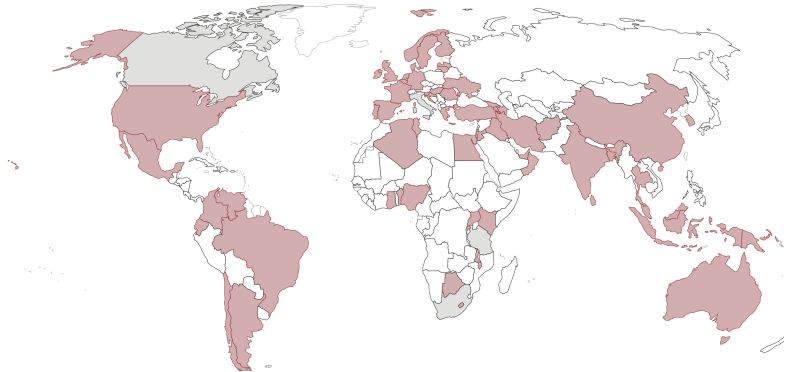
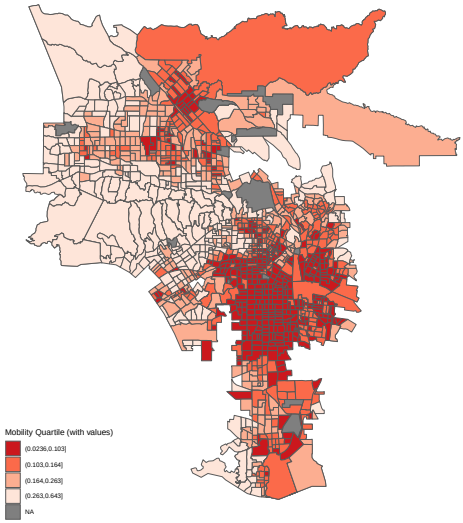


Source: Neilson 2021

Most ZOC neighborhoods classified as low mobility by Chetty et al. (2018)



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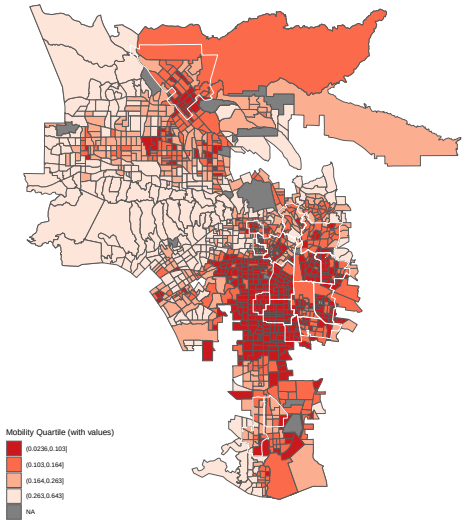

Descriptive Statistics

	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
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Black	0.107	0.03	-0.077
			(0.027)
Hispanic	0.683	0.862	0.179
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White	0.038	0.015	-0.024
			(0.009)
N	26,517	13,015	

Go Back

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Go Back

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

Go Back

School-level Balance

	Control (1)	Low - Control (2)	High - Control (3)
ELA	-.116	.021	.028
		(.102)	(.103)
Math	-.109	-.005	.029
		(.1)	(.116)
College	.081	.006	-.005
		(.022)	(.024)
Migrants	.063	-.009	-.005
		(.008)	(.008)
Female	.486	0	.015
		(.014)	(.01)
Poverty	.947	.011	.005
		(.026)	(.027)
Special Education	.126	.016	.008
		(.011)	(.009)
English Learner	.121	.005	.022
		(.015)	(.02)
Black	.04	-.009	-.011
		(.015)	(.014)
Hispanic	.846	.008	-.014
		(.037)	(.024)
White	.017	0	-.002
		(.007)	(.008)
Size of Cohort	239.639	16.212	18.399
		(44.856)	(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	-.027	-.016	.531
			(.026)	(.02)	(.023)	
Math Scores	-.124	-.122	.004	-.021	-.016	.475
			(.023)	(.017)	(.019)	
Parents College	.08	.074	0	0	-.001	.999
			(.008)	(.005)	(.007)	
Migrant	.037	.032	.008	-.001	.01	.172
			(.004)	(.004)	(.007)	
Female	.485	.488	-.008	-.002	-.01	.85
			(.01)	(.013)	(.017)	
Poverty	.945	.933	.002	.001	-.003	.476
			(.004)	(.004)	(.004)	
Special Education		.14	-.001	.009	.006	.531
			(.008)	(.008)	(.008)	
English Learners	.153	.154	.001	0	.014	.406
			(.006)	(.007)	(.009)	
Black	.039	.027	.004	-.002	-.002	.526
			(.004)	(.004)	(.003)	
Hispanic	.902	.908	-.005	.003	-.001	.744
			(.006)	(.007)	(.006)	
White	.018	.015	-.002	0	-.002	.81
			(.003)	(.003)	(.003)	
Joint Test P-value			.883	.979	.987	
Number of Students	8,610	5,344	3,329	3,351	2,534	

Go Back

Student-level Balance (within treated schools)

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

Go Back

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Bell Zone of Choice

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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.

