The Aggregate Effects of School Choice: Evidence from a Two-Stage Experiment

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Background

- India has achieved near universal primary school enrollment.
  - ~96% enrollment in among children aged 6-14 (Pratham, 2010).
- But learning levels are low
  - 92% of 1st grade students cannot read at grade level
  - 31% cannot even recognize letters accurately
  - 60% of children aged 6-14 cannot read at 2nd grade level (Pratham 2010)
- Severe accountability problems in the public school education system.
  - 25% teachers in public schools were absent during unannounced visits, and less than half of them were actually in the classroom teaching (Kremer et al, 2005).
- Sharp increase in the number of fee-charging private schools over the past decade
  - Over 20% of rural children and over 50% of urban children aged 6-14 attend private schools (Desai et al. 2009)
  - Drivers include demand for English, and public school failure

Summary Statistics on Public & Private Schools (in our sample)

	Private Schools (1)	Government Schools (2)	(1)-(2)	P-value of (1)- (2)
Normalized Baseline Telugu Score	**0.65**	-0.03	0.68	0.00
Normalized Baseline Math Score	**0.67**	-0.01	0.68	0.00
Both parents have completed primary school	**0.58**	0.27	0.31	0.00
At least one parent has completed grade 10	**0.56**	0.34	0.22	0.00
Scheduled Caste	0.14	**0.33**	-0.19	0.00
Household Asset Index	**3.85**	3.20	0.65	0.00
Annual Fees	**1330.37**	3.79	1326.57	0.00
Total annual spending	1462.66	**7,679.71**	-6217.05	0.00

Motivation

- Existing studies in India find significantly higher test scores in private schools even after controlling for HH assets/literacy
  - Muralidharan & Kremer (2008)
  - Desai, Dubey, Vanneman, & Banerjee (2009)
  - But confounded by omitted variables and selection issues

- Theory (and cross sectional data) suggest a strong case for considering voucher-based education reforms that fund students and not schools – increasing choice and competition
  - Ethical as well as efficiency reasons to consider this
  - Concerns about social stratification (limited 'voice' as well as 'exit' options for poor)

- The recent Right to Education Act includes a provision mandating that private schools reserve up to 25% of the seats in their school for students from disadvantaged backgrounds

- No evidence on what the impact of such a provision may be!

This Paper

- Presents results from the first school-choice experiment in India (designed to mimic key provisions of the RtE Act)
- Experiment conducted across 180 villages in the state of Andhra Pradesh
- Randomly selected communities and students are provided with vouchers/scholarships to move to a private school of their choice (typically within the same village)
- Key design feature is the ability to:
  - Compare the impact of receiving the scholarship relative to a "pure" control that is uncontaminated by students leaving for private schools
  - Study the impact of the program on (a) students left behind in the public schools, and (b) students starting out in the private schools to begin with

- Experimental Design & Validity
- Results - Process
- Results – Test Scores

Experimental Design

Typical Experimental Design for School Choice Studies

Group 1	Group 2	Group 3	Group 4
Non-Applicants in Public Schools	Applicants in Public Schools NOT awarded a Voucher	Applicants in Public Schools AWARDED a Voucher	Non-voucher students in private schools

Experimental Design

Design of the AP School Choice Project

Treatment Villages

Group 1T	Group 2T	Group 3T	Group 4T
Non-Applicants in Public Schools	Applicants in Public Schools NOT awarded a Voucher	Applicants in Public Schools AWARDED a Voucher	Non-voucher students in private schools

Control Villages

Group 1C	Group 2C	Group 3C	Group 4C
Non-Applicants in Public Schools	Applicants in Public Schools NOT awarded a Voucher	Does not exist	Non-voucher students in private schools

Key Features of Scholarship Program

- Household level
  - Completely voluntary, can always go back to public school
  - No conditions (except answering surveys and taking assessments)
  - Scholarship covered all school fees, books, and uniforms
  - Did not cover transport and mid-day meals
  - Household did not see any cash or physical voucher (payments made directly to schools)
- School level
  - Completely voluntary as well
  - Fees set by Foundation at the 90th percentile of the distribution of private school fees in the sample villages (expected to be above marginal cost for all schools)
    - Pre-specified rate of fee increase for 5 years (based on inflation) with an average annual increase of ~10-12%
  - Schools were asked if they:
    - A) Wanted to participate in the program
    - B) And if so, how many seats they could offer to scholarship students
  - Schools not allowed to cherry pick students – if there was more demand for a particular school than the number of places offered under (B), then those places would be allocated by lottery
  - Fees would be directly paid by the Foundation (including books, and uniforms)
  - No top up fees could be charged (except for the school bus if used)

