Understanding Private School Performance in Rural Pakistan

Nick Eubank

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Explosion of Rural Private Schools

- Pakistan: from 2000 to 2005, enrollment increased 47%. By 2005, 1/3 of students in private school.
- India: in 2005, >20% of rural students in private school.

Context

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Private schools radically outperform government schools.

- (**Jimenez:1991wa**; **Jimenez:1995vg**; **Pratham:2005vw**; **Andrabi:2011hl**; **Desai:2009ty**; **Tooley:2003vf**; **Alderman:2003we**; **Alderman:2001wk**)

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But why?

Better Inputs?

Explanation 1: Better Teaching

Better Inputs?

- No

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Better Inputs?

- ▶ No

But perhaps better induced efforts

- ▶ Clearly problem in government:(**Muralidharan:2008tb**;
  Chaudhury:2006vp)
- ▶ Consistent with US research: **Hanushek:1997tt**;
  Hanushek:2003hz; **Banerjee:2007wx**

- Even after controlling for HH wealth and parental education, maybe private school students are "different."

Explanation 2: Sorting

- Even after controlling for HH wealth and parental education, maybe private school students are "different."
    - >20% of households send send children to *both* government and private schools.
- Some attempts to control through randomization of vouchers
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If true, then private school superiority is illusory.

- Problem in light of push for vouchers.
  (**Chakrabarti:2008vc**; **Kelkar:2006tq**; **Panagariya:2008wi**)

Contribution

Examines compatibility with novel finding:
Private school dominance declines by 50% with village caste fractionalization.

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Examines compatibility with novel finding:
Private school dominance declines by 50% with village caste fractionalization.

- ▶ Consistent with private school dominance arising from selective "sorting"

Outline

Data

Learning and Educational Attainment in Punjab Schools (LEAPS)

- 2003-2007 panel data with data from teachers, students, households, and owners.
- One four year panel (12,110 children)
- One two year panel (11,852 children)
- 112 Villages
- Three Districts
- Includes: Child Test Scores, Teacher Test Scores, Parental Educational, HH Wealth
- Test scores are normalized using IRT – mean 0, standard deviation 1.

Measuring Learning

Lagged-Value-Added Model:

$$Y_{i,t} = \alpha_t X_{i,t} + \alpha_{t-1} X_{i,t-1} + \cdots + \alpha_1 X_{i,1} + \epsilon_{i,t} \qquad (1)$$

Measuring Learning

Lagged-Value-Added Model:

$$Y_{i,t} = \alpha_t X_{i,t} + \alpha_{t-1} X_{i,t-1} + \cdots + \alpha_1 X_{i,1} + \epsilon_{i,t} \tag{1}$$

$$Y_{i,t} = X_{i,t}\alpha + Y_{i,t-1}\beta + \epsilon_{i,t} \tag{2}$$

- ▶ Flexible persistence parameter
- ▶ All past scores included to control of measurement error.
- ▶ Controls for differences in initial levels, but not differences in rates.

Measuring Learning

Village Level:

1. Run Lagged-Value Added regressions with village-school type dummies for each village j.

$$Y_{i,t} = X_{i,t}\alpha + Y_{i,t-1}\beta + \mathbb{I}_{i,j,type,t}\gamma_{j,type} + \epsilon_{i,t}$$

2. Extract dummies and calculate village public-private gap.
3. Analyze at level of village.

$$Gap_j = Z_j\delta + \eta_j$$

Measuring Learning

Teacher Level:

1. Run Lagged-Value Added regressions with teacher fixed effects dummies for each teacher k.

$$Y_{i,t} = X_{i,t}\alpha + Y_{i,t-1}\beta + \mathbb{I}_{i,k,t}\zeta_k + \epsilon_{i,t}$$

2. Extract fixed effect coefficients as estimates of teacher contributions

3. Analyze at level of teacher (weighted by number of students).

Outline

Caste in Punjab

- Very similar to caste in India
  - Biraderi implies "an inherent, inbuilt hierarchy that governs social interactions"(**Gazdar:2007vt**).
- Not synonymous with economic status:
  - "the poorest Jatt is still better off than the richest kammi." (**Gazdar:2007vt**)