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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
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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.

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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.

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

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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
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Preparatoria de Artes Visuales y Técnicas (VAPA)	74	67	Legacy HS	Escuela Pequeña
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School and Peer Quality Definition

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

- Y_{ij} is student i's potential achievement at school j
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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

School and Peer Quality Definition

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

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- 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

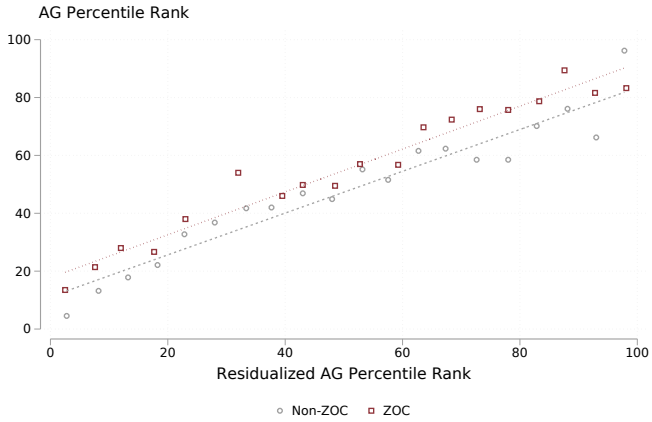
$$Q_j^P = \text{int}\left(\frac{\text{rank}(\hat{\theta}' \bar{X}_j)}{J} \times 100\right)$$

- Peer and school quality are positively correlated Evidence

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

Peer Effects: Regression-adjusted rankings preserve ordinal rankings

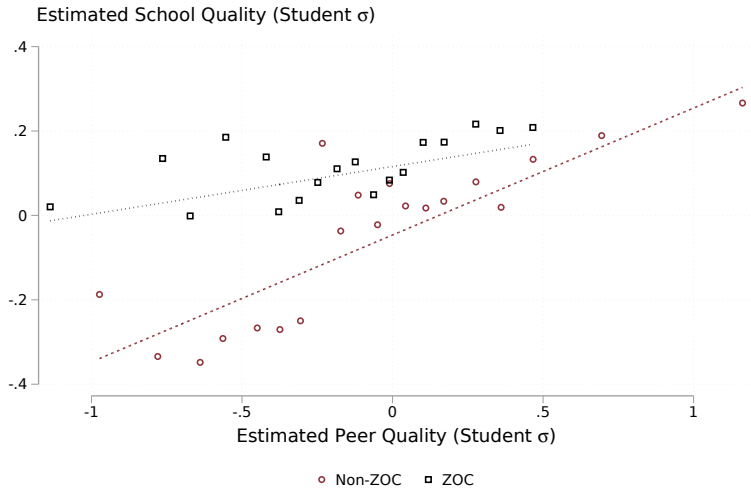


VAM Validation

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

Go back Go back to main

IA-AG Correlation



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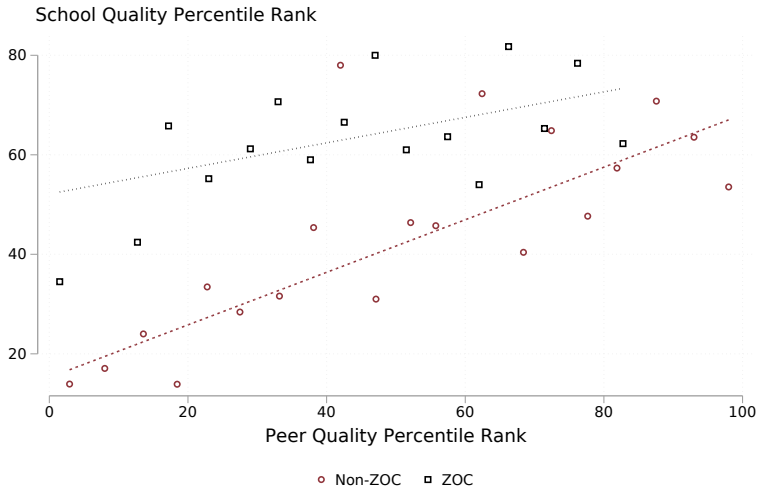

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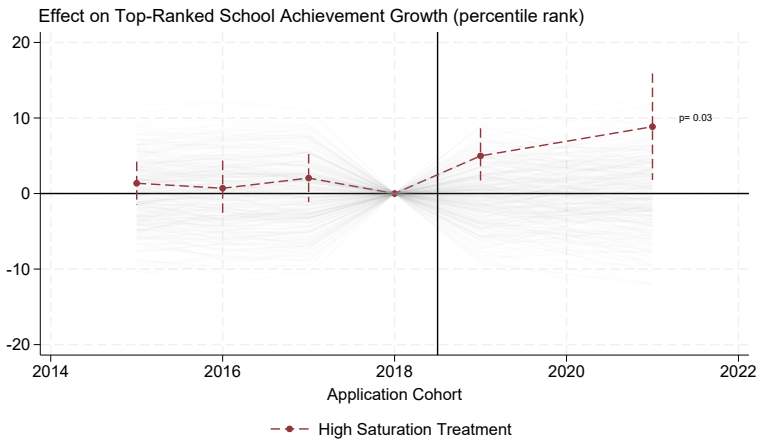
Treatment effects on other school attributes

