

Public Infrastructure, Location of Private Schools and Quality of Schooling in An Emerging Economy



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Motivation



- The market for schooling is changing in an emerging economy like India.
- While public providers traditionally dominate the supply side, it is being increasingly challenged by private suppliers, frequently giving rise to coexistence of public and private providers in the same locality.
- A changing structure of the education market may affect the productivity/performance of schools through changing behaviour of market participants, namely, schools and parents/students.

Setting the context

- The Public Report on Basic Education in India (PROBE, 1999) has highlighted serious weaknesses in public schooling (especially poor service delivery) and a growing trend toward privatization in five north Indian states.
- PROBE report: 16% of the villages has a private school in 1996-97.
- Kremer and Muralidharan (2006): 28% of the villages had a private school in 2003.
- AISES: 9% and 15% districts had a private school respectively for 1992 and 2002 (recognised schools).

Selected economic indicators

	Literacy (%) (ranking)	Literacy(%) (ranking)	Change (%)	Economic growth (%)
State	1991	2001	2001-1991	1991-2001
Bihar	37.49 (1)	47.53 (1)	10.04	8.75
MP	44.67 (4)	64.11 (4)	19.41	19.5
Rajast han	38.55 (2)	61.03 (3)	22.48	21.7
UP	40.71(3)	57.36 (2)	16.65	14.3
HP	55.85 (5)	68.59 (5)	12.74	18.6
All India	51.63	65.38	13.75	11.5

Share of private schools in India

	Recognised % of districts with private schools (census)	Recognised % of districts with private schools (census)	Recognised+unrecog % of villages with private schools (survey)	Recognised+unrecog % of districts with private schools (survey)
	1992-93	2002-03	PROBE	M&K
Bihar	0.2	1.5	20	54
MP	11	15	8	23
Rajasthan	8.5	24.6	14	52
UP	15.6	24.6	28	57
HP	7.4	21	11	15

Existing Literature



- Limited literature: Bashir (1994) and Kingdon (1996) compare the relative efficiency of private and public schools.
- Kingdon (1996) found that private unaided (PUA) schools performed significantly better in urban UP. Bashir (1994), however, indicated that students in PUA schools had better Mathematics achievement, but less achievement in Tamil language in Tamil Nadu.
- Muralidharan and Kremer (2006) found that private schools are more common in areas of poor public schools.

Contributions

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- The present paper goes beyond the existing literature in terms of objectives, methodology and therefore its results.

Objectives



- We investigate the location choice of private schools at the village level.
- We examine the extent to which presence of private schools has been a response to the household demand for private schools.
- We examine the possible effects of increased school choice (i.e., coexistence of private and public schools) on overall school quality at the village level.

Public capital hypothesis



- Potential contribution of public capital to regional economic environment can be traced back to as early as Hansen (1965) who distinguished between social public capital (education and public health facilities) and economic public capital (infrastructural facilities).
- More recently Aschauer (1989, 1997), Barro (1990) have revived the public capital hypothesis as public capital makes private inputs more productive.

Public capital hypothesis (contd)

- Public capital raises the marginal product of private inputs (both labour and capital) and thus the rate of return on private investment.
- Public infrastructure (e.g., good road network) may lower production costs of private firms and thus the expected rate of return on private investment.
- There may be some crowding out of private investment, especially if increased investment in public capital and infrastructure is financed through an increase in distortionary taxes.
- Role of poor infrastructure and public capital has however received relatively little attention to explain the lopsided development in developing countries.

Hypothesis



- We argue that private schools are more likely to be set up in villages with more public capital and infrastructure.

Possible explanation: wealth inequality

- Suppose that government sets up one school per village. Given unequal distribution of land and assets, there may be concentration of well-off households in some villages. These well-off households may lobby for and set up a private school in much the same way they may lobby for better roads, electricity etc.
- Thus more unequal villages with better off households may not only have more public capital and infrastructure, but also private schools and also better schooling quality in general.

Private schools and village demographics

	Villages with private school	Villages with no private school	T-statistics
Large village popn. > 1000 (%)	50	21	14.446**
Low caste (%)	58	63	-4.928**
Muslim (%)	5	11	-10.155**
Never enrolled children (%)	0	35	-9.644**
sd of land	3.75	3.28	4.051**

Private schools and access to public infrastructure

Proportion of villages with	Villages with private S	Villages with no private S	T-statistics
Access to piped water	0.33	0.15	9.776**
Access to phone	0.52	0.20	16.079**
Access to PO	0.47	0.24	11.850**
Av. Distance from Pucca Road (km)	1.6	3.6	-20.663**

Data



- We primarily use school- village- and household-level information obtained from the PROBE survey data collected in 1996.
- It covers four of India's worse performing states, Bihar, UP, Rajasthan and MP.
- The fifth state HP is however much better-off compared to the rest.
- Although this is somewhat older data-set, it allows us to examine the issues of our interest in a way that has not been done before.

Differences between private and state schools: PROBE survey

	Private school	State school	T-stats
No of infra. facilities	5.8	4.8	3.425**
Principal absent (%)	18	33	-2.411*
Teacher's age	28	38	-5.099**
Pre-service training (%)	18	67	-7.437**
In-service training (%)	11	54	-7.288**
Pupil-teacher ratio	24.5	47.6	-9.228**
Pass rates (%)	99.2	94.3	4.759**

Location choice of private school

- We assume that state schools were established before the private schools.
- We assume that the provision of state education is exogenously determined by government policies.
- We assume that private providers maximise private profit.