Caste in Punjab

Village Fractionalization
By District
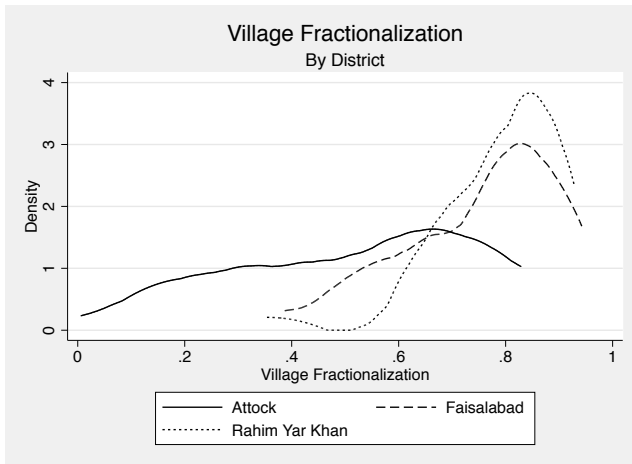
Caste in Punjab

Caste Fractionalization and Value Added Scores
With 90 Percent Confidence Intervals
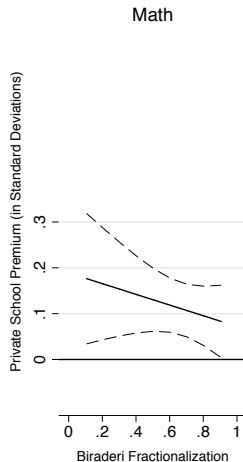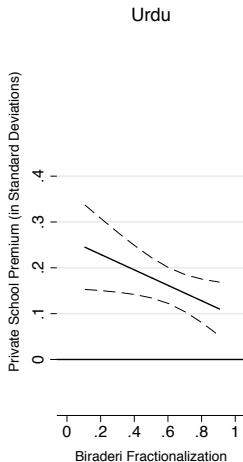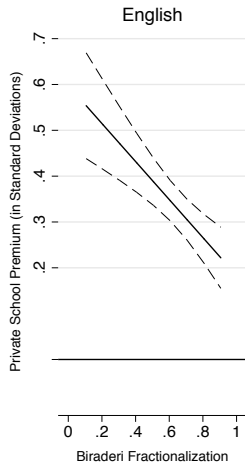
English

Urdu

Math

Private School Premium (in Standard Deviations)

Biraderi Fractionalization

Controls include village fixed effects, gender, age, age squared, child wealth and parental education
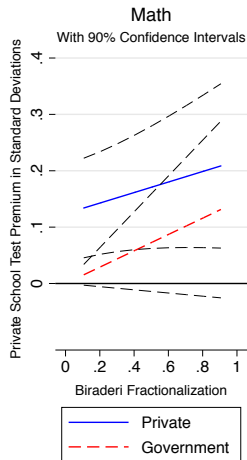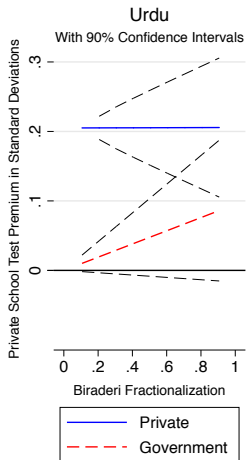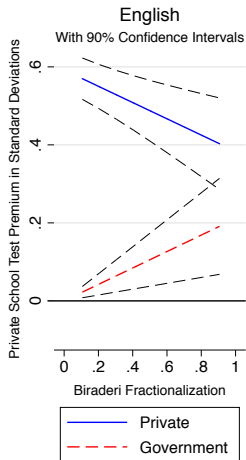
Caste Fractionalization and Value Added Scores
With 90 Percent Confidence Intervals

Controls include village fixed effects, gender, age, age squared, child wealth and parental education

