



UNIVERSITY OF
LIVERPOOL

Management
School

Working Paper in Economics

202217

**Determinants of School Choice:
Evidence from India**

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Determinants of School Choice: Evidence from India *

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February 15, 2021

Abstract

This paper explores the relative roles of quality of schools and household characteristics on the household's choice of school in India. I use a standard binary choice logit model to estimate the effect of income on private school enrolment after controlling for school attributes and other household characteristics. I find that per capita income is the most important predictor of whether a household chooses a public or private school. Using per capita consumption as a proxy for income, the results show that a doubling of per capita income increases the probability of choosing a private school over a public school about 10%. I also find that mother's education is more important than father's education in the decision on the choice of school. Quality of schools also matters, but is a relatively weaker predictor of household choice.

Keywords: private schools, parental choice, enrolment, school quality, income and education, India

JEL code: I20, I28, I29

*The author thanks Priya Ranjan (first reader) and Damon Clark (second reader) for their guidance. The author also thanks Michelle Garfinkel and Jean-Paul Carvalho for their helpful comments. All errors are my own. The views expressed herein are those of the author and not necessarily those of the Reserve Bank of India or any other institution with which the author is affiliated.

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1 Introduction

Recent evidence from India points to a disproportionate increase in private school enrolment in the last decade [Pratham (2012, 2013)]. This has been despite the massive rise in funds being devoted to universalize the outreach of public education. In 2012-13, the Indian union government devoted USD 12.4 billion to education and USD 7.3 billion to their flagship primary education program Sarva Shiksha Abhiyan (SSA)¹. Net enrolment has gone up as a result to almost 99% (District Information System for Education, 2011). Per student allocations have become more than three-fold in the last five years, from \$27 in 2007-08 to \$93 in 2012-13 for Sarva Shiksha Abhiyan (SSA). However, this hasn't slowed growth in the private education sector, and private school enrolment as a share of total enrolment has gone up from 17% in 2005-06 to 36% in 2013-14². This isn't just an urban phenomenon, rural households in India are also expressing the same choice. According to Muralidharan (2015), there is near universal access to free primary education in India. Still there has been a rapid growth of fee-charging private schools that cater to the poor. Most recent estimates for rural India show over 28% enrolment in private schools. The corresponding figure for urban areas is likely to be over 65% in 2012 (Rangaraju et al., 2012).

This parental preference for private education is reported to be arising from the low quality of public education in India. Private schools are perceived to be a better alternative in delivering learning outcomes and fulfilling parental aspirations (Tooley and Dixon, 2007; Save the Children UK, South and Central Asia, 2002). The Probe Report (1999) observed that “In a private school, the teachers are accountable to

¹Initiative (2013). The SSA was initiated by the Indian government in the year 2000 to bring primary schooling to every child. The drive led to the construction of many more primary schools, so that every child has access to a functional public school in her neighbourhood.

²DISE (District Information System for Education) statistics. DISE is a census of recognized schools published by the Government of India. Data is available from the year 2002 onwards on school facilities, teachers, enrolment, etc., though information is scant and hence not very reliable for the early years. From the year 2011 onwards, Right to Education (RTE) compliance information on facilities in schools is also available.

the manager (who can fire them), and, through him or her, to the parents (who can withdraw their children). In a government school the chain of accountability is much weaker, as teachers have a permanent job with salaries and promotions unrelated to performance. This contrast is perceived with crystal clarity by the vast majority of parents.”

However, whether the better performance by private schools is due to better quality of services or simply cream-skimming (or sorting) has not been conclusively proven in the literature. Kingdon (1996) finds that standardizing the home background and controlling for sample selection significantly reduces the advantage of private schools over public in Uttar Pradesh in India. Sonalde Desai et al. (2009) also find similar results using a nationally representative sample. In another study using data from two large states in India, Goyal and Pandey (2009) note that the private school advantage varies by state, school type and grade, being negligible in some cases. French and Kingdon (2010) analyze data for rural India and find only a modest advantage of attending private school using a number of methodologies including family fixed effects and panel data. Muralidharan (2015) use experimental data from Andhra Pradesh, India and find private school students performing slightly better than public school students in certain subjects.

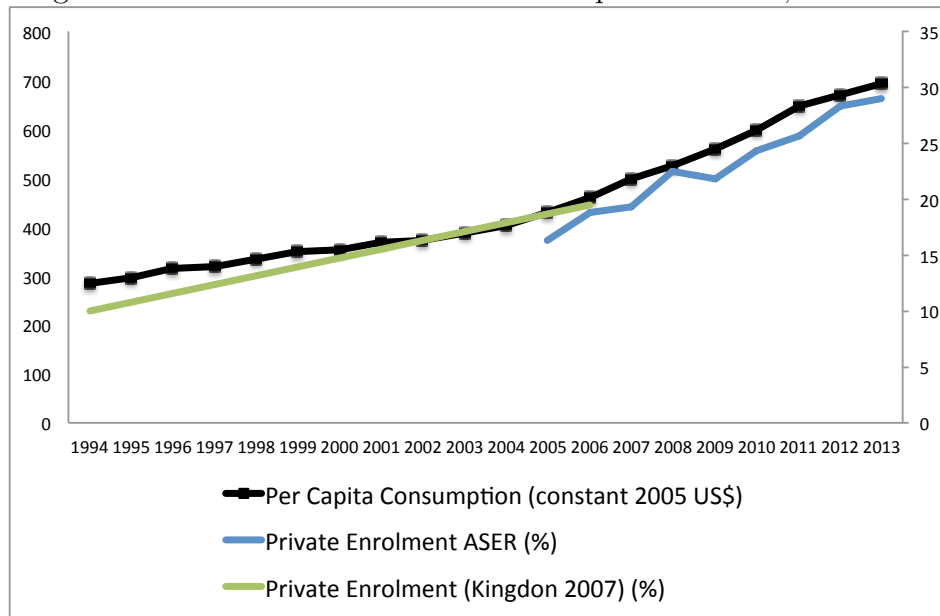
If the immediate returns to schooling aren't vastly different between the two types of schools, then we need to understand the characteristics of families that self-select into each schooling system. The existing evidence clearly reveals preferences of parents for private education, who are becoming consumers of fee-charging private schools as opposed to being the beneficiaries of the public school system. Families spend a significantly larger amount of resources on private school fees, uniforms and books, all of which are effectively free in public schools in India. There could be several reasons why certain families prefer private over public schools, including but not limited to a status effect, symbolic consumption, perceived difference in returns to schooling, etc.