	(1)	(2)	(3)	(4)	(5)
	Pure Control Mean	High Saturation 2019	Low Saturation 2019	High Saturation 2021	Low Saturation 2021
Achievement Growth	65.587	4.896**	1.033	8.775**	0.097
		(2.120)	(2.175)	(4.186)	(2.962)
		[.053]	[.412]	[.055]	[.373]
Incoming Achievement	34.517	-1.540	-2.061	0.482	3.122
		(1.646)	(1.774)	(2.397)	(2.313)
		[.275]	[.282]	[.395]	[.058]
Female	0.487	0.002	-0.002*	0.005	-0.001
		(0.001)	(0.001)	(0.004)	(0.002)
		[.205]	[.085]	[.188]	[.263]
Migrant	0.082	0.000	0.002**	-0.001	0.000
		(0.001)	(0.001)	(0.003)	(0.001)
		[.393]	[.055]	[.343]	[.443]
Poverty	0.979	0.001	0.006**	0.005	0.002
		(0.002)	(0.003)	(0.005)	(0.003)
		[.36]	[.01]	[.288]	[.34]
Special Education	0.119	0.003***	0.001	0.003	-0.001
		(0.001)	(0.001)	(0.003)	(0.002)
		[.013]	[.19]	[.233]	[.32]
English Learner	0.146	0.001	0.002	-0.009	-0.001
		(0.003)	(0.001)	(0.007)	(0.003)
		[.318]	[.102]	[.145]	[.395]
College	0.054	0.000	-0.003**	0.001	-0.001
		(0.001)	(0.002)	(0.004)	(0.002)
		[.477]	[.023]	[.383]	[.425]
Black	0.044	0.000	-0.001	-0.011	-0.002
		(0.002)	(0.001)	(0.011)	(0.003)
		[.395]	[.21]	[.263]	[.34]
Hispanic	0.908	-0.002	0.004	0.006	0.001
		(0.002)	(0.003)	(0.011)	(0.005)
		[.195]	[.102]	[.323]	[.438]
White	0.019	0.001	-0.002*	0.004	0.000
		(0.001)	(0.001)	(0.003)	(0.002)

Impacts on AG (with Randomization Inference)



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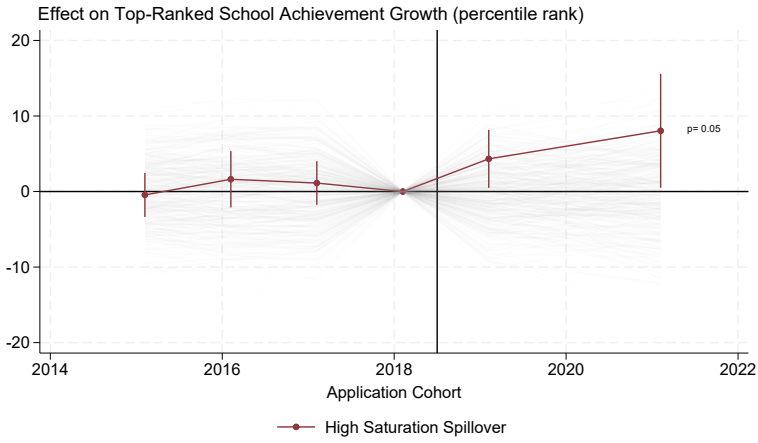

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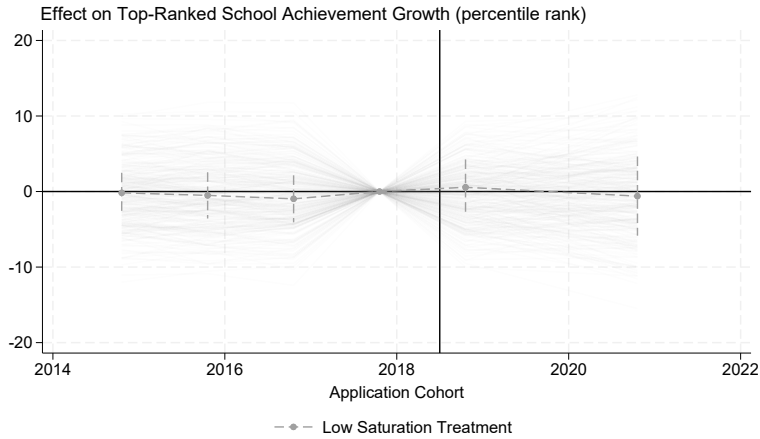

