Understanding Private School Performance in Rural Pakistan

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November 4, 2012

Context

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.

Private schools radically outperform government schools.

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

But why?

Explanation 1: 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
  - (**Angrist:2002up**; **Bellei:2008uu**)
- But lots of problems...
  - Risk of losing vouchers induces efforts
  - Selective admission

If true, then private school superiority is illusory.

Explanation 2: Better Incentives for Good Teachign

What matters is not inputs, but effort

- Shown in the US: **Hanushek:1997tt**; **Hanushek:2003hz**; **Banerjee:2007wx**
- Shown to be lacking in Government Schools in South Asia: (**Muralidharan:2008tb**; **Chaudhury:2006vp**)

Contribution

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

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

Why do we care?

Vouchers: hope for the future, or waste of resources?

- ▶ Big push: (**Chakrabarti:2008vc**; **Kelkar:2006tq**;
  Panagariya:2008wi)

Model for Government Schools?

- ▶ Stop hiring well educated teachers, instead focus on
  incentives.

We are literally talking about the education of *hundreds of millions
of children*.

Outline

Data

Learning and Educational Attainment in Punjab Schools (LEAPS)

- ► 2003-2007 panel data
- ► 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:

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

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

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

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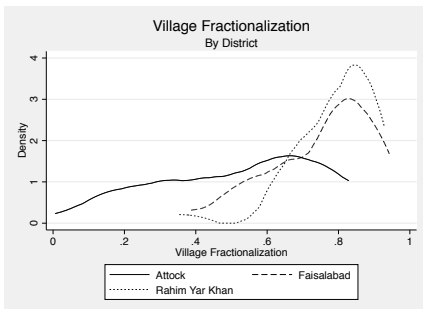3. Analyze at level of teacher (weighted by number of students).

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

Caste in Punjab

Caste Fractionalization and Test Scores

Figure : Private School Test Score Premium with Lagged Scores

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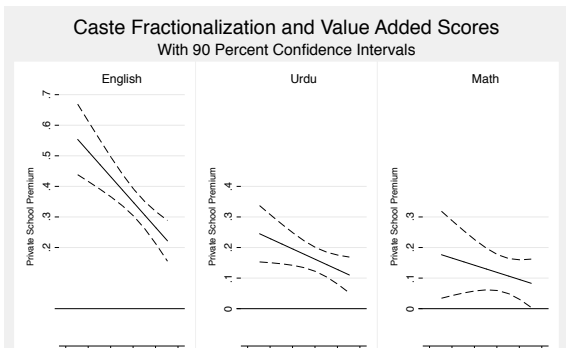
Caste Fractionalization and Test Scores

Outline

No Difference in Inputs

Table 4: Private 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	-0.91	-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

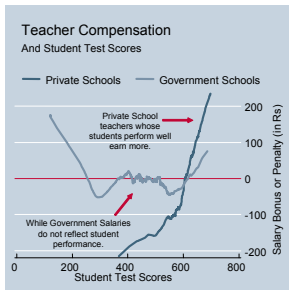|	(1) Days Absent	(2) Female	(3) From Village	(4) Teacher English Exam Score	(5) More than Grade School Education	(6) Basic School Facility Index
Biraderi Fractionalization	-0.33	0.099	0.26	0.093	-0.10	0.32
	(-0.34)	(0.72)	(1.20)	(0.36)	(-0.84)	(0.63)
Median Village Expenditures	-0.00018	0.000026	-0.0000068	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

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

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.

Salary Bonus or Penalty (in Rs)

Days Absent per Month

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)

Student Test Scores

No Difference in Incentives

Table 6: Village Fractionalization and Teacher Compensation

	Private Teachers		Government Teachers	
	(1)	(2)	(3)	(4)
	Log Salary	Log Salary	Log Salary	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

A Sorting Story

Homogenous Villages: Children sort on academic potential.

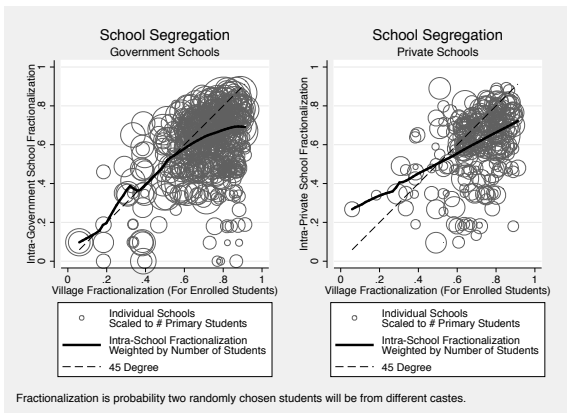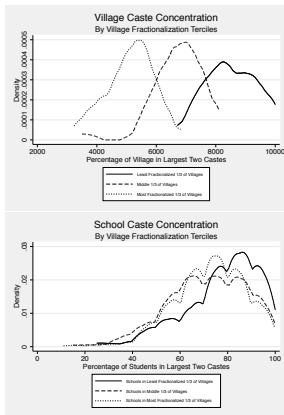Fractionalized Villages: Children also sort by social status.

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

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

School Caste Concentration
By Village Fractionalization Terciles

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

School Segregation
Private Schools

○ 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) Pct of Students High Status	(2) 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 Fractionalization	504.7**	527.9**	608.6**
	(2.33)	(2.50)	(2.37)
Village: Median Expenditures		61.6	20.8
		(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

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.