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Author(s): Marine de Talancé

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## PRIVATE AND PUBLIC EDUCATION: DO PARENTS CARE ABOUT SCHOOL QUALITY?

MARINE DE TALANCÉ<sup>a</sup>

In recent decades, private schooling has flourished in many developing countries. This article investigates the reasons behind this schooling choice and assesses whether the rise in enrollment in private schools is due to differences in quality between them and public schools. To this end, we consider two measures of school quality: an objective one (value-added by the schools) and a subjective one (parents' perceptions). We focus on children enrolled in primary schools in Pakistan and rely on probit models. We found evidence that both perceived and observed school quality matter. Parents are more likely to send their children to a private institution not only when public schools are of lower quality but also when they think they are. In addition, we find that there are gender and socio-economic barriers to access to private schools.

*JEL Codes:* I21, I25, I28.

*Keywords:* Demand for Schooling, Pakistan, Private Education, Quality of Education, School Choice.

### 1. INTRODUCTION

Even though private schooling has been growing significantly in recent decades in many developing countries (Kingdon, 1996; Kitaev, 1999, 2007; Srivastava, 2007; Tooley and Dixon, 2003), little is known about the factors driving private school choice. This paper examines why some parents choose private schools even when free public institutions are available. More precisely, we investigate whether this rise of private schooling is due to differences of quality between public and private schools.

Two main explanations have been put forward to explain the surge in private enrollment (Heyneman and Stern, 2014). The first is the “excess demand” model which argues that, because of budgetary and space constraints, public schools cannot meet the expanded demand for education which prompts certain households to look for alternatives in the private sector. The second explanation is the “differentiated demand” model and this states that private and public schools are imperfect substitutes. Parents opt for private schools because they seek specific characteristics such as a higher quality of education, religious courses or a specific language of instruction. Previous research has clearly established that school characteristics - their size (Nishimura and Yamano, 2013), distance from home (Carneiro, Das, and Reis, 2016), instructional resources (Alderman, Orazem, and Paterno, 2001), facilities (Glick and Sahn, 2006), etc - explain educational decisions, including private school choice. However, the role of school quality itself has not been investigated, even though low quality of public schools is purported to be one of the main factors

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<sup>a</sup>ERUDITE, Univ Gustave Eiffel, UPEC, F-77454 Marne-la-Vallée, France; (2) DIAL, LEDa, IRD, [UMR 225], Université Paris-Dauphine, PSL Research University, Paris, France. [marine.detalance@u-pem.fr](mailto:marine.detalance@u-pem.fr)

explaining the growth of enrollment in private schools in developing countries.<sup>1</sup>

The main objective of this paper is to fill this void in the literature by investigating whether parents choose private schools because of quality differences with public schools. More precisely, to the traditional determinants of demand for schooling, we add two measures of quality: an objective indicator of private and public school quality (their value-added) and a subjective one (parents' perceptions of school quality). These two complementary measures help determine whether parents choose private schooling because they think public schools are bad or because private schools are truly better. In this paper, we mainly use mothers' beliefs because our results suggest they are more correlated with school choice than fathers' beliefs.

Investigating the drivers of private school choice also improves our understanding of the consequences of the expansion for private schooling on inequalities, an ongoing subject of debate (Andrabi, Das, and Khwaja, 2015). The development of private schools increases competition in the schooling system (Friedman, 2009) which theoretically leads to efficiency gains in terms of both quality and costs as private and public institutions compete to attract students (Holmes, DeSimone, and Rupp, 2003; Hoxby, 2007). It could also boost access to education by relaxing governmental financial and space constraints. However, if private schools, through their tuition fee or localization strategies, exclude poor and rural children, their expansion could exacerbate inequalities (Aslam, 2009; Hartwig, 2013; Heyneman and Stern, 2014; Pal, 2010; Watkins, 2004). The secondary objective of this study is therefore to contribute to this literature by measuring socio-economic and gender inequalities in the access to private education.

We focus on the case of Pakistan, a country that has been experiencing rapid growth in private schooling, making use of a rich dataset, the Learning and Educational Achievement in Punjab Schools (LEAPS) project. These data have three advantages compared with those used previously in the literature. First, information was gathered on all the actors in the educational sector (school principals, teachers, children and their families). Second, both perceived and objective school quality can be computed as parents rated the quality of each school available in their village (perceived quality) and pupils in schools were tested by the LEAPS team (objective quality). Third, the panel dimension allows us to partly counteract potential endogeneity biases.