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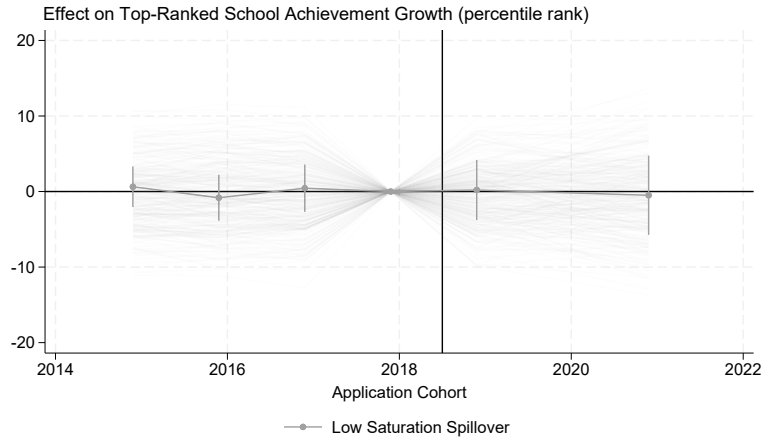
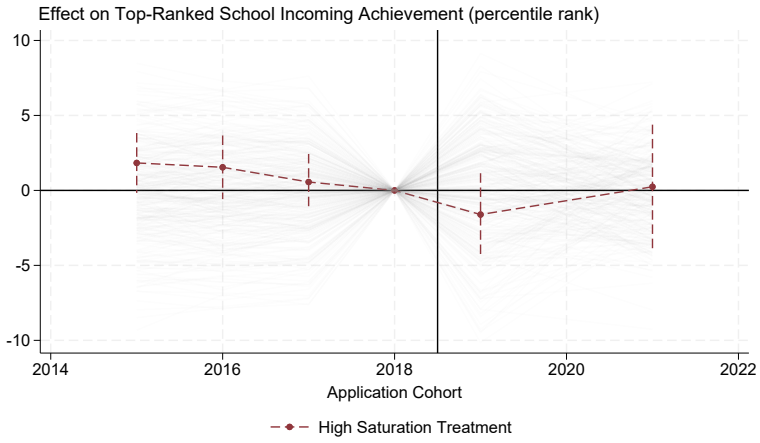


Impacts on IA (with Randomization Inference)



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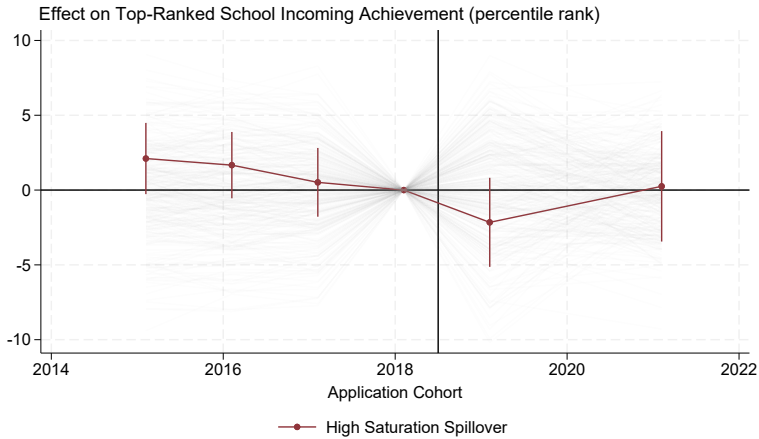

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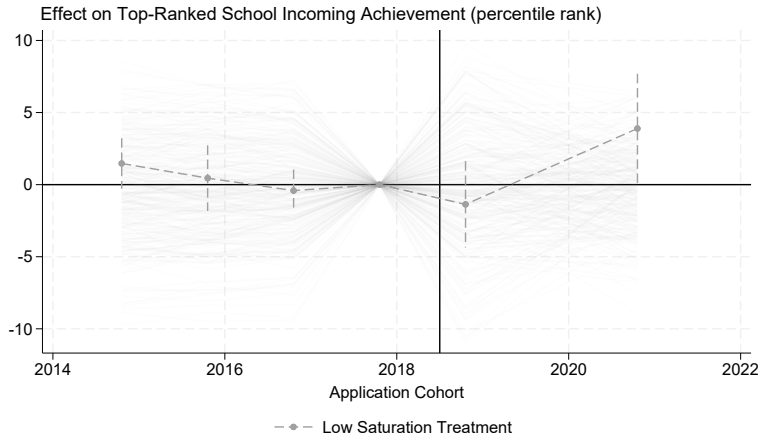

