Private Schooling, Learning, and Civic Values in a Low-Income Country

Tahir Andrabi — Pomona
Natalie Bau — UCLA
Jishnu Das — Georgetown
Asim Khwaja — Harvard

Motivation

- Private school enrollments have increased dramatically in low-income countries.
  - In 2010: 80 million children in private schools in South Asia.
  - In Pakistan, share rose from 5% (1990) to 35% (2005).

- Raises urgent questions for education policy:
  1. Can private schooling improve learning?
     - Evidence of low accountability and learning in the public sector in low-income countries (Chadhury et al., 2006; Pritchett, 2013).
     - Previous evidence of (weakly) positive effects on test scores (Singh, 2015 and Muralidharan and Sundararaman, 2015).
     - Important to know if learning *improves* since lower costs per student are driven by different factor prices rather than using inputs more efficiently.
  2. Does private schooling have negative externalities for civic values or nation-building? (Bazzi et al., 2020)
  3. If there is heterogeneity in school quality, can we estimate this, and what implications does it have for policies that reallocate students to private schools?

This Paper I

- Use unique data from the LEAPS project in Pakistan that tracks children in public and private schools to extend estimates of 'homogeneous' effect of private schooling with multiple identification strategies.
  - Value-added estimates with panel data.
    - Augment value-added with child fixed effects, exploiting school-switchers.
  - IV estimates exploiting private school closures.
  - IV estimates exploiting relative distance to a private school.
- Across strategies, find evidence of large and statistically significant positive effects on learning.

This Paper II

- Estimate the effect of private schooling on civic values.
  - Addresses an important, potential negative externality of private schooling.
  - Particularly important in Pakistan, where national-building may be a key role of public schooling.
- Evidence suggests private schooling does not decrease and may increase civic values.

This Paper III

- But 'private' estimates are a weighted average of potential treatment effects due to heterogeneity in both public and private school quality.
- Different "voucher" policies will result in different weights.
- Turn to estimating school value-added (SVA) for every public and private school in the market.
  - Validate that SVA are forecast unbiased.
- Average test score effect of policies that reallocate students from current public to private schools range from $+0.072$ (worst private school in village) to $+0.227$ (best in village).

Agenda

Introduction

Context & Data

'Homogeneous' Private School Effect

Variation in School Quality

Conclusion

Context

- Over one-third of primary school enrollment in rural Punjab, Pakistan is in the private sector.
- Private schools are small, for-profit enterprises.
  - No government regulation.
  - No subsidies.
  - Follow government curriculum, but can add materials as long as base curriculum is followed.
- Median annual fee in rural Punjab: 18 USD.
- Accessible to moderately poor.
- Public school salaries are 500% greater than private school salaries.
- Private school teachers are less qualified and less experienced (Bau and Das, 2020).

Data

- Survey data collected from 112 villages in Punjab, Pakistan yearly from 2004-2007.
  - Sample restricted to villages with at least 1 private school.
- School surveys of all schools in the village (849).
  - School infrastructure, GPS coordinates, teacher information.
- Panel of tests (researcher-administered) of two cohorts of children (3rd graders in 2004 and 2006).
  - Yearly scores for math, English, and Urdu.
  - Civics scores in 2006.
- Household survey.
  - 16 households per village.
  - GPS coordinates, information on what schools children attend.

Civic Value Measures

- **Civic Knowledge Questions**: Political structure of the state and its history, basic geography of the country and region, familiarity with a popular song and national slogan, and a historical poem.
- **Civic Disposition**: Preference for government institutions and democratic decision-making.
- **Gender Bias**: Questions about relative ability of girls vs. boys in learning and leadership.

Questions

Agenda

Introduction

Context & Data

'Homogeneous' Private School Effect

Variation in School Quality

Conclusion

Method 1: Value-Added Method

Similar to Chetty et al. (2014) and Singh (2015), estimate

$$y_{igst} = \beta_0 + \lambda_g y_{igs,t-1} + \beta_1 private_{ist} + \alpha_g + \alpha_t + \mathbf{\Gamma X_{igst}} + \epsilon_{igst},$$

where

- y_{igst}: test score of student i in grade g of school s in year t.
- $private_{ist}$: indicator variable equal to 1 if a child attends a private school.
- $y_{igs,t-1}$: lagged test score.
- α_g: grade fixed effects.
- β_1: effect of 1 additional year of private schooling.