To understand why parents choose private over public education, we need to take a look at the families making that choice. The rise in privatization of education in India has been concurrent with the opening of the Indian economy and subsequent growth in incomes owing to financial liberalization in the 1990s (Kingdon, 2007). In the last decade alone, household consumption expenditures (in constant 2005 US\$) have risen by 61%, from \$431 in 2005 to \$693 in 2013 (World Bank). If private schooling is considered superior to public education, then a natural consequence of these rising incomes would be more enrolment in private schools. It is important to understand such parental preferences for private schooling to make better public policies and use of public funds.³ For example, the failure of public schools to attract or retain children could be less about the actual quality gap between the two types of schools, and more about the family background of the children. However, little is known about the relative importance of household characteristics vis-a-vis school-quality gap between private and public schools in a household's choice of school in India.

In this paper, I attempt to understand the relationship of pre-school characteristics (such as family income, parental education, social identity, gender of the child) and school quality information about the local private and public school, with the choice of type of school. I use data from the India Human Development Survey 2005, which has information on a nationally representative sample of about 42,000 households from both urban and rural India. Specifically, I attempt to quantify the income effect on private school enrolment. After controlling for the relevant household characteristics that affect perceptions of returns to private schooling, such as parental education and gender of the child, and school attributes related to quality and costs of schooling, the income effect must not be big, if the households are not credit constrained or there is no symbolic consumption of education (Banerjee, 2004).

³If school resources and teacher attributes have little influence on the effectiveness of schools, then the public expenditure on improving these facilities would not have the desired consequences of bringing and keeping children in government schools. Researchers and public policy specialists have suggested several other methods of effectively using public resources to fund education for all, including the use of vouchers and public-private partnerships in the education sector.

Figure 1: Private Enrolment and Consumption in India, 1994-2013



The remaining paper is organized as follows. Section II discusses the relevant literature and a simple theoretical model explaining the question. Section III describes the sample, explores the methodology used and interprets the results. Section IV concludes.

2 Theory and Literature

2.1 Literature

There has been some research on what matters for parents when choosing for a school type. Banerjee (2004) models the decision-making by families in alternative ways. The author studies implications of credit constraints and non-conventional preferences (such as symbolic consumption) on the family's investment decision in education. Observation 4 in the paper notes that there can be income effects and parental preference effects on investment in human capital if there is symbolic consumption of investment in human capital, even in the presence of perfect credit

markets and a given interest rate.

Empirical studies on public and private schools have focussed on the relative effectiveness of each type of school. However, there has been some work on understanding the choice of school type based on both pre-school and school characteristics. Hastings et al. (2005) use data from the Charlotte-Mecklenburg School District to study parents' preferences for school characteristics including school test-scores and distance. They allow for heterogeneity of preferences among families belonging to different social categories and income brackets. The authors find that student income and own academic ability are positively related with the preference for school test scores. However, the authors don't study the choice of school for public-private school type classification.

Alderman et al. (2001) study the choice of schooling, and within schools differentiate between the public-private school type for poor neighborhoods in Lahore, Pakistan. Their results suggest that household consumption is the most important determinant of the decision on school investment. Among school attributes, class size, instructional fees and school distance matter most to families. In another paper, Glick and Sahn (2006) use data from the Madagascar Permanent Household Survey, a comprehensive, multi-purpose nation-wide survey of 4,508 households collected in 1993–1994, to explain primary school choice between public and private providers. Nishimura and Yamano (2013) provide evidence from rural Kenya using panel data from 2004 to 2007 on households' decision regarding attending a private or public school. They also include household, individual and school characteristics and find that the response of families to school quality differences between the two types of schools differs according to economic strata and gender of the child.

In all these papers, the sample size is relatively very small compared to the one used in the current study. Except for Glick and Sahn (2006), none of the studies have a nationally representative sample. Hence, their results are not generalizable for national policy making. In this paper, I use a specification similar to Alder-

man et al. (2001), with data from the India Human Development Survey 2005. The IHDS-2005 has extensive information on about 42,000 households from all states and union territories of India, including socio-economic aspects of the family as well as the community of the child. In that respect, I am able to generate more general results for policy analysis. Owing to the geographic range of the exercise, the IHDS collects information on only two representative schools in the family's neighborhood, one private and one public. Therefore, unlike Alderman et al. (2001), I do not have information on the location of all schools in the neighborhood, thereby not being able to use distance as a factor in the choice of a school type for families.

This paper contributes to the existing literature on school choice in three important ways. First, it is the first such exercise that studies the choice of school type by households for India. No other paper has assessed this household decision for such a large country before. Second, almost all papers use some index of household assets to proxy for household income. IHDS on the other hand uses detailed consumption patterns of about 30 categories of consumption items to get precise and reliable estimates of household consumption. This in turn helps in getting more precise estimates. Third, almost all studies on the intra-household decision-making on education choices find no difference in the effect of mother's or father's education on the child's school choice. However, I find a much stronger influence of the highest educated female in the family compared to the education of the male in selecting school type.