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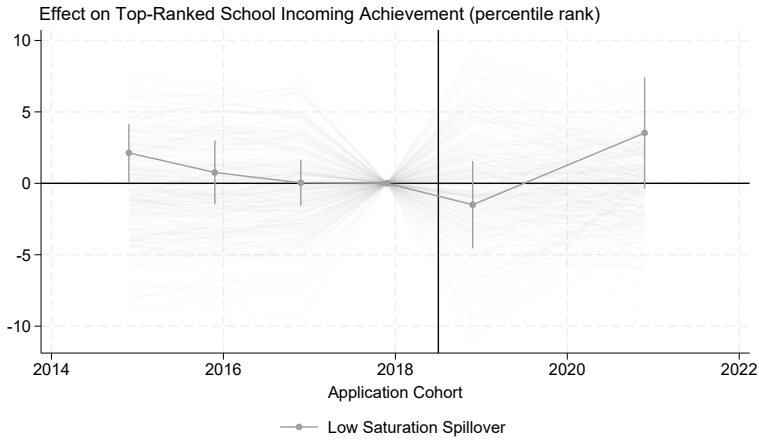
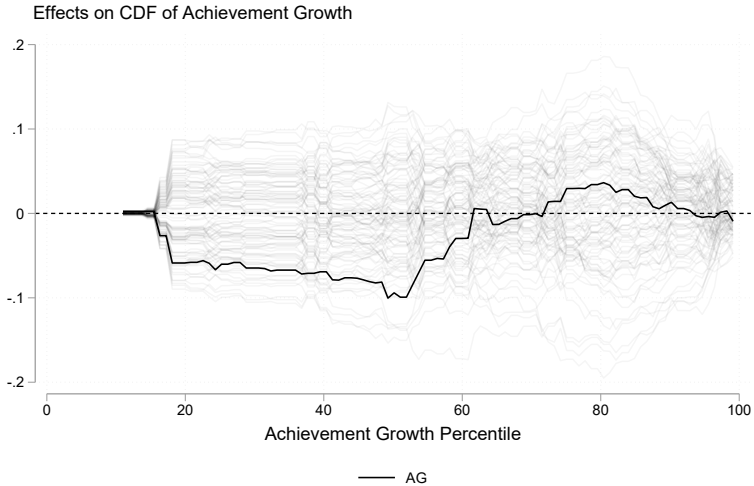


Distributional Impacts on AG (with Randomization Inference)



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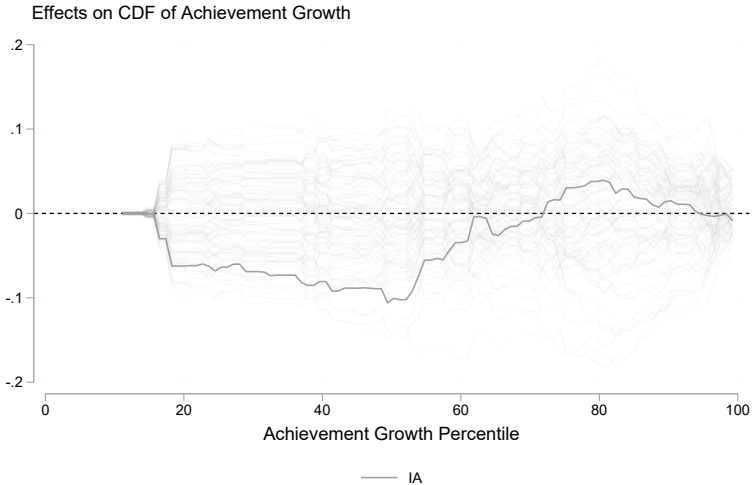

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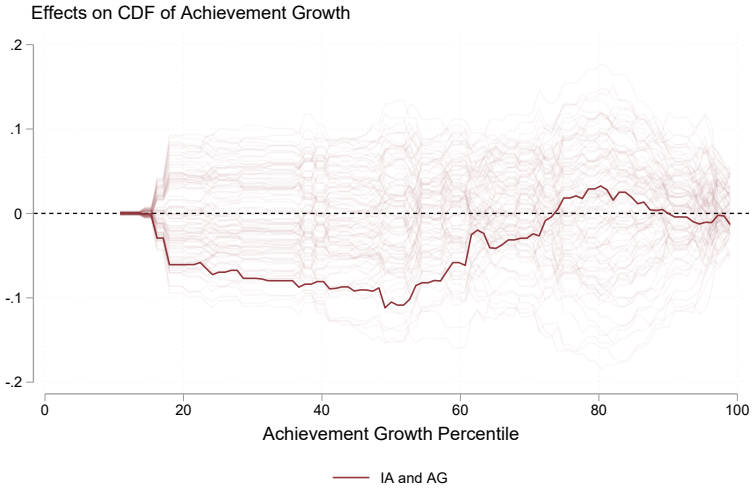

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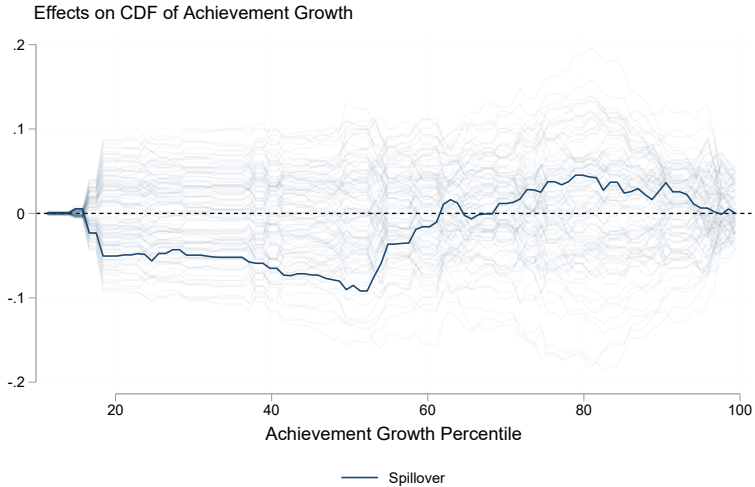