Our results indicate that private school choice is driven by both mothers' opinions and objective differences in school quality. Parents prefer private institutions partly because they think that public schools are of poorer quality but also because this is often objectively true. These results validate the differentiated demand model which states that the distinctive characteristics of private schools explain the increased demand. The lack of information on public schools is also a driver of private enrollment. When parents have no idea about the quality of public schools, it increases the odds of choosing a private institution. Regarding inequalities, the results suggest that there are gender and socio-economic barriers in private school enrollment. Concerns about the consequences of the expansion of the private educational sector on inequalities are therefore justified. Moreover, wealthy parents are more sensitive to quality signals than poor parents which could further exacerbate inequalities.

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<sup>1</sup>Previous studies include some measures for school quality. However, the proxies used (expenditures, pupil-teacher ratios, educational material and infrastructure) are actually weakly correlated with "true" academic achievement (Glewwe and Muralidharan, 2016).

The rest of the paper is organized as follows. Section II describes the educational system in Pakistan with a focus on private schooling. Section III details the empirical specifications. In Section IV, we describe the LEAPS database and the variables of interest. Section V presents the empirical results along with some robustness testing and Section VI contains the conclusions.

## 2. PRIVATE EDUCATION IN PAKISTAN

Private schooling has a long history in Pakistan, dating back to before its independence. Before 1972, the private sector was dominated by missionary schools targeting the wealthiest children (Jimenez and Tan, 1985, 1987). In 1972, a wave of nationalization developed public schooling and discouraged private initiatives. However, because of a lack of public funding, this policy was reversed in 1979 and private schools reopened, followed by a sharp rise in private enrollment in the 1990's (Andrabi, Das, and Khwaja, 2008) (Figure 1). This rapid growth in Pakistan is consistent with the situation in many other developing countries (Kingdon, 1996; Kitaev, 1999, 2007; Rose, 2006; Srivastava, 2007; Tooley and Dixon, 2003, 2007). A low-fee private educational sector targeting disadvantaged families has emerged in Pakistan (Andrabi, Das, and Khwaja, 2008; Fennell, 2013). Fees are kept low by recruiting young local women, with more basic training who accept lower wages (Andrabi, Das, and Khwaja, 2008; Kingdon, 2008; Muralidharan and Kremer, 2008). Today, the average annual fees in a private school in rural Pakistan are Rs. 4,494 (\$42) while the average monthly income of the lowest wealth quintile in rural areas is Rs. 16,428 (\$156).<sup>2</sup> Although almost half of the pupils in private schools are girls and children from rural areas, enrollment in private schooling is still conditioned by household wealth. In rural areas, while 66% of the richest children enrolled in primary school attend a private institution, this proportion is only 11% for the poorest children.<sup>3</sup>

In this study, following Nguyen and Raju (2014), private schools are defined as formal educational institutions run by non-governmental actors with for-profit objectives. This definition excludes non-profit schools<sup>4</sup> and includes private schools receiving some public funding, even though the Pakistani government does not provide large subsidies for private schooling (Heyneman and Stern, 2014; Andrabi, Das, and Khwaja, 2017).<sup>5</sup>

Pakistan provides a unique framework to study the choice between public and private schools for three main reasons. First, parents are allowed to freely choose a school for their child and setting up a new private institution is relatively simple due to little government regulation (Andrabi, Das, Khwaja, and Zajonc, 2011; Andrabi, Das, and Khwaja, 2017). Second, a typical rural private school remains affordable for low-income households (Andrabi, Das, and Khwaja, 2008). Finally, in Punjab, the educational marketplace is relatively competitive with an average of seven schools per village.

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<sup>2</sup>Data on fees come from the 2013-2014 Pakistan Social and Living Standards Measurement (PSLM) survey and those on wealth come from the 2013-2014 Household Integrated Economic Survey (HIES).

<sup>3</sup>2013-2014 PSLM survey

<sup>4</sup>Only 1% and 3% of enrolled children are in religious and NGO schools, respectively (PSLM 2013-14).

<sup>5</sup>Only 3% of private schools sampled receive funding from the government or from other donors.