Identifying assumption: assignment of a child to a school is exogenous conditional on past test score performance.

Value-Added Results

	Math		English		Urdu		Mean	
	(1) Baseline	(2) SES	(3) Baseline	(4) SES	(5) Baseline	(6) SES	(7) Baseline	(8) SES
Private	0.153***	0.147***	0.229***	0.227***	0.159***	0.159***	0.129***	0.130***
	(0.023)	(0.022)	(0.023)	(0.022)	(0.021)	(0.020)	(0.020)	(0.019)
Adjusted R^2	0.528	0.523	0.572	0.569	0.590	0.589	0.653	0.648
N	37432	29394	37432	29394	37432	29394	37432	29394
Clusters	969	968	969	968	969	968	969	968

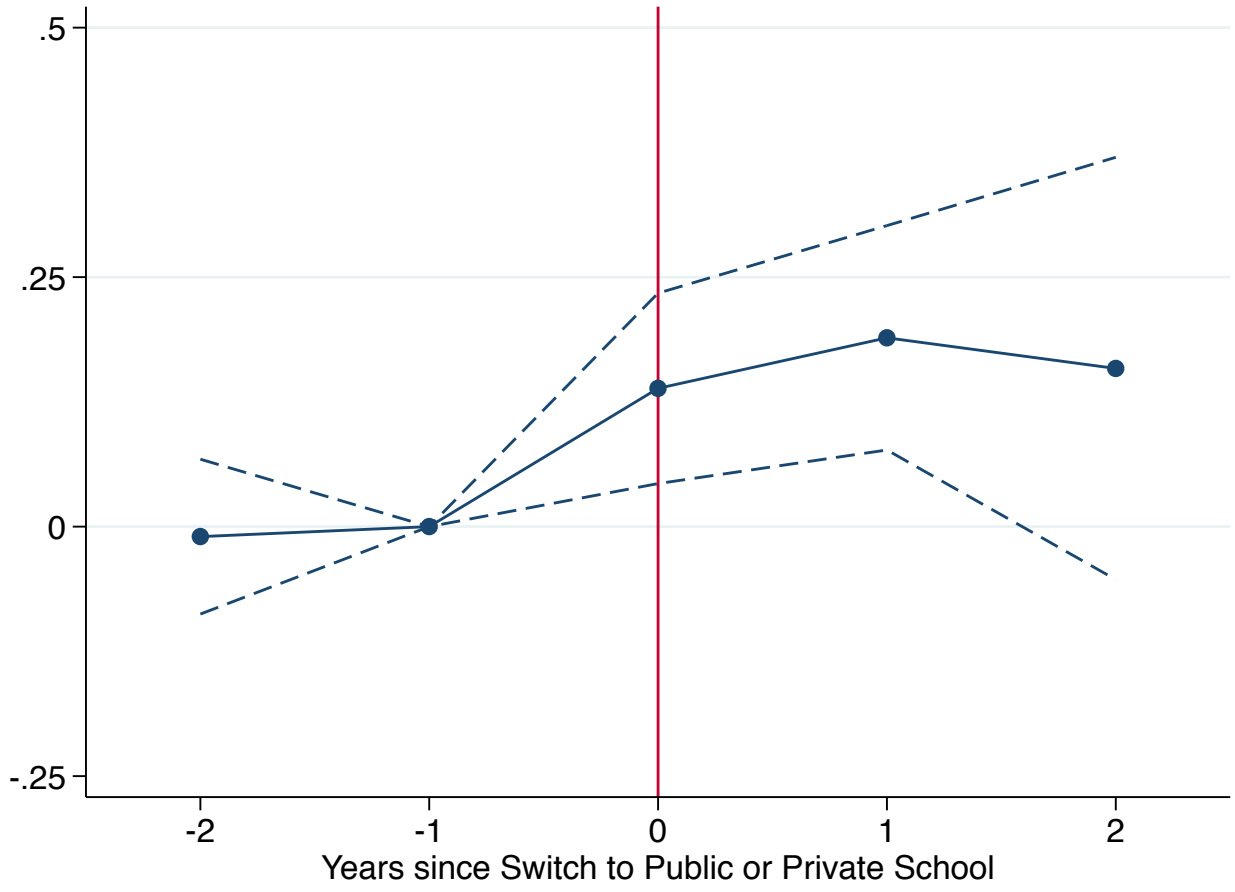
Baseline VA specification and specification with additional SES controls deliver very similar results.