Validity of Design

- Randomization ensures that there is no difference between any of the groups across T & C villages on observables
  - Baseline test scores
  - HH affluence/education
- Main challenge is attrition
- We try to track every kid who applied for a scholarship, and a representative sample of groups 1 and 4
- 33% attrition in group 1; 39% in group 4
  - But no differential attrition
- 10% attrition in group 3T; 15% attrition in groups 2T and 2C
  - This difference IS significant
  - But, no difference on observables
  - Will do both inverse probability re-weighting and Lee bounds

Descriptive Results: Teacher Comparisons

Characteristics:	Private School Teachers (1)	Government School Teachers (2)	(1) - (2)	P-value of (1)-(2)
Male	**0.22**	0.43	-0.21	0.00
Age	27.01	**39.61**	-12.60	0.00
Years of teaching	4.76	**14.53**	-9.77	0.00
Number of Schools taught previously	0.78	**2.63**	-1.85	0.00
Completed at least college or masters	0.61	**0.89**	-0.28	0.00
Teacher training completed	0.27	**0.99**	-0.72	0.00
In-service teacher training program attended in the last 6 months	0.01	**0.79**	-0.77	0.00
Come from the same village	**0.46**	0.14	0.32	0.00
Current gross salary per month	2,003.32	**13,843.32**	-11,840.00	0.00
Total number of observations	1,641	1,195		

Descriptive Results: Teacher time use diaries

Teacher Time Use (minutes) in a Typical Day in Control Villages

Characteristics:	Private School Teachers (1)	Government School Teachers (2)	(1) - (2)	P-value of (1)-(2)
Teaching activity	**247.67**	218.77	28.90	0.00
Preparing for classes	7.78	7.03	0.75	0.47
Correcting homework	**53.47**	38.99	14.48	0.00
Maintaining order and discipline	14.40	12.98	1.42	0.29
Administrative/paper work	5.84	**17.28**	-11.43	0.00
Breaks during school	**45.91**	40.98	4.93	0.05
Getting children to attend school	1.81	**5.77**	-3.96	0.00
Mid-day meals	19.71	**35.34**	-15.63	0.00
Extra classes	**9.97**	3.93	6.05	0.00
Others	6.33	4.39	1.94	0.14
Total time spent in a given day	**412.89**	385.44	27.45	0.00
Total number of observations	1,641	1,195		

Descriptive Results: Teacher and Classroom Activities

Classroom activity and Teacher Absence in Control Villages

Classroom level Characteristics:	Private School Teachers (1)	Government School Teachers (2)	(1) - (2)	P-value of (1)-(2)
Class is engaged in active teaching	**0.47**	0.35	0.12	0.00
A teacher is present in class	**0.97**	0.93	0.05	0.00
Effective in teaching and maintaining discipline	**0.47**	0.36	0.11	0.00
Teacher has complete control over class	**0.70**	0.42	0.28	0.00
Same teacher teaches another class in the same room	0.20	**0.79**	-0.59	0.00
Teacher level Characteristics				
Cannot find the teacher (absent) before the class starts	0.08	**0.27**	-0.19	0.00
Teacher is actively teaching	**0.44**	0.29	0.15	0.00
Teacher is in school and not teaching	0.02	**0.06**	-0.04	0.00

Descriptive Results: Student Time Use Diaries

Characteristics	Private Schools (1)	Govt. Schools (2)	(1) - (2)	P-value of (1)-(2)	Applicants offered from treatment (3)	Applicants from control (4)	Intention to Treat Estimate (3)-(4)	P-value of (3)-(4)	Treatment on Treated Estimate (5)	P-Value of (5)
Bathing/Toilet/Getting ready	55.43	64.66	-9.24	0.00	57.64	64.49	-6.84	0.13	-9.37	0.13
Time spent in school	**428.84**	395.40	33.44	0.00	422.72	398.00	**24.73**	0.00	**33.86**	0.00
Studying and doing homework at home	**75.79**	49.07	26.72	0.00	50.17	49.41	0.76	0.85	1.04	0.85
Private tuition	**28.38**	17.11	11.27	0.05	15.59	21.91	-6.32	0.38	-8.66	0.37
Watching TV	77.29	78.89	-1.61	0.78	76.38	78.58	-2.21	0.70	-3.02	0.70
Playing with friends	83.12	**103.69**	-20.57	0.00	104.38	104.28	0.10	0.99	0.14	0.99
At home	827.33	841.72	-14.39	0.16	888.96	847.17	41.79	0.13	-30.39	0.12
Working in the household or on chores	7.95	**24.68**	-16.73	0.00	11.77	23.47	**-11.70**	0.08	**-16.03**	0.08
Caring for children and elderly	6.28	**14.66**	-8.38	0.01	8.51	16.62	-8.11	0.02	-11.10	0.02