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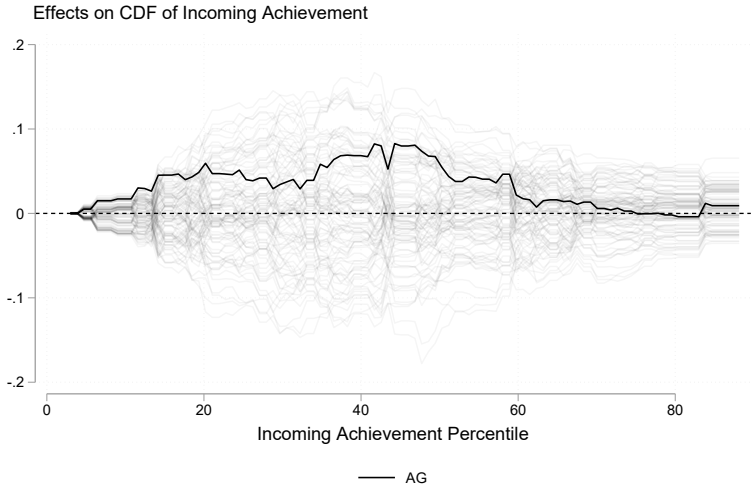

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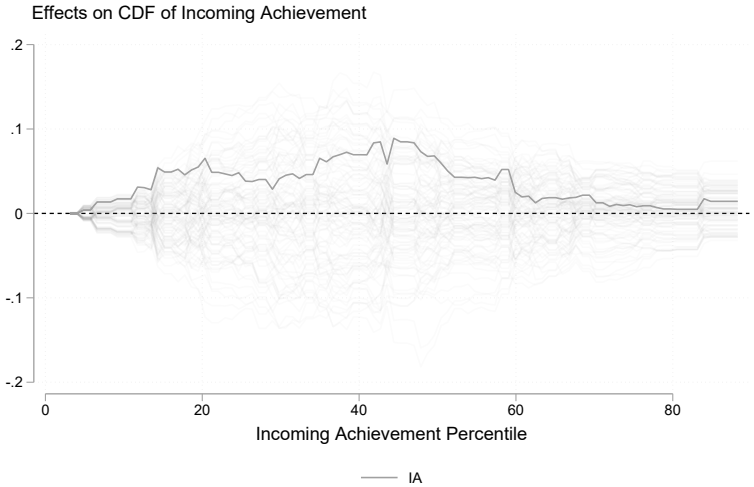

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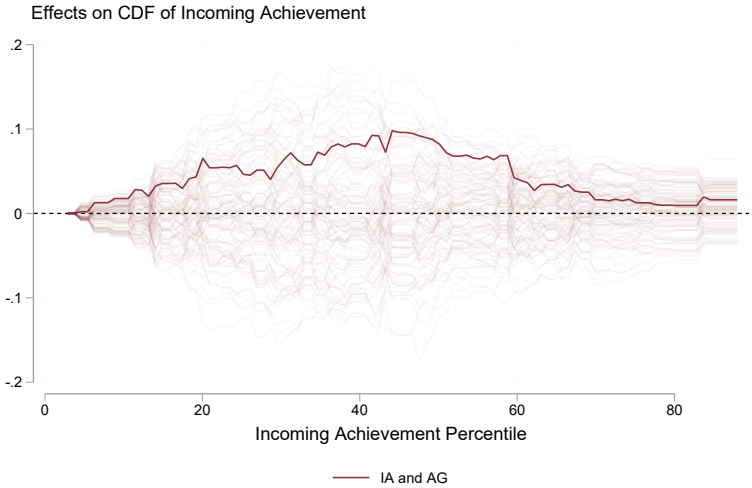

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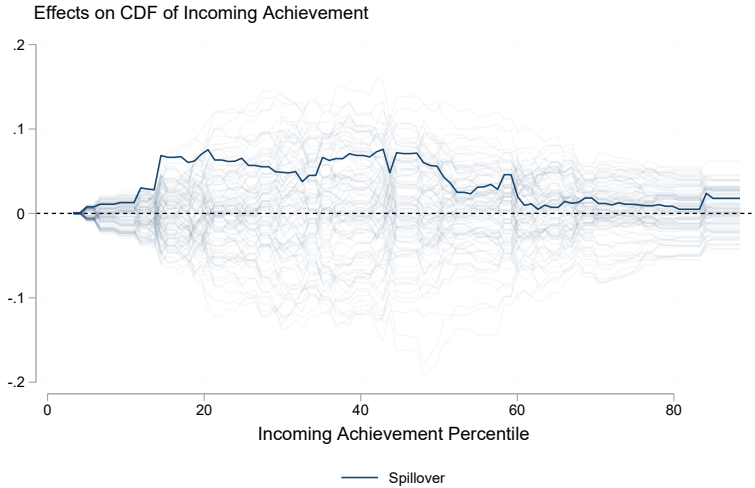