Value-Added Results with Child Fixed Effects

	Math		English		Urdu		Mean	
	(1) Baseline	(2) SES	(3) Baseline	(4) SES	(5) Baseline	(6) SES	(7) Baseline	(8) SES
Private	0.112**	0.120***	0.191***	0.190***	0.126***	0.137***	0.148***	0.154***
	(0.051)	(0.046)	(0.042)	(0.042)	(0.046)	(0.044)	(0.044)	(0.042)
Adjusted R^2	0.780	0.774	0.788	0.785	0.817	0.816	0.845	0.842
N	37432	29395	37432	29395	37432	29395	37432	29395
Clusters	969	968	969	968	969	968	969	968

- Child fixed effects explain much of the variation in test scores.
- Yet, results controlling for time-invariant, child-specific unobservables are nearly identical to standard VA estimates.
- Preliminary evidence that bias from unobservables is small.

Event Study Graph for School-Switchers



- Key assumption of child fixed effects strategy: no pre-trends in test scores for children who switch to private schools.

Method 2: Exploit Exogenous Switches Due to Private School Exit

First stage:

$$private_{ivst} = \beta_0 + \lambda_g y_{igs,t-1} + \mu_1 closure_{it} + \mathbf{\Gamma X_{igst}} + \alpha_g + \alpha_t + \alpha_v + \epsilon_{igst},$$

where

- v indexes a village and α_v is a village fixed effect.
- The instrument $closure_{it}$ is an indicator variable equal to 1 if a private school previously attended by student i has closed.
- Sample: only students initially in private school.

Second stage: Value-added regression + village fixed effects.

Key identifying assumption: School closure is unrelated to pre-trends in a child's test scores.

- F-test for covariates in regression of instrument on mother education, father education, teacher's perceptions of child ability, and gender is 1.49 ($p = 0.202$).

School Closure: Test Scores

	(1) First Stage	(2) Math	(3) English	(4) Urdu	(5) Mean
School Closure IV	-0.253***				
	(0.063)				
Private		0.531***	0.278*	0.533***	0.380**
		(0.188)	(0.164)	(0.195)	(0.157)
F-Statistic		133.46	126.91	133.10	129.59
Number of Observations	10695	10695	10695	10695	10695
Number of Clusters	603	603	603	603	603

Recalling that this is a value-added specification, effects are estimated annual gains.

School Closure: Civic Values

	(1) First Stage	(2) Full Index	(3) Pakistan Knowledge	(4) Government Index	(5) Male Bias
School Closure IV	-0.307***				
	(0.075)				
Private		0.145***	0.148**	0.152**	-0.089
		(0.056)	(0.064)	(0.076)	(0.101)
F-Statistic		16.91	16.91	16.91	16.53
N	6711	7045	7045	7045	6711
Clusters	458	459	459	459	458

Method 3: Distance IV

- Exploit the fact that Pakistani villages were established as "planned villages."
  - Wealthier households placed closer to the center, and private schools tend to locate close to the center.
    - 59% of private schools within 500 km of the center, and 76% within 1 km.
  - Public schools more likely to be allocated to cheaper, public land on outskirts of village.
    - 40% of public schools within 500 km of the center, and 53% within 1 km.
- **Instrument**: difference between distance to closest public and private school.
  - School attendance is extremely distance sensitive.
- **Key control**: distance to the center.
- **Intuition**: compare two equally wealthy households, an equal distance to the center, but one is on the same side of the village as the public school and the other is not.

Map

Method 3: Distance IV

First stage:

$$\begin{aligned} \textit{years private}_{igst} =& \mu_1(\textit{Distpri}_i - \textit{Distgov}_i) + \mu_2(\textit{DistCenter}_i) \\ &+ \mu_3(\textit{DistCenter}_i) \times \textit{female}_i + \mathbf{\Gamma X_{igst}} + \alpha_v + \alpha_g + \alpha_t + \epsilon_{igst}, \end{aligned}$$

where

- $\textit{Distpri}_i$: distance to closest private school.
- $\textit{Distgov}_i$: distance to closest government school.
- $\textit{DistCenter}_i$: distance to the village center.