Possible factors affecting presence of private schools

- Characteristics of existing state schools define the nature of the schooling market at the village level (e.g., PTR, attendance of teachers, absence of the head teacher, if teachers do multigrade teaching, infrastructural facilities available in the school).
- Since public capital is largely location specific, location choice of private firms, may follow the location of public capital and infrastructure. We thus include a set of village characteristics relating to public infrastructural facilities.
- Third, village-level distribution of land (mean and standard deviation) is taken as a measure of wealth inequality.

A Probit Model



- We determine if a private supplier (from a pool of potential suppliers) has successfully entered the village market:
- $PRIVS = 1$ if a private school is set up in the village and zero otherwise
- Given the binary nature of the dependent variable $PRIVS$, we use a binary probit model to determine entry/location of private schools in the village market.

Empirical specifications



- We experiment with various specifications:
- (1) We include characteristics of existing state schools in the village.
- (2) We include village characteristics – both land distribution and infrastructure.
- (3) We include both school and village characteristics.
- In each case we control for state fixed effects.

Private school entry/location

	(1)	(2)	(3)
Head teacher's absence	+ve*	-	+ve*
Teacher's attendance	-ve**	-	-ve**
Distance from road	-	-ve**	-ve**
Distance from district HQ	-	-ve**	-ve**
Devt. index	-	+ve**	+ve**
SD of landholding	-	+ve**	+ve**

Wealth inequality and household characteristics

- It follows from initial descriptive stats. that higher proportion of educated and upper caste households tend to live in villages with better infrastructure including private school.
- The latter however does not indicate endogenous migration of households from a less developed village to a more developed one with better public infrastructure.
- In fact rural to rural migration happens usually within a state and the rate is rather low in India (less than 5% of the total population of India in 2001), primarily attributable to a lack of social connections and thin land market across the Indian villages.
- We argue that it is a reflection of wealth inequality.

Demand for private schools



- In this case we use the household- and child-level data to examine if the supply of private schools is backed by household demand.
- A significant proportion of children is however not enrolled.
- So we jointly determine the probability of ever-enrolment along with that of choice of private schools → simultaneous probit model
- Alternatively, one can use a sequential process and obtain bivariate probit estimates of choice of private schools with selection of ever-enrolment.
- We compare alternative estimates.

Demand for private schools

	Simultaneous probit	Sequential bivariate probt
% of female<18 yr	ve	+ve
Mother's edn.	+ve**	+ve**
Father's edn.	-ve	-ve
Muslim	-ve**	-ve**
PTR in local state school	+ve**	+ve**
Teachers' presence	-ve**	-ve**



Demand for private school

- Individual or sibling characteristics are not important.
- Children with more literate mothers are more likely to go to private school; effect of father's education is insignificant though.
- Characteristics of existing state schools are important: likelihood of private education is higher if the quality of local state schools is poor (e.g., higher pupil per teacher, lower teacher's attendance rate); state school's infrastructural facilities are however not significant.

Effect of school choice on school quality

- Presence of private schools in villages with existing state schools offers more choice for parents/children (relative to those villages with only state schools).
- The question is whether this increased school choice is associated with better quality of schooling in the village (relative to the locality with only state schools).

School choice and pass rates

	Villages with private school	Villages with no private school	T-statistics
Class V pass rates	92.3	80.8	2.547*

Effects of school choice on school quality

Variables	OLS	2SLS
Presence of a private school	0.14 (9.070)**	0.22 (3.095)**
Low caste	-0.14 (9.323)**	-1.26 (3.871)**
Proportion of educated mother	0.56 (5.238)**	8.7 (3.089)**
State fixed effects	Yes	Yes

Why school quality is better in villages with private schools?

- In the absence of any strategic response from existing state schools to private entry, these results are likely to be driven by village wealth distribution, access to public infrastructure and also demographics.
- Villages with more unequal land distribution tend to have more wealthy households and also better infrastructural facilities.
- Private schools too tend to be set up in these better-off villages with more infrastructural facilities and wealthy people.
- Better resources/endowment in better off villages are likely to contribute to better school quality.

Is there a strategic response from state schools?

- There is evidence that school quality is better in the villages with both state and private schools.
- Differences in the quality of schooling across villages could reflect the strategic response of government schools to private entry.
- In the Indian context, however, this does not seem to be the case as state school's behaviour is guided by general government policy and not dictated by competitive schooling market. This is further supported by the results below.

Govt. school pass rates

Variable	Estimates (T-stat)
Presence of a private school	-0.28 (1.134)
Educated mother	0.21 (3.795)**
Educated father	0.13 (3.573)**
Muslim	-0.39 (1.772)*

Concluding comments



- Thus private schools are likely to enter the villages with (a) poor public school performance; (b) more infrastructural facilities and © more wealthy households.
- The likelihood of household choice of private school is higher, if local state schools have higher PTR and low teacher's attendance rates.
- School pass rates are higher while government school pass rates are unaffected by the presence of a private school in the village.

Future research



- We cannot however control for the possible correlation between infrastructure development and some unobservable determinants of school quality indices using the single cross-section data available from the PROBE survey. This is an issue that remains rather unexplored in the development literature and we hope that future research will generate further wisdom in this respect.

Definitions of some regression variables

- School infrastructural facilities: Index of functional school infrastructure, e.g., drinking water, toilet, electricity, fan, playground, blackboard etc.
- Parent-teacher co-operation index: It is a composite variable comprising of if the teacher asked for parent's support, teacher's satisfied with parents' support and his/her social standing,
- Teacher's attendance rate: number of teachers present on the survey date/number of teacher appointed.
- Principal absent: Principal was absent at the time of the survey visit $y=1$, $n=0$