Outline

No Difference in Inputs

Table 4: Private Teacher Characteristics and Village Fractionalization

	(1)	(2)	(3)	(4)	(5)	(6)
	Days Absent	Female	From Village	Teacher English Exam Score	More than Grade School Education	Basic School Facility Index
Biraderi Fractionalization	-0.91	-0.052	0.31*	0.19	0.20*	-0.023
	(-1.32)	(-0.60)	(1.71)	(1.06)	(1.68)	(-0.07)
Median Village Expenditures	0.000054	0.0000057	0.0000030	0.000016	0.000013	0.000049
	(0.64)	(0.46)	(0.12)	(0.50)	(0.68)	(1.13)
Log Number of Households	-0.29	-0.030*	-0.036	0.045	0.0072	-0.13
	(-1.47)	(-1.67)	(-0.74)	(0.86)	(0.29)	(-1.43)
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1494	1494	1494	768	1494	493

All results clustered at the village level.
All regressions weighted by number of students.
Robust t-statistics presented in parenthesis.
* p¡0.10, ** p¡0.05, *** p¡0.01

No Difference in Inputs

Table 5: Government Teacher Characteristics and Village Fractionalization

	(1) Days Absent	(2) Female	(3) From Village	(4) Teacher English Exam Score	(5) More than Grade School Education	(6) Basic School Facility Index
Biraderi Fractionalization	-0.33	0.099	0.26	0.093	-0.10	0.32
	(-0.34)	(0.72)	(1.20)	(0.36)	(-0.84)	(0.63)
Median Village Expenditures	-0.00018	0.000026	-0.0000068	0.000052*	0.000021	0.000033
	(-0.99)	(0.99)	(-0.23)	(1.75)	(1.23)	(0.53)
Log Number of Households	-0.33	-0.040*	-0.040	0.034	0.000076	-0.094
	(-1.41)	(-1.80)	(-0.59)	(0.71)	(0.00)	(-0.85)
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	988	988	988	477	988	291

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Robust t-statistics presented in parenthesis.
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Teacher Absenteeism and Compensation

Private Schools — Government Schools

In Government Schools, the most absent teachers are the highest earners.

While in Private Schools, absenteeism is penalized.

Days Absent per Month

Salary Bonus or Penalty (in Rs)
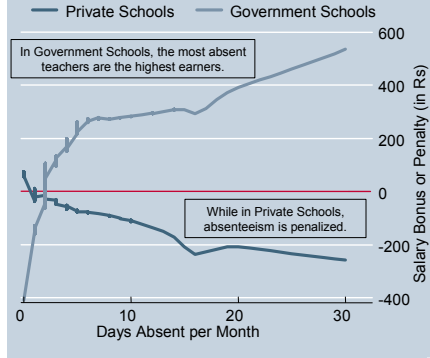
Teacher Compensation
And Student Test Scores

Private Schools — Government Schools

Private School teachers whose students perform well earn more.

While Government Salaries do not reflect student performance.

Salary Bonus or Penalty (in Rs)

200

100

0

-100

-200

Student Test Scores

0   200   400   600   800
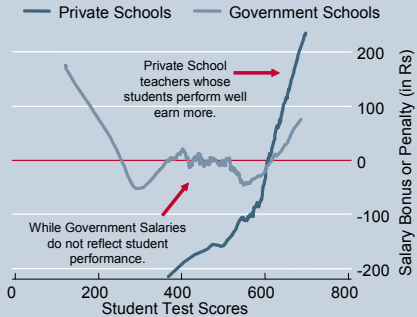
No Difference in Incentives

Table 6: Village Fractionalization and Teacher Compensation

	Private Teachers		Government Teachers	
	(1) Log Salary	(2) Log Salary	(3) Log Salary	(4) Log Salary
Days Absent Last Month	0.041**	-0.0068	0.0017	0.0041***
	(2.00)	(-0.85)	(0.40)	(2.79)
Biraderi Fractionalization	0.24	0.21	-0.085	-0.050
	(1.18)	(0.78)	(-1.47)	(-0.74)
Days Absent * Fractionalization	-0.063**		0.0050	
	(-2.05)		(0.77)	
Gender	-0.32***	-0.27**	-0.012	0.0095
	(-3.78)	(-2.17)	(-0.72)	(0.54)
Age of teacher	0.0053	0.023**	0.021***	0.018***
	(1.21)	(2.54)	(12.18)	(14.48)
Average Value Added Score		0.22		-0.033
		(0.48)		(-0.48)
Value-Added * Fractionalization		-0.47		-0.020
		(-0.67)		(-0.22)
Constant	7.07***	8.02***	7.51***	7.60***
	(29.09)	(20.15)	(47.83)	(61.24)