Estimate with a **two-sample IV strategy** to exploit larger available sample for the first stage.

Exclusion restriction: F-stat of regression of instrument (conditional on distance to center) on rich set of household characteristics is 0.67 ($p = 0.752$).

Distance IV: Test Score Results

	(1) First Stage	(2) Math	(3) English	(4) Urdu	(5) Mean
Difference Distance IV	-0.312**				
	(0.150)				
Years in Private		0.013	0.304***	0.148*	0.155**
		(0.073)	(0.081)	(0.077)	(0.068)
F-statistic	10.34				
Number of Observations	5963				
Number of Obs. 1st Stage		5963	5963	5963	5963
Number of Obs. 2nd Stage		3102	3102	3102	3102

Distance IV: Civic Values

	(1) First Stage	(2) Full Index	(3) Pakistan Knowledge	(4) Government Index	(5) Male Bias
Difference Distance IV	-0.315**				
	(0.150)				
Years in Private		0.027*	0.031*	0.015	-0.159***
		(0.015)	(0.018)	(0.023)	(0.030)
F-statistic	10.34				
Number of Observations	5963				
Number of Obs. 1st Stage		5963	5963	5963	5963
Number of Obs. 2nd Stage		1037	1037	1037	968

What Have We Learned So Far?

- Depending on identification strategy, gains of 0.15 sd or greater per year from attending a private school.
  - On order of 38% increase in annual learning gains.
- Moderate to large gains in civic values as well.
- But estimates depend on the identification strategy.
  - No homogenous private school effect.
  - What public school is the marginal kid at?
  - What private school is she switching to?
- To identify the range of effects of policies that move children between public and private schools, need to characterize the distribution of public/private school effects.
  - Estimate school value-addeds (SVAs) for public and private sectors.

Agenda

Introduction

Context & Data

'Homogeneous' Private School Effect

Variation in School Quality

Conclusion

Estimating SVA

Key estimating equation:

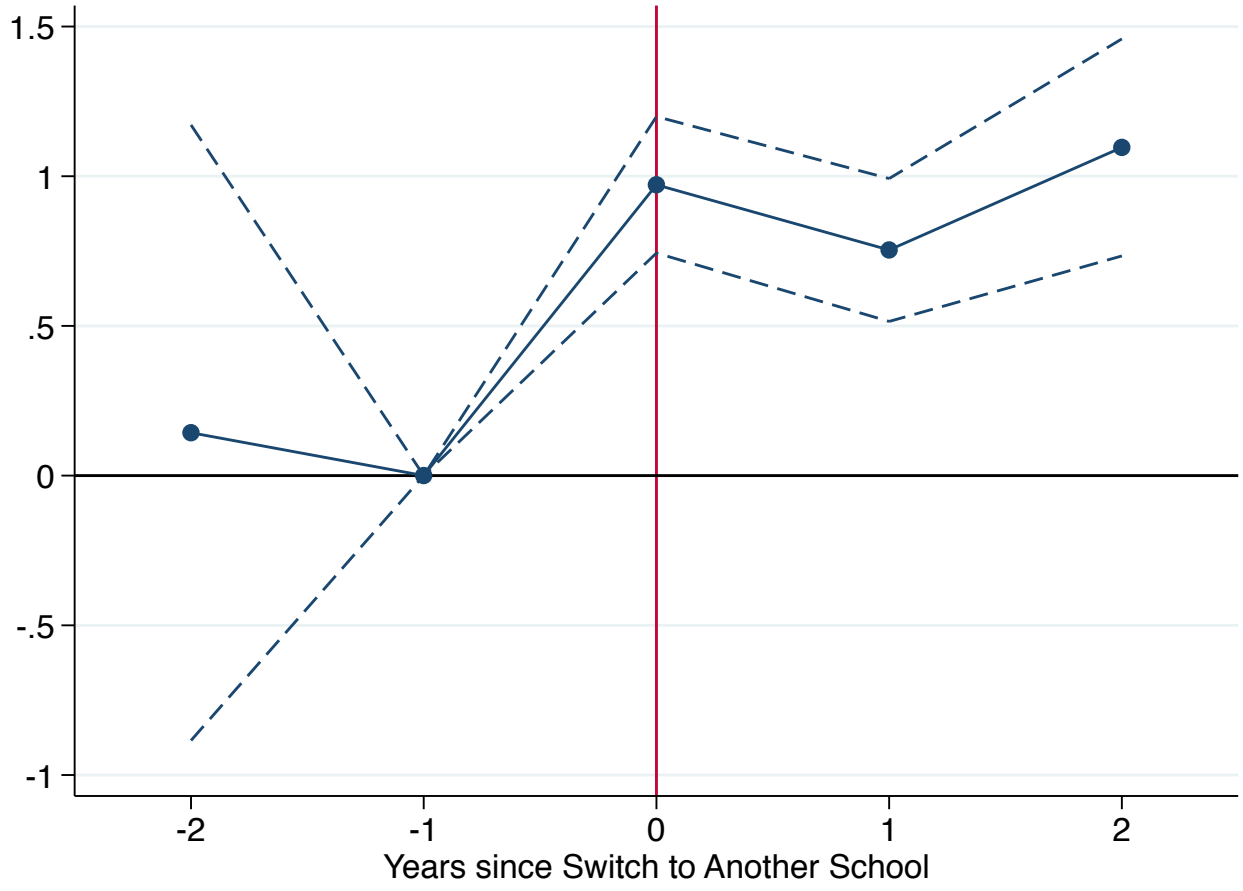
$$y_{igst} = \beta_0 + \lambda_g y_{igs,t-1} + \alpha_s + \alpha_g + \alpha_t + \epsilon_{igst},$$