2.2 A Simple Theoretical Model

In classic economics literature, the choice of schooling has mostly been treated as the household's problem of maximizing expected lifetime utility subject to an economic constraint (Stiglitz, 1974; Ranjan, 2001; Baland and Robinson, 2000). The costs of schooling include direct costs such as tuition fee, and opportunity costs such as foregone labor wages or domestic help. The benefits include expected higher human capital and earnings in future. Thus, at the first stage, children whose parents can af-

ford to send them to schools will attend one, whereas children of poor parents will be forced to either work outside or stay at home. In the second stage, parents make the choice of type of school - broadly public or private. The second stage choice problem exists due to a heterogeneity in school quality between the two school types. In what follows, I build a model of households' school choice based on a representative household maximizing expected utility given a budget constraint. I use a standard static model of household utility, assuming that a benevolent parent maximizes household consumption. I do not differentiate between consumption of the parent and the child.

Before moving to the formal model, here's a brief intuition of how the model would work. The tradeoff between a public and a private school is quality versus fee. A private school, offering better quality of services and expectations of higher human capital accumulation and earnings, is simply costlier. Hence families above a certain threshold of income only will afford private schooling, if they believe that the returns from private schooling are superior. On the other hand, the tradeoff between public schools and no schooling (or simply schooling and no schooling) is between the opportunity cost of schooling versus some human capital accumulation. In this case, there will be some families for whom the child's time is important in augmenting the meagre income of the family. It could be in the form of child labor wages or in the form of taking care of household chores and younger siblings while both parents are out to earn bread. For such families, the quality and fee difference between public and private schools is immaterial unless they can afford to forego the child's time at home or work. Throughout the paper we will assume the absence of credit markets, so these budget constraints are binding. It will be the middle-income group, which does not care about the forgone child labor income that will be most sensitive to the private fee versus quality tradeoff. When public school quality deteriorates, there will be more of such families transferring from public to private schools, willing to pay the higher fee now for higher future returns.

This is the essence of the argument provided to increase public spending on improving public school quality in the Indian policy debate today. However, an equally

compelling reason for a shift from public to private schools is rising incomes. As the economy grows, more and more households find private education affordable. While competitive private schools have the incentives to adapt to the demands of a changing, global world, public schools lag behind. So the quality differential is maintained, and may in fact grow bigger over time. Changes such as reduction in the fee charged by private schools, or growth of affordable private schools will also have the same effect.

There is a continuum of households $\mathbb{I} = [0, 1]$ and each household $i \in \mathbb{I}$ comprises of one parent and one child. Each parent is initially endowed with an income A_i , which has a cumulative distribution function F , with $F' > 0$. The household's utility comprises of utility from consumption of net wealth and utility from the perceived returns to schooling. Net wealth comprises of the household's initial endowment, plus child labor wages if the child doesn't attend school, minus school fees if the child attends a private school. I assume that net costs of attending a public school are zero. Although there are costs other than the school fees such as those of books, uniforms, transportation, etc the government covers a majority of them through schemes that provide free books and uniforms to students.⁴

The perceived returns from schooling q^j are exogenous, $j \in \{p, g\}$, and are different for public and private schools, q^g and q^p respectively. Each period, a household has three choices: keep the child out of school ($e^l \in \{0, 1\}$), send child to a government school ($e^g \in \{0, 1\}$), or send child to a private school ($e^p \in \{0, 1\}$). These are mutually exclusive and exhaustive choices ($e^g + e^p + e^l = 1$). Government schools have no fee, and have a perceived return of q^g . Private schools have a fee f , and a perceived return of q^p . With the no-schooling option, a parent either sends the child to work outside which gets the family some child labor earnings, or takes the child's help for household chores or to take care of the younger siblings. This also

⁴In fact, the Indian government has a flagship program called the Mid-day meal scheme wherein attending students are provided with either cooked meals or dry grains to take home from the school. Thus the assumption of zero net costs of attending public schools may not be too much of a simplification.

saves some of the parent' time which can be used to go out and earn adult wages. Therefore, we assume that either way, the no-schooling option adds some wages w to the household's income, but has zero returns from education since the child is unable to learn to read. Other assumptions are: no credit markets; school fee, wages and quality are constant and exogenous, logarithmic utility function.

2.3 The Household's Problem

Thus, each period a household maximizes the combined utility of the parent and the child, comprising of net wealth and expected future returns, subject to the time constraint that the child can only do one of the three activities.⁵ The household utility function is given by

$$U_i = \log\{A_i + we^l - fe^p\} + \log\{1 + q^g e^g + q^p e^p\} \quad (1)$$

subject to

$$1 = e^l + e^p + e^g \quad (2)$$

So, utility from choosing the no-schooling or labor option ($e^l = 1$, $e^p = e^g = 0$) is:

$$U^l = \log\{A_i + w\}$$

Similarly utility from choosing a government school ($e^g = 1$, $e^p = e^l = 0$) is:

$$U^g = \log\{A_i\} + \log\{1 + q^g\} = \log\{A_i(1 + q^g)\}$$

and from choosing a private school ($e^p = 1$, $e^l = e^g = 0$) is:

$$U^p = \log\{A_i - f\} + \log\{1 + q^p\} = \log\{(A_i - f)(1 + q^p)\}$$

⁵Although some children work after school to be able to supplement household income and/or cover the costs of schooling. In some cases, students enroll in both a public and a private school to take advantage of government schemes providing free schooling supplies and food at the public school, and good classes at the private school, we abstract from such cases here.