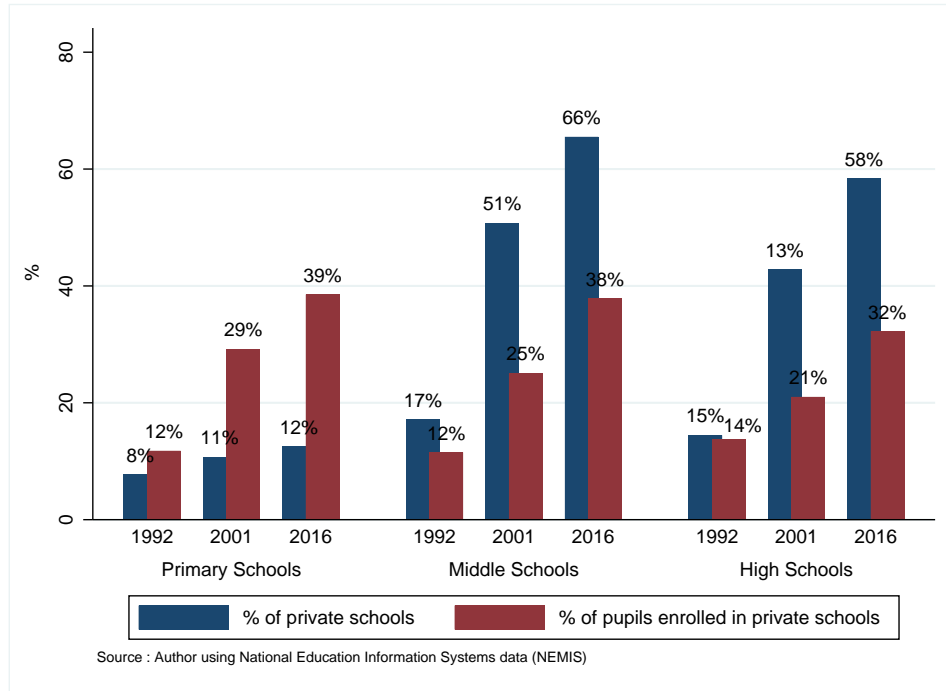


Figure 1: Prevalence of private schools and enrollment in Pakistan, 1992-2016

Reading note: In 1992, 8% of primary schools were private and 12% of children enrolled in primary school were in private schools.

### 3. EMPIRICAL SPECIFICATIONS

#### 3.1. Private school choice

To model private school choice, we assume that, conditional on enrollment, parents can either send their child to a public school (option  $G$ ) or to a private one (option  $NG$ ) and that they would opt for the option maximizing their utility. A common assumption in the literature on school choice (Alderman, Orazem, and Paterno, 2001; Glick and Sahn, 2006; Gertler and Glewwe, 1990) is that parents derive their utility from their own consumption of goods and services ( $C$ ) and from their child's human capital ( $H$ ). Parents value their child's education *per se* because they are altruistic and/or because their child, once educated, will earn more in the future and will be able to help them financially when they grow old. For each schooling choice, household consumption and the child's human capital will vary:

$$(1) \quad U_{hij} = u(C_{hij}, H_{hij}) \text{ with } j = [G, NG]$$

$U_{hij}$  denotes the utility of household  $h$  associated with schooling option  $j$  for child  $i$ . Subscript  $i$  allows utility to vary across children within a household (for instance, between girls and boys).

The level of consumption ( $C$ ) equals income ( $Y$ ) minus schooling costs ( $P$ ):  $C = Y - P$ . In line with Glick and Sahn (2006), utilities are specified in a non-linear form, through wealth quintiles, to highlight the impact of household income on parental school-

ing decisions.<sup>6</sup>

We also allow the wealth coefficients to differ from the one associated with school costs:

$$(2) \quad U_{hij} = \alpha_0 H_{hij} + \sum_{k=1}^5 \alpha_{1jk} E_k - \alpha_{2j} P_{ij} + \epsilon_{hij}$$

$P_{ij}$  represents the cost of schooling associated with option  $j$ .  $E_k$  denotes the wealth quintiles and  $\epsilon_{hij}$  is the error term. As the child's human capital,  $H_{hij}$ , is not directly observable, we use its reduced form:

$$(3) \quad \alpha_0 H_{hij} = \beta_j F_{hi} + \gamma_j QS_j + \mu_j B_{hj} + \delta_{hij}$$

where  $F_{hi}$  corresponds to a vector of observed household and child characteristics.  $QS_j$  represents a vector of observable school characteristics, including its objective quality. We assume that parental beliefs (subjective opinions) about school quality may differ from observed school quality. For this reason, the increase in the child's human capital is also a function of parents' subjective beliefs about each schooling option ( $B_{hj}$ ). Finally,  $\delta_{hij}$  is a random error term.

Substituting equation (3) into the utility function (equation (2)) yields:

$$(4) \quad U_{hij} = \beta_j F_{hi} + \gamma_j QS_j + \mu_j B_{hj} + \sum_{k=1}^5 \alpha_{1jk} E_k - \alpha_{2j} P_{ij} + \eta_{hij}$$

Parents would opt for private schooling,  $Private_{hi} = 1$ , if  $U_{hiNG}$  exceeds  $U_{hiG}$ . This decision rule can be modeled by a probit or logit specification:

$$(5) \quad \begin{cases} Private_{hi} = 1 \text{ if } U_{hiNG} - U_{hiG} > 0 