where

- α_s: school fixed effect $\rightarrow$ estimate of school value-added.
- When SVA is on the right-side of an equation, use Empirical Bayes shrunk values.

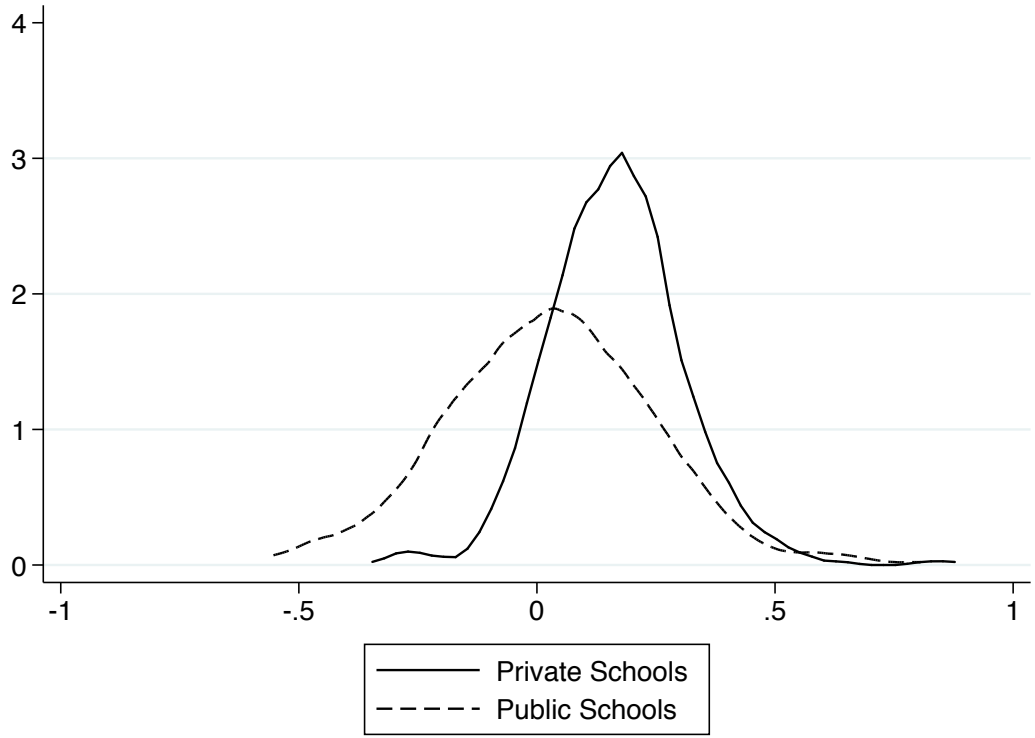
Key identifying assumption: Sorting into schools is not related to unobserved characteristics conditional on flexible controls for past test scores.