In this discrete choice framework, a household chooses a private school when $U^p \geq U^g$ and $U^p \geq U^l$; a government school when $U^g > U^p$ and $U^g \geq U^l$; and no school when $U^l > U^p$ and $U^l > U^g$.

2.4 The Choice of School

Given this simple framework, the private schooling outcome (i.e. $e^p = 1$, $e^g = 0$, $e^l = 0$) is observed when

$$\log\{(A_i - f)(1 + q^p)\} \geq \log\{A_i + w\}$$

and

$$\log\{(A_i - f)(1 + q^p)\} \geq \log\{A_i(1 + q^g)\}$$

i.e.,

$$A_i \geq \frac{f(1 + q^p)}{(q^p - q^g)} = A^*, \text{ and } A_i \geq \frac{w + f}{q^p} + f = \hat{A} \quad (3)$$

So household income has to be above a certain threshold for private schools to be chosen. This threshold depends positively on private school fee, child labor wages, and negatively on the difference in quality of public and private schools.⁶

Similarly, public school outcome will be observed when $U^g > U^p$ and $U^g \geq U^l$, or

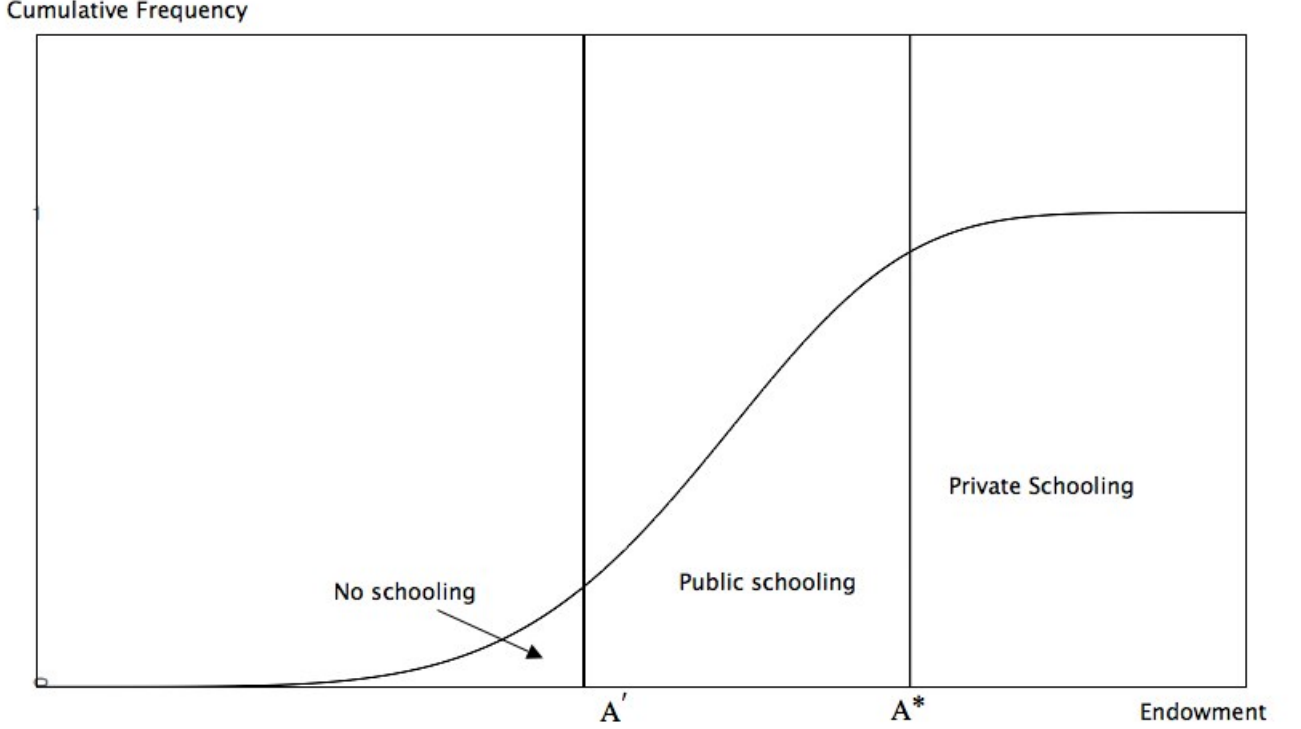
$$A_i < \frac{f(1 + q^p)}{(q^p - q^g)} = A^*, \text{ and } A_i \geq \frac{w}{q^g} = A' \quad (4)$$

and the no-school outcome will be observed when $U^l > U^p$ and $U^l > U^g$, or

$$A_i < \frac{w + f}{q^p} + f = \hat{A}, \text{ and } A_i < \frac{w}{q^g} = A' \quad (5)$$

⁶ $A^* > \hat{A} > A'$ when $A^* > A' = \frac{w}{q^g}$, i.e. if child labor wages are not too high and public school quality not too low, then we can say that A^* will be the binding constraint for private education. \hat{A} turns out to be a linear combination of A^* and A' with weight $\frac{q^g}{q^p}$. Whenever $q^p > q^g$, \hat{A} will be a convex combination of A^* and A' . I focus on this case, and when $A^* > A'$, we get the following cutoffs for the three school outcomes: Private Schooling: $A_i A^* > \hat{A}$; Public Schooling: $A^* > A_i \geq A'$; No Schooling: $\hat{A} > A' > A_i$.

Figure 2: The three outcomes of school over the income distribution



Thus, combining (3), (4) and (5) we get a threshold level of parental endowment A^* such that families above that threshold will always choose a private school over a government school, and families with their endowments between A^* and A' will send their children to government schools. Families with endowments below A' will keep their children out of school.