Non-cognitive outcomes improve but not test scores

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

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

Non-cognitive outcomes improve but not test scores

	(1)	(2)	(3)	(4)	(5)
		Low Saturation		High Saturation	
	Control Mean	2019	2021	2019	2021
		Panel A: School Experience Survey			
Happiness Index	0.048	-0.038	-0.006	0.028	0.072**
		(0.027)	(0.030)	(0.027)	(0.028)
		[0.117]	[0.445]	[0.223]	[0.028]
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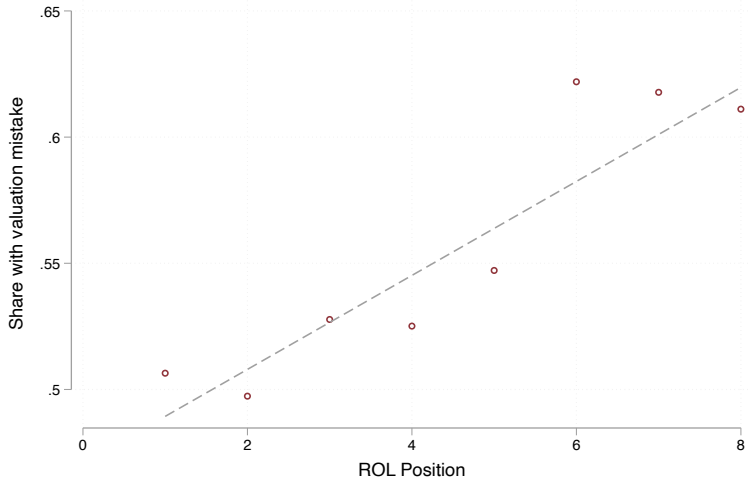
Biases are choice relevant



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Pessimism Correlates

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

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Pessimism Correlates

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Parents College +	1.085 ***	0.627 ***	-0.009	0.126
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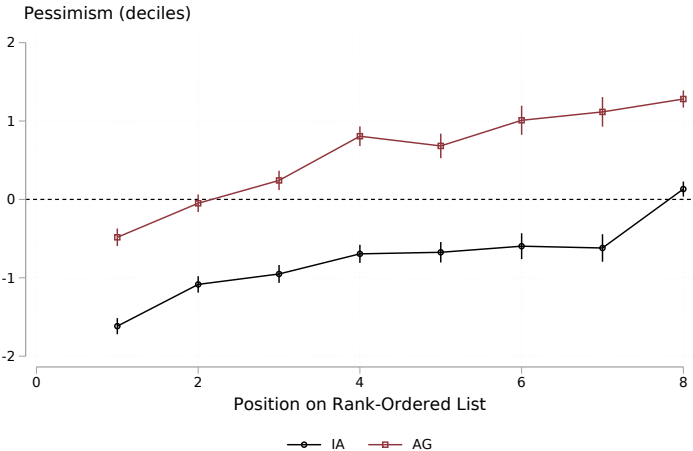
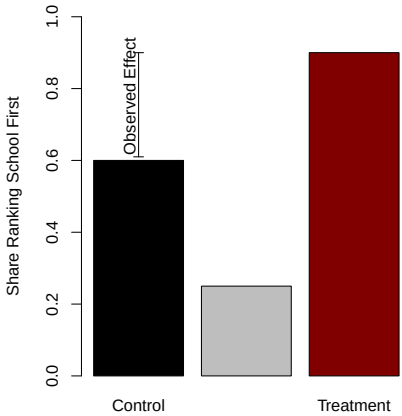
Bias by Position of the Rank-Ordered List