Outline

Sorting

Table 7: Child Test Scores and Fractionalization

	English		Urdu		Math	
	(1)	(2)	(3)	(4)	(5)	(6)
Private School	0.31***	0.29***	0.14***	0.14***	0.11***	0.087**
	(10.98)	(10.42)	(5.74)	(5.65)	(3.17)	(2.58)
Biraderi Fractionalization	0.13*	0.096	0.085	0.069	0.13	0.13
	(1.70)	(1.33)	(1.26)	(1.08)	(1.34)	(1.46)

A Sorting Story

Homogenous Villages: Children sort on academic potential.

Fractionalized Villages: Children also sort by social status.

A Sorting Story

Homogenous Villages: Children sort on academic potential.

Fractionalized Villages: Children also sort by social status.

1. Parents pick winners

Table 9: School Choice and Child Intelligence

	(1)	(2)
Mom Reports Child Above Average Intelligence	0.058**	0.041*
	(2.82)	(1.99)
Mom Has Some Schooling	0.080	-0.032
	(1.51)	(-0.27)
Mom Has Some Schooling	0.084**	0.084
	(3.23)	(0.71)
Log Month Expenditure	0.043	-0.038
	(1.78)	(-1.05)
Age	-0.021***	-0.017**
	(-3.76)	(-3.26)
Age Squared	0.00025	0.00017
	(1.78)	(1.64)
Female	0.029	-0.0012
	(1.27)	(-0.04)
Constant	-0.24	0.35
	(-1.13)	(1.85)
Village Fixed Effects	Yes	No
Household Fixed Effects	No	Yes
Observations	3426	3426

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Village Caste Concentration
By Village Fractionalization Terciles

Density

Percentage of Village in Largest Two Castes

Least Fractionalized 1/3 of Villages
Middle 1/3 of Villages
Most Fractionalized 1/3 of Villages

Village Caste Concentration
By Village Fractionalization Terciles

Density — Percentage of Village in Largest Two Castes
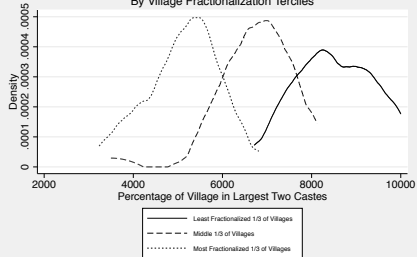
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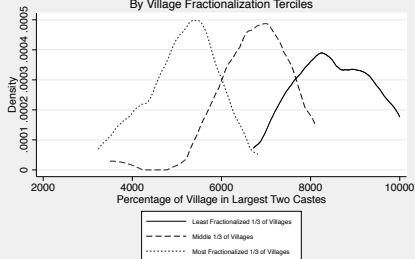
School Caste Concentration
By Village Fractionalization Terciles

Density — Percentage of Students in Largest Two Castes

Schools in Least Fractionalized 1/3 of Villages
Schools in Middle 1/3 of Villages
Schools in Most Fractionalized 1/3 of Villages

School Segregation
Government Schools

Intra-Government School Fractionalization (y-axis: 0, .2, .4, .6, .8, 1)

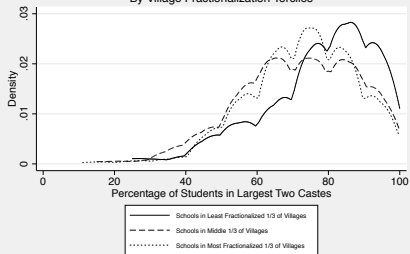Village Fractionalization (For Enrolled Students) (x-axis: 0, .2, .4, .6, .8, 1)
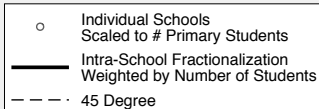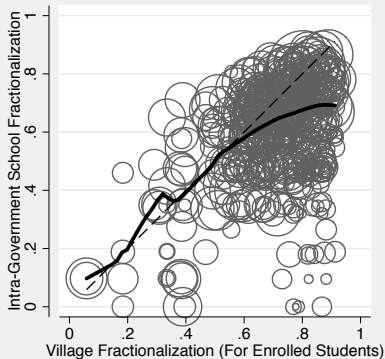
School Segregation
Private Schools