Descriptive Results: Parental Satisfaction, Aspiration and Perceptions of Their Child's Education

Characteristics	Private Schools (1)	Government Schools (2)	P-value of (1)-(2)	Applicants offered from treatment (3)	Applicants from control (4)	P-value of (3)-(4)	Treatment on Treated Estimate (5)	P-Value of (5)
Satisfied with quality of child's education	**0.92**	0.77	0.00	**0.86**	0.77	0.06	**0.13**	0.06
Like to see child go to college	0.18	0.17	0.80	0.17	0.15	0.45	0.04	0.45
Aspire to have a child get a formal sector job	**0.71**	0.60	0.02	0.66	0.57	0.21	0.12	0.21
Quite likely that child will meet the aspiration of getting a formal sector job	**0.78**	0.60	0.00	0.61	0.59	0.87	0.02	0.87
Differences between Parental Ratings on Child's Characteristic and Teacher's Effectiveness								
High intelligence	0.75	0.50	0.00	0.53	0.49	0.43	0.06	0.43
High discipline	0.76	0.57	0.00	0.62	0.56	0.37	0.07	0.38
High interest in going to school	0.88	0.78	0.00	0.77	0.78	0.86	-0.01	0.86
High interest in doing homework	0.85	0.55	0.00	0.63	0.55	0.16	0.11	0.16
High interest in learning	0.73	0.48	0.00	0.50	0.50	0.94	-0.01	0.94
High interest in maintaining personal hygeine	0.86	0.60	0.00	**0.72**	0.60	0.05	**0.16**	0.06
Differences between Parental Ratings onTeacher's Effectiveness in Improving -								
Intelligence/academic ability	0.81	0.60	0.00	**0.71**	0.59	0.07	**0.16**	0.07
Discipline	0.80	0.61	0.00	**0.73**	0.62	0.08	**0.15**	0.08
Interest in going to school	0.81	0.63	0.00	**0.77**	0.66	0.06	**0.16**	0.06
Interest in doing homework	0.85	0.63	0.00	0.71	0.61	0.12	0.13	0.12
Interest in learning	0.80	0.56	0.00	0.63	0.57	0.36	0.09	0.37
Personal hygeine	0.75	0.58	0.00	**0.73**	0.61	0.07	**0.16**	0.07

Children's Views on Schools and Teachers

Characteristics	Private Schools (1)	Government Schools (2)	P-value of (1)-(2)	Applicants offered from treatment (3)	Applicants from control (4)	P-value of (3)-(4)	Treatment on Treated Estimate (5)	P-Value of (5)
Child likes going to school	0.95	0.92	0.08	0.87	0.94	0.07	-0.10	0.06
Teacher checks the child's homework	0.99	0.92	0.00	0.98	0.91	0.01	0.11	0.01
Teacher punishes for not doing homework	0.90	0.79	0.00	0.89	0.78	0.02	0.16	0.02
Teacher has beaten the child in school	0.87	0.77	0.00	0.79	0.74	0.34	0.07	0.33
Child carries water from home	0.64	0.44	0.00	0.54	0.42	0.08	0.17	0.08
Child sits in the front of the classroom	0.37	0.36	0.71	0.34	0.33	0.74	0.02	0.74
Teacher encourages use of workbooks	0.80	0.45	0.00	0.64	0.51	0.04	0.20	0.04
Homework assigned at least once in two days	0.98	0.81	0.00	0.97	0.80	0.00	0.24	0.00
Teacher beating at least once in the last week	0.66	0.57	0.09	0.57	0.55	0.80	0.03	0.80
Child uses the school toilet	**0.37**	**0.14**	**0.00**	**0.34**	**0.16**	**0.00**	**0.27**	**0.00**

Test Score Impact (1)

Panel A: Comparing 3T with 2T

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Offered	0.003	-0.086**	-0.063*	0.141***
	(0.036)	(0.037)	(0.038)	(0.046)
N	2,654	2,718	2,718	2,654
N in 3T	1,738	1,778	1,778	1,738
N in 2T	916	940	940	916