Validation: Forecast Unbiasedness



- Additional validation: can recover almost exact same point estimates as the child fixed effect strategy using SVAs to calculate individual-level treatment effects. See Results

Distribution of Private and Public School Quality



Large variance in quality:

- Attending a 1 SD better private school: increase mean test scores by .21 (student test score) sd.
- Attending a 1 SD better public school: increase mean test scores by .32 sd.
- One possible explanation for larger variance in public sector: poorly-performing private schools exit.

What is the Range of Possible (Partial Equilibrium) Treatment Effects From "Voucher" Policies?

	Public to Best Private			Public to Worst Private		
	(1) p(10)	(2) Mean	(3) p(90)	(4) p(10)	(5) Mean	(6) p(90)
Math	0.032	0.212	0.395	-0.074	0.066	0.199
English	0.016	0.278	0.570	-0.069	0.054	0.246
Urdu	0.036	0.209	0.327	-0.042	0.070	0.179
Mean	0.027	0.227	0.431	-0.037	0.072	0.188

- Effect of moving public school students from current public to best or worst private *in the same village.*
- Mean: Average across all individual-level treatment effects.
- p(10) and p(90): treatment effects at the 10th and 90th percentiles.

What Predicts School Quality?

Regressions of SVA on school characteristics:

	Public Schools		Private Schools	
	(1) Mean SVA	(2) Mean SVA	(3) Mean SVA	(4) Mean SVA
Library	-0.094**	-0.110**	0.085*	0.109**
	(0.043)	(0.049)	(0.045)	(0.052)
Computer	0.067	-0.076	0.052	0.052
	(0.130)	(0.167)	(0.048)	(0.053)
Sports	0.027	0.021	0.079	0.074
	(0.055)	(0.061)	(0.052)	(0.062)
Hall	-0.043	-0.029	-0.128*	-0.139
	(0.089)	(0.107)	(0.074)	(0.091)
Wall	0.001	0.002	-0.111	-0.222*
	(0.036)	(0.037)	(0.103)	(0.114)
Fans	0.051	0.054	0.138*	0.087
	(0.055)	(0.063)	(0.081)	(0.133)
Electricity	-0.043	-0.066	-0.071	0.041
	(0.053)	(0.065)	(0.092)	(0.107)
Student-Teacher Ratio	-0.001	-0.001	0.003	0.003
	(0.001)	(0.001)	(0.002)	(0.002)
Number of Private Schools	0.008		-0.000	
	(0.006)		(0.003)	
Number of Public Schools	-0.003		0.010**	
	(0.006)		(0.004)	
Log Number of Children	0.003		-0.014	
	(0.018)		(0.015)	
Fixed Effects	District	Village	District	Village
Adjusted R Squared	0.33	0.45	0.21	0.46
Within Adj. R Squared	0.01	0.02	0.07	0.08
Number of Observations	1881	1881	1160	1160
Number of Clusters	112	112	108	108

Agenda

Introduction

Context & Data

'Homogeneous' Private School Effect

Variation in School Quality

Conclusion

Conclusion

- The average private school is better than the average public school.
  - Between grades 3 and 5, assuming persistence of .5 (Bau and Das, 2020), adds 0.26 sd (relative to total gains of 1.03 sd).
  - Also appears to improves civic values.
- However, there is a wide range of possible treatment effects.
  - Movements from worst public to best private within the same village can increase scores by 0.2sd
  - If factor prices remain the same, this would save \$3/student, but if teachers are eventually paid the same wages, this would cost an additional \$3.
- Distributions of school quality can be computed using SVA, even in low-income countries.
  - Data allowing SVA calculations is increasingly available in low-income countries.

Validation #2: Child Fixed Effects Comparison

Comparison of SVA and child fixed effect estimates of the effect of private schooling on test scores for school-switchers:

	(1) Math	(2) English	(3) Urdu	(4) Mean
Child FE Estimates	0.157	0.201	0.124	0.168
SVA difference	0.177	0.174	0.140	0.164