Since the derivative of A^* with respect to private school quality q^p is always negative,

$$\frac{\partial A^*}{\partial q^p} = \frac{f(q^p - q^g) - f(1 + q^p)}{(q^p - q^g)^2} < 0 \quad (6)$$

when the perceived private school quality (q^p) is raised, the threshold income to afford private schools A^* unambiguously goes down. This implies that the fraction

of parents who send their kid to a private school, given by $1 - F(A^*)$ goes up. Thus if private school quality is not very different from that of public schools, then the required income to choose private schooling tends to infinity ($A^* \rightarrow \infty$), which makes the proportion of households choosing private schools close to zero ($1 - F(A^*)$). Again, if the relative costs of private education are very high (large f), it makes little sense for households to choose private schooling. These costs could include direct costs such as tuition, registration and other fees, cost of supplies such as books, stationary, uniforms, or indirect costs such as distance. Most government schools also offer scholarships and free supplies to students from economically and socially weaker backgrounds. Such help from public schools closes the cost gap between private and public schools, and weakens the influence of income on enrolment choice. Apart from relative costs, quality gap between schools is the other determinant of school choice. This quality gap depends not just on observable attributes of the schools that parents have access to, but also parents' perceptions of the quality gap. This might be biased towards one or the other type of school depending on the personal characteristics of the parent, her identity, educational background, etc. For example, parents from urban areas and with higher education attainment might favor a local private school because they perceive it to be better than the available local public schools. It could also be the case that if returns to education are perceived to be higher for a male child (for old age benefits from co-housing with sons), then private schooling will be more dominant for boys. In summary, the relative costs and perceived returns to schooling are the two primary factors in the model that affect the choice of school for parents.

2.5 A Closer look at the choice between Public and Private schools

All parents above income A^* will prefer a private school to a public school, where

$$A^* = \frac{f(1 + q^p)}{(q^p - q^g)} \quad (7)$$

Let us normalize public school quality q^g to zero and private school fee f to 1. Then,

$$A^* = \frac{(1 + q^p)}{q^p} = 1 + \frac{1}{q^p} \quad (8)$$

where q^p essentially is the quality gap between the local public and private school.

Above the curve, with higher parental income and private school quality, we observe private schooling whereas below the curve, with lower parental income and low private school quality, we observe public schooling. Since we've normalized public school quality to zero, the x-axis also denotes the difference between public and private school quality.

As the quality gap between public and private schools widens, the threshold level of income required for parents to switch from public to private schools falls. ⁷

3 Data

3.1 Sample

The implications of this basic model can be tested using cross-section data on household income, measures of school quality as perceived by parents for both public and private schools in the neighborhood, and the choice of type of school by households. We use data from the India Human Development Survey (IHDS 2005), which captures the required income and school parameters. The IHDS was conducted in all states and union territories of India ⁸ including data on 382 out of 612 districts in India in 2001. The sample was drawn using stratified random sampling, and consists 27,010 rural and 13,126 urban households. Households answered questions related to health, education, employment, socio-economic status, marriage, fertility, gender

⁷As private school fee f goes up, the curve separating private school with public school outcomes shifts upwards. Consequently, a smaller fraction of parents will be able to afford private schools over public schools.

⁸The only exceptions were Andaman Nicobar and Lakshadweep Islands.

relations, and social capital. Children aged 8-11 completed short reading, writing and arithmetic tests. Additionally, for almost all of the villages and urban blocks sampled, an attempt was made to interview at least one public and one private primary school from the community (Desai et al. (2008)). The choice of school was based on popularity and enrolment.

This nationally representative sample of 41,554 households came from 1,503 villages and 971 urban neighborhoods in India. Of these, there were 29,207 children in the age group 6-14 years, who also had corresponding information from the schools dataset on at least one public and one private school in the Primary Survey Unit (PSU) of the family.⁹¹⁰ In the analysis that follows, we use information on the families of these 29,207 children from the household survey, and on the attributes of one school of each type - both public and private - from the schools survey. It must be noted that the school attributes are not necessarily of the particular school attended by the child. For example, it is possible that the child attends a private school, say KK, in a PSU but the school survey collected information only on the private school, say AA, and the public school, say BB, in the PSU. Since we need information only on one 'representative' school for each type (public and private) in the community, this does not limit the analysis a lot. Table 1 gives some summary statistics on the interviewed households used for the study.

We get comparable sample of about 28% private school enrolment among school-going children in our subsample. The monthly per capita consumption is highest in families that send their children to private schools. We also observe that private schooling is more of an urban phenomenon, with 36% of private school enrolment

⁹A Primary Survey Unit (PSU) is a village in the rural context and a block in the urban context.

¹⁰The remaining 14,953 children in the relevant age group did not have corresponding information on at least one public and one private school in the area, and were dropped from the analysis for two reasons. One, it has not been documented in the survey whether the missing information for communities with data on one type of school was due to non-existence of the other type of school or due to field work limitations. Second, the presence (or absence) of either a private or government school in a community could be the result of a complex mix of supply and demand factors, which this paper does not analyze.

Table 1. Descriptive Statistics

	Private School	Public School	Out of School	Total
Enrolled Students (#)	8,105	16,038	5,064	29,207
Male (%)	57	51	46	52
Urban (%)	36	13	13	19
Household specific				
Monthly per capita consumption (Rs)	930	577	504	653
Average highest male education in the family (grade)	8	5	3	6
Average highest female education in the family (grade)	6	3	1	3
Student specific				
Private tuitions (hours)	2	2	3	2
Private tuitions (Rs)	272	135	561	180
Reading Ability Level	3	2	0	2
Math Ability Level	2	1	0	1
Writing Ability Level	1	1	0	1

coming from urban areas. There is also a marked difference in the gender composition of private and public schools. 57% of private-school enrolled children are boys, as opposed to only 51% among the public school students. This is indicative of the mindset of Indian parents that is biased against females when deciding to invest in their education. So far we don't see a large difference in either the income levels or gender composition between public school children and out of school children, though the out of school children do seem to be slightly worse off.