- 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

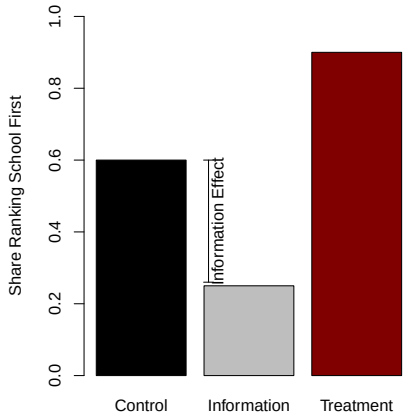
Intuition

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



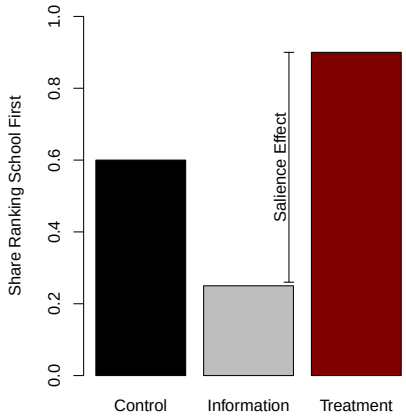
Intuition

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



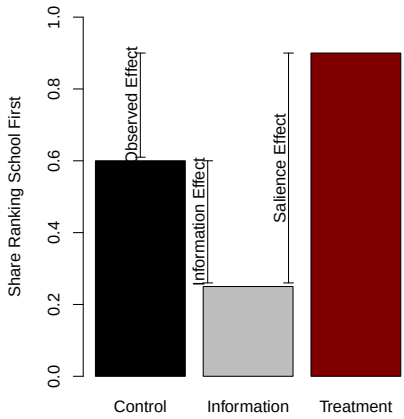
Intuition

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

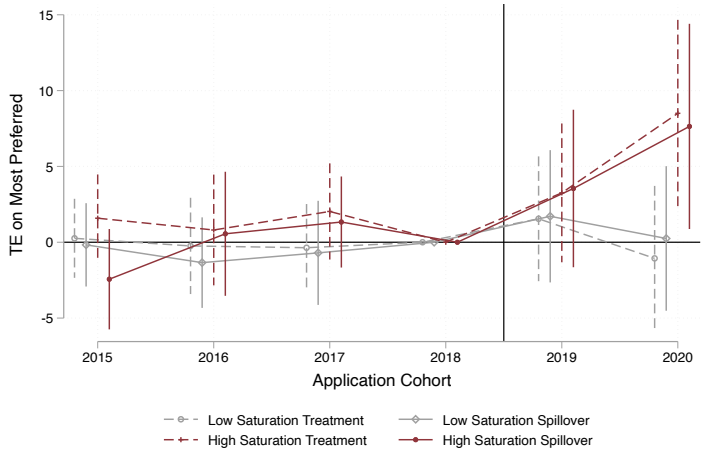


Intuition

Observed Effect = Salience Effect - Information Effect



Reduced Form Effects Implied by Structural Model



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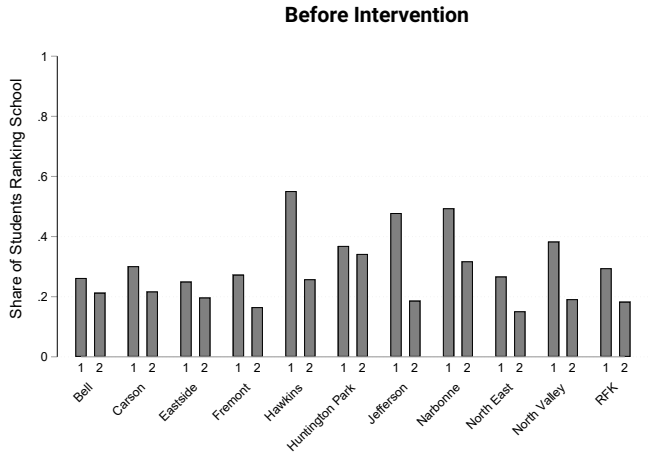
Many Applicants Face No Admission Risk

	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

No Descriptive Evidence of Strategic Behavior



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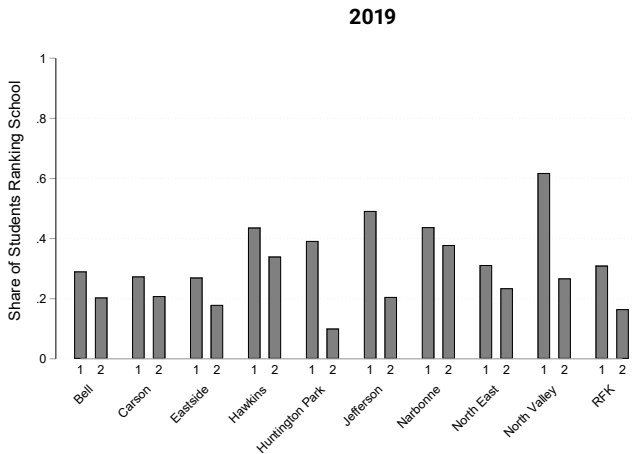

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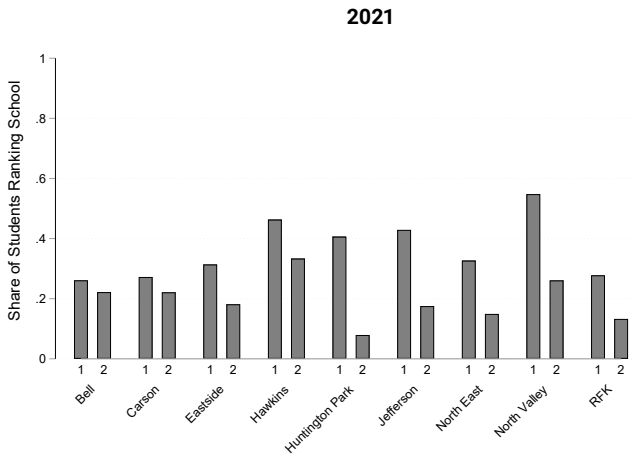

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