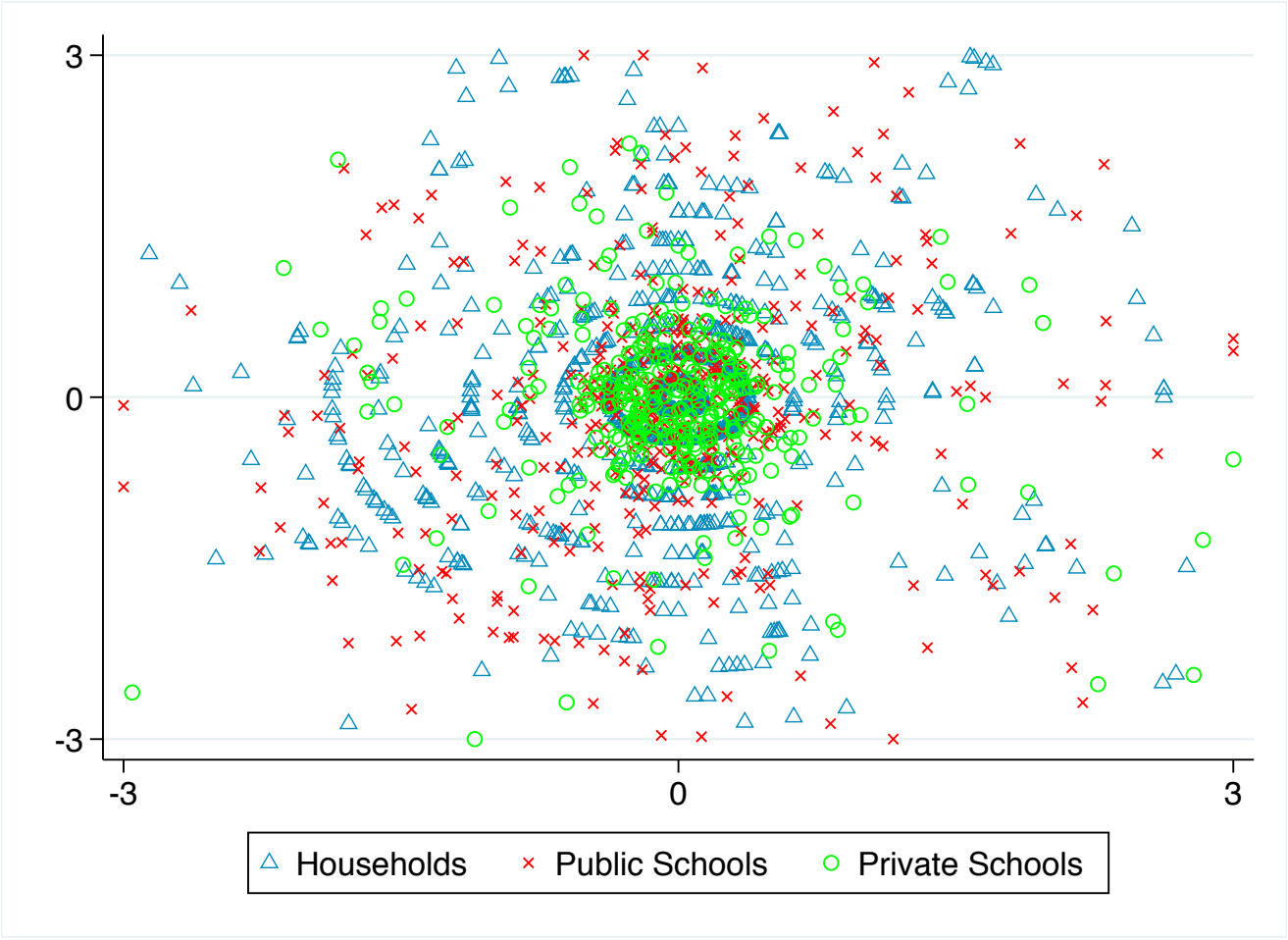
Back

Components of Civic Values Indices

	(1) Public Schools	(2) Private Schools
Pakistan Knowledge		
What is a neighboring country of Pakistan?	0.334	0.412
What is the largest province by area?	0.282	0.348
Which city has the largest population?	0.472	0.599
Who is the founder of Pakistan?	0.815	0.922
Who is the prime minister?	0.442	0.576
Who gave independence?	0.432	0.451
Where was the earthquake?	0.639	0.782
Finish the pop song	0.497	0.623
Government Index		
Finish the poem	0.248	0.372
Finish the national slogan	0.147	0.201
Would give money to government or army	0.321	0.329
Vote to choose lunch	0.140	0.158
Male Bias		
Boys are better at studies	0.193	0.143
Boys are better at monitoring	0.263	0.245
Additional Question		
A good scientist observes better	0.266	0.247

Back

Variation in School Locations



Back