Surprisingly, some out of school children's families are spending substantial amounts on home tuitions. This may have several reasons (to be explored further...). It could be due to the absence of any decent school in the neighbourhood, so the parents decided to home-school the child, employing private tutors. Or it could be due to a lack of faith in the formal schooling system.

Test scores of children from each school type corresponds well with the fact that children from private schools perform better on all three measures - reading, writing, and math. Out of school children have very little to no ability at solving simple math questions or reading small paragraphs or writing a small sentence. As can be seen from Table 2, enrolment goes up with higher income, with a steeper effect in urban areas.

School attributes are summarized in the Table 3. Private school fee is substantially higher than public school fee. There is a provision for free books and meals for all students in most public schools. Class size (or pupil-teacher ratio) is substantially less in private schools compared to public schools. Not only are class sizes much bigger, there are also multi-grade classrooms in many public schools. This also substantially dilutes the quality of teaching in the classroom in government schools in India. English instruction and computer education seems to be the forte of private schools, as is the popular perception, with public schools seriously lagging behind. Other major differences are in infrastructure facilities such as separate chairs and desks for all students and separate toilet facilities for boys and girls.

Table 2. Private Enrollment breakdown by per capita consumption quartiles in rural and urban areas

Quintile	Rural		Urban	
	cutoff (Rs.)	% Private	cutoff (Rs.)	% Private
1st		12%		38%
	359		534	
2nd		21%		47%
	529		797	
3rd		27%		63%
	798		1218	
4th		44%		77%
	N ≈ 18,153		N ≈ 5,990	

Table 3. School Attributes

	Private School	Public School
Average School fee	671	18
Free Meal or food (%)	13	87
Free books	16	88
Class size	30	41
English-medium of instruction (%)	51	27
Computer Education (%)	29	6
Full-time Teachers	7	5
Formal Teacher Evaluation	79	72
Average # classrooms	5	7
Chairs/desks for all students (%)	63	29
Hours electricity	2.2	3.8
Separate Toilets	62	46

3.2 Estimation Equation

We know from the above model that a household i will choose school type j if $U_i^j \geq U_i^k$ where $j, k \in \{Private\ school, Public\ school\}$. Let e_i^p be the dummy variable indicating household i 's choice of private school. Then,

$$e_i^p = \begin{cases} 1, & \text{if } U_i^p \geq U_i^g, \\ 0, & \text{if } U_i^p < U_i^g \end{cases} \quad (9)$$

The choice probability is then

$$P_i = Prob(e_i^p = 1) = Prob(U_i^p > U_i^g) \quad (10)$$

The reduced model for this choice probability of individual i is:

$$P_i = \beta_0 + \beta_1 X_i + \beta_2 H_i + \beta_3 S_i + u_{it} \quad (11)$$

where X represents household income, H is a vector of household characteristics other than income and S is vector of covariates including school attributes, such that u_{it} is a random disturbance. We fit this model to the data to estimate the effect of income on the probability of private school enrolment (for the baseline year 2005) after controlling for school characteristics that may affect the choice.

If we find the coefficient of income significantly different from zero, then it seems reasonable to conclude that income affects private school enrolment. Since income increased over the years, it is not surprising that private enrolment increased. By multiplying the marginal effect of income from the baseline case (β_1) with the growth in incomes over the relevant years, we can account for some of the increase in private enrolment. The underlying assumption here is that the model's parameters are stable over time.

I fit a logit model on the data.¹¹ I also fit a multinomial logit model with out

¹¹I also fit an LPM (both with and without fixed effects) for comparison. The estimates are

of school children. The coefficient of income for private schooling does not change, keeping public schooling as the base. The results are presented in the next section.

3.3 Results

Tables 4 and 5 provide the estimates for regressing household choice of schooling on some parameters of household income, relative costs of schooling and factors that might influence perceptions of the returns from schooling from the two types of schools. We also include a multinomial regression to compare results, by including out of school children in the sample, which is a substantial 18%.

3.3.1 Interpretation of coefficients

Household Related variables

1. Income. For every doubling of per capita income, private school enrolment goes up by about 10%.
2. Highest education of a female adult in the family. This is the next most important predictor of private enrolment. An additional year of female education in the family increases the likelihood of private school enrolment by about 1.5%.
3. Highest education of a male adult in the family. Less important than adult female education in the family. An additional year of education for the male head Increases private school enrolment by about less than 1%.
4. Gender of pupil. Girls are about 6% less likely than boys to go to private schools. In the multinomial logit specification, girls are less likely to attend private schools but more likely to not go to any school relative to boys.
5. Age of pupil. Higher age leads to lower private school enrolment. This could be due to less access to a higher secondary school compared to primary schools

similar in all cases.

Table 4. Regression results of binary choice between private and public schools enrollment on household and school characteristics.