Intra-Private School Fractionalization (y-axis: 0, .2, .4, .6, .8, 1)

Village Fractionalization (For Enrolled Students) (x-axis: 0, .2, .4, .6, .8, 1)

○ Individual Schools
Scaled to # Primary Students

— Intra-School Fractionalization
Weighted by Number of Students

-·- 45 Degree
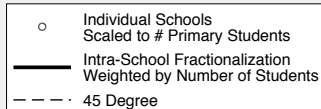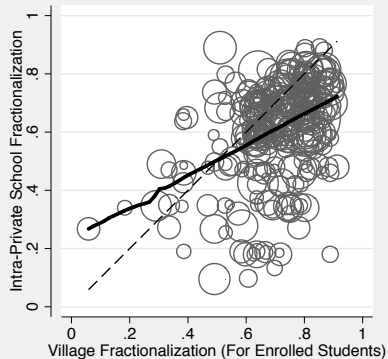
Fractionalization is probability two randomly chosen students will be from different castes.

Social Status and School Type

	(1)	(2)
	Pct of Students High Status	Pct of Students High Status
Private School	-0.11**	-0.13**
	(-2.30)	(-2.13)
Biraderi Fractionalization	-0.047*	-0.19***
	(-1.85)	(-14.78)
Fractionalization * Private	0.18**	0.21**
	(2.34)	(2.15)
Median Village Expenditure	0.0000014	
	(0.87)	
Village: Pct Adults Literate	0.00022	
	(1.22)	
Log Village Size	0.00074	
	(0.16)	
Village: Pct High Status	1.01***	
	(62.12)	
Constant	-0.0039	1.00***
	(-0.10)	(83.16)
District Fixed Effects	Yes	No
Village Fixed Effects	No	Yes
Observations	782	782

t statistics in parentheses

* p¡0.10, ** p¡0.05, *** p¡0.01

Fractionalization and Prices

	(1) Weighted by School	(2) Weighted by School	(3) Weighted by Primary Students
Biraderi	504.7**	527.9**	608.6**
Fractionalization	(2.33)	(2.50)	(2.37)
Village: Median		61.6	20.8
Expenditures		(1.25)	(0.44)
Expenditure Gini		-49.9	45.5
		(-0.24)	(0.20)
District Fixed Effects	Yes	Yes	Yes
Observations	287	287	285

t statistics in parentheses

* p¡0.10, ** p¡0.05, *** p¡0.01

Inconsistencies

Table 13: School Choice and Child Intelligence

	All		High Status		Low Status	
	(1)	(2)	(3)	(4)	(5)	(6)
Mom: Child Above Avg Intelligence	0.056	0.063	0.15	0.085	0.075	0.28
	(0.66)	(1.01)	(1.53)	(1.22)	(0.41)	(1.25)
Biraderi Fractionalization	-0.022	0.19	0.90***	0.18		0.45**
	(-0.55)	(1.00)	(22.83)	(0.76)		(2.64)
Child Above Avg * Fractionalization	0.0029	-0.031	-0.14	-0.067	-0.067	-0.35
	(0.02)	(-0.35)	(-0.96)	(-0.64)	(-0.26)	(-1.19)

Sorting Paradox

Why pay more for the same education?

Sorting Paradox

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Neighborhood Effects: Students performance is affected by peers

Sorting Paradox

Why pay more for the same education?

Neighborhood Effects: Students performance is affected by peers

Networking: About forming positive associations.

- ▶ In homogenous villages, most important association is intelligence.
- ▶ In fractionalized villages, caste matters too.

Outline

Places a lower bound on role of sorting.