Panel B: Comparing 3T with 2C

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Offered	0.018	-0.079**	-0.053	0.178***
	(0.040)	(0.039)	(0.041)	(0.053)
N	4,527	4,622	4,622	4,527
N in 3T	1,738	1,778	1,778	1,738
N in 2C	2,789	2,844	2,844	2,789

Test Score Impact – by Medium of Instruction

Panel A: Scholarship students who go to English medium schools

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Offered	0.056	-0.205***	-0.152**	0.517***
	(0.061)	(0.063)	(0.068)	(0.083)
N	3,239	3,300	3,300	3,239
N in 3T	450	456	456	450
N in 2C	2,789	2,844	2,844	2,789

Panel B: Scholarship students who go to Telugu medium schools

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Offered	0.002	-0.037	-0.028	0.057
	(0.046)	(0.047)	(0.048)	(0.058)
N	3,934	4,014	4,014	3,934
N in 3T	1,145	1,170	1,170	1,145
N in 2C	2,789	2,844	2,844	2,789

Test Score Impact – by Medium of Instruction (2)

Panel C: ITT Estimates by Village Type

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Villages with English Medium Schools only				
Offered	0.163**	-0.071	0.012	0.548***
	(0.074)	(0.080)	(0.092)	(0.088)
N	1,255	1,274	1,274	1,255
Villages with Telugu Medium Schools only				
Offered	0.047	0.061	0.003	0.052
	(0.083)	(0.088)	(0.087)	(0.106)
N	825	842	842	825
Villages with both English and Telugu medium private schools				
Offered	-0.058	-0.115**	-0.117**	0.054
	(0.058)	(0.053)	(0.059)	(0.081)
N	2,382	2,438	2,438	2,382

Test Score Impact: Spill-overs to Other Groups

Panel A: Comparing Non-Applicants from Government Schools

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Group 1	0.050	-0.025	0.046	0.119
	(0.062)	(0.069)	(0.064)	(0.075)
N	1,008	1,030	1,030	1,008
N in 1T	476	490	490	476
N in 1C	532	540	540	532

Panel B: Comparing Non-scholarship students from Private Schools

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Group 4	-0.012	0.063	0.027	-0.119*
	(0.048)	(0.049)	(0.058)	(0.066)
N	1,346	1,386	1,386	1,346
N in 4T	704	717	717	704
N in 4C	642	669	669	642

Test Score Impact: Treatment on Treated

	Normalized End line General Score (Y3)	Normalized End line Telugu Score (Y3)	Normalized End line Math Score (Y3)	Normalized End line English Score (Y3)
Accepted	0.032	-0.142**	-0.095	0.316***
	(0.070)	(0.070)	(0.074)	(0.093)
N	4,527	4,622	4,622	4,527
N in 3T	1,738	1,778	1,778	1,738
N in 2C	2,789	2,844	2,844	2,789

Test Score Impact: Aggregate Impact

Table: Aggregate Treatment Effect Across All Villages

	Group 1	Group 2	Group 3	Group 4	All Villages
Normalized End line General Score (Y3)	0.050	0.012	0.018	-0.012	**0.048**
	(0.062)	(0.044)	(0.040)	(0.048)	**(0.047)**
Normalized End line Telugu Score (Y3)	-0.025	0.006	-0.079**	0.063	0.056
	(0.069)	(0.042)	(0.039)	(0.049)	(0.043)
Normalized End line Math Score (Y3)	0.046	0.008	-0.053	0.027	0.052
	(0.064)	(0.045)	(0.041)	(0.058)	(0.048)
Normalized End line English Score (Y3)	0.119	0.031	0.178***	-0.119*	0.023
	(0.075)	(0.057)	(0.053)	(0.066)	(0.065)
Population	10267	4453	1980	30050	
Sample Size	1554	3784	1778	2258	
Sampling Weights	6.94	1.15	1.1	13.3	

Summary and Discussion

- Paper presents results from the first school-choice experiment in India (designed to mimic key provisions of the RtE Act)
- Process indicators are a lot better for the private schools
- Parental satisfaction is also significantly higher
- But no significant impact on average test scores
  - Important heterogeneity by subject/language of instruction
- Mixed results for the private school/voucher debate
  - Parental/HH factors may account for most of the cross-sectional gaps
  - But: What levels of learning are private schools optimized for?
  - Adjustment issues?
  - Value of scholarship is ~40% of per child spending in govt. schools