Dependent: Private school=1, Public School=0	LPM			LOGIT
	No fixed effects	with State fixed-effects	with Village/Block fixed-effects	Marginal effects at mean
Log _e (Per capita consumption)	0.100 (28.35)**	0.101 (26.82)**	0.093 (21.95)**	0.120 (27.39)**
Highest education (female)	0.013 (16.59)**	0.016 (19.40)**	0.014 (17.51)**	0.013 (15.28)**
Highest education (male)	0.008 (12.09)**	0.006 (9.42)**	0.006 (9.30)**	0.010 (12.23)**
Girl	-0.061 (-11.05)**	-0.059 (-11.27)**	-0.059 (-12.12)**	-0.071 (-10.88)**
Age	-0.006 (5.16)**	-0.005 (-4.72)**	-0.005 (-5.28)**	-0.007 (-5.08)**
Urban residence	0.188 (24.96)**	0.191 (25.15)**		0.194 (25.06)**
Dummy for social identity (Base: Forward caste Hindu)				
Other Backward Caste	0.011 (-1.37)	-0.022 (-2.72)**	-0.035 (-4.01)**	0.019 (2.15)*
Adivasi	-0.013 (-1.05)	-0.024 (-1.98)*	-0.076 (-4.94)**	-0.048 (-2.64)**
Dalit	-0.063 (-7.36)**	-0.078 (-9.25)**	-0.104 (-11.02)**	-0.079 (-7.57)**
Muslim	0.029 (2.77)**	-0.01 (-0.88)	-0.026 (-1.87)	0.041 (3.61)**
Sikh/Jain/Christian	0.205 (11.37)**	0.156 (8.14)**	0.116 (5.33)**	0.203 (9.96)**
School Quality Gap (base: Public Schools)				
Class size	0.0003 (3.92)**	0.0004 (4.56)**		0.0004 (4.07)**
Grade English Instruction Begins	-0.003 (-1.73)	0.0010 (0.42)		-0.003 (-1.57)
Separate toilet for girls*Girl dummy	0.015 (1.78)	0.012 (0.42)		0.015 (-1.44)
Computer education	0.035 (5.57)**	0.030 (4.76)**		0.041 (5.72)**
Log(School Fee)	-0.040 (-12.77)**	-0.026 (-7.82)**		-0.047 (-13.52)**
Free meals	-0.028 (-3.47)**	0.001 (0.14)		-0.033 (-3.49)**
Free books	-0.010 (-2.78)**	-0.005 (-1.34)		-0.010 (-2.2)*
Free uniforms	0.040 (9.86)**	0.004 (0.68)		0.046 (9.59)**
Scholarships	-0.027 (-6.43)**	-0.003 (-0.75)		-0.030 (-6.16)**
Separate toilet for girls	-0.04 (-6.58)**	-0.010 (-1.65)		-0.050 (-6.88)**
Constant	-0.656 (-19.67)**	-0.659 (-18.30)**	-0.554 (13.49)**	-6.430 (-31.89)**
Adjusted R ²	0.22	0.26	0.40	0.18
N	24,134	24,134	24,134	24,134

Note: (1) figures in brackets are t-values or z-statistics. (2) *p<0.05; **p<0.01

in the locality. Although in the sample of older kids who were attending public schools, a significant proportion had access to at least one private school that taught the same or higher grade. It could also mean higher costs of private education for higher grades.

6. Caste group: Being from a high caste family not important. But being a Dalit or Adivasi reduces probability of private enrolment by about 4 – 8%.
7. Religion. Being a Muslim positively affects the likelihood of private enrolment, whenever significant. This could be due to enrolment in *Madrasas*, which are private establishments. Being either Sikh, Jain or Christian increases private enrolment probability in all specifications.
8. Urban residence. Next most important predictor of school choice after income. Urban families are 15% more likely to send their children to private schools. Rapid urbanization in the last decade in India could also be a major driver of privatization of education in India.

School Related Variables

We need variables that parents think affect the returns to schooling. The following variables are constructed as differences between private and public schools, with public school as a base.

1. Pupil-teacher ratio or class size. Positive and significant, but very small. Here public schools with bigger class sizes reflect inferior quality for parents, perhaps even multi-grade teaching. However, bigger class size in private schools is a signal of better quality, as there are small unrecognized fly-by-night type private schools also that mushroom anywhere but don't stay for long. This is not a possibility with public schools which are more often than not overstuffed.
2. Medium of instruction: English is preferred, for its importance in the job-market, and hence higher expected returns of future earnings, although the

coefficient is not significant in most specifications above. I also used an English-medium-school dummy, instead of the grade that english instruction begins. The variable is still not significantly different from zero in most specifications.

3. Use of computers. Positive and significant effect. Computer education increases private enrolment probability by about 3%.
4. Separate Toilets for girls. When interacted with the girl dummy, this gives the expected positive sign. However, the estimate is not significantly different from zero.
5. School fees. Significant and negative, denoting that parents care about the cost of schooling when choosing between private and public schools. Private schools are less preferred if they charge very high fee, or are unaffordable.

Other incentives, such as :

- Free Meal. Not significant
- Free Uniform. Positive and significant effect.
- Free Supplies (textbooks and stationary). Sign not consistent across models. Not significant most of the times.
- Scholarship. Important (in some specifications) but negative coefficient.

Broadly, only class size, school fee and computer education are important in determining the choice of school. The estimates are significant and of the expected sign, but the magnitude is extremely small, especially compared to the size of the household characteristics estimates. Other than these factors which are clearly important, parents seem to not consider the other factors while choosing type of school, such as free supplies and scholarships. Contrary to what has been found in other studies, I do not find evidence of separate toilets for girls or English-instruction being important determinants of the choice of school type. It seems to mainly rest on household characteristics, which defines not just the ability to afford private education, but also perceptions of the differential returns from public and private education.

Table 5. Regression results of multinomial choice between privateschool, public school, and no school enrollment on household and school characteristics.

Dependent: Private school=2, Public School=1 (BASE), No-School=0	MULTINOMIAL LOGIT	
	Marginal effects at mean	
	(z-values)	
	Private School	No School
Log _e (Per capita consumption)	0.108 (29.83)**	-0.044 (-15.41)**
Highest education (female)	0.013 (17.62)**	-0.010 (-13.72)**
Highest education (male)	0.009 (14.14)**	-0.008 (-15.51)**
Girl	-0.067 (-6.44)**	0.040 (9.67)**
Age	-0.005 (-6.46)**	0.005 (5.19)**
Urban Residence	0.154 (24.45)**	0.013 (2.27)
Dummy for social identity (Base: Forward caste Hindu)		
Other Backward Caste	0.007 (1.02)	0.028 (3.77)**
Adivasi	-0.061 (-4.03)**	0.073 (7.36)**
Dalit	-0.080 (-9.08)**	0.058 (7.64)**
Muslim	0.012 (1.33)	0.084 (10.44)**
Sikh/Jain/Christian	0.156 (9.4)**	0.020 (0.98)
School Quality Gap (base: Public Schools)		
Class size	0.0004 (5.27)**	-0.0004 (-8.14)**
Grade English Instruction Begins	-0.002 (-0.93)	-0.005 (-1)
Separate toilet for girls*Girl dummy	0.014 (-1.64)	-0.002 (-0.54)
Computer education	0.038 (6.28)**	-0.013 (-2.49)
Log(School Fee)	-0.037 (-12.86)**	0.003 (1.2)
Free meals	-0.033 (-4.33)**	0.034 (5.69)**
Free books	-0.006 (-1.65)	0.002 (0.8)
Free uniforms	0.038 (9.66)**	-0.005 (-1.55)
Scholarships	-0.022 (-5.47)**	-0.005 (-1.75)*
Separate toilet for girls	-0.036 (-6.09)**	-0.005 (-1.06)
Constant	-6.265 (-32.07)**	0.441 (2.01)*
R ₂	0.1374	
N	29,196	

Note: (1) figures in brackets are z-statistics. (2) *p<0.05; **p<0.01

In Table 5, I use a multinomial model specification, including characteristics for out of school children also from the data. Keeping government schools as the base category for easy comparison with the results of the previous models, I find that the estimates are almost the same for children attending private schools as in earlier models. For out-of-school children, estimates of household income, parental education, girl dummy and age are opposite in sign to those of private school children. This reflects the fact that keeping children out of school is the less preferred option for parents compared to putting them in a public school. Girls are more likely to stay out of school compared to boys, and older children more likely to drop out from the education system. All the socially disadvantaged classes and minorities are more likely to have their children out of school compared to the base of forward caste Hindus. Urban residence is no longer significant in explaining the choice of schooling and no-schooling.

For private-public school characteristics, higher private school fee leads to more schools from staying outside the education system. Similarly bigger class sizes in private schools leads to less children out of school. This could be evidence of the role of private schools in providing more educational opportunities and choices for families when the public system is already constrained. Free meals are the most important factor attracting children into schools, providing strong justification for the Mid-day Meal Scheme in India of providing free meals to children for attending school. Scholarships could also be important in bringing about this outcome of bringing children to schools.

3.4 Issues in interpreting the coefficients

Although the analysis establishes a high correlation of private enrolment with average household consumption, I can't claim that it identifies the true effect of income in choosing a school type. There is a possible omitted variable problem, and a possible endogeneity problem. The omitted variable bias could result for several reasons, including but not limited to the child's innate ability and the choice of location by

private schools, which affects distance from the school. For example, if more high ability children come from more resourceful households, and they also prefer private schooling, then the income effect would be upward biased. Similarly, if private schools locate in relatively rich localities, then income would be negatively correlated with relative distance from private schools vis-a-vis public schools. A smaller distance to school is associated with more private enrollment, making the income effect upward biased. However, there is some evidence that poor families prefer to choose schools closer home to reduce costs (Hastings et al. (2005)). Hence, distance from private school could be negatively correlated with income as well, making the income estimate downward biased.

Even if we believe these estimates, we don't know how much of the income effect is indicating credit constraints and how much is an exogenous taste for private education¹². But either way, there are implications for inequality and social mobility. If it is the poorer and socially disadvantaged families who cannot afford private schools, thus being stuck with either the less effective public school system or deciding to keep their children completely out of schools, then this will perpetuate the socio-economic inequalities rampant in the Indian society. Considering that public schools are also less adept at equipping children with skills that are desirable for a better and more secure future, this might be a channel through which intra-household gender inequities and inter-household social injustice are maintaining their hold, despite state efforts to bring change.

4 Conclusion

With a near doubling of incomes in the last decade in India, we can say now that the corresponding rise of about 13 – 18% in private enrolment is not surprising. Most of it, about 10%, can be explained by the characteristics of households, and the general perceptions in the economy. This does not say that efforts to improve

¹²The taste for private education could be due to symbolic consumption, or Akerlof-Kranton type identity homogenization.

the quality of pedagogy in public schools is misplaced. On the contrary, this study notes that to keep up the demand for public schools, the pace of improvement has to be quickened. Not only does the public education sector need to provide better supplies and resources to students, it perhaps also needs to engage with students and parents on other levels, and change its overall reputation of not delivering results.

More important are the estimates of female versus male education in the family in driving children into schools or better schools. Previous studies in other countries on the subject have always found the effect of mother's and father's education similar on the schooling decision of children. However, estimates using the IHDS-2005 data strongly point towards the salience of mother's education in determining education investments in the family. This is also consistent with the literature on intra-household transmission of identity and values to the children through the mother.

Further work is needed to pin down the exact role of income in the education decisions of families, be it for evidence of credit constraints or non-conventional preferences of parents. More detailed data analysis using models of intra-household decision-making would also be useful in identifying the changing role of mothers and their education in the family decision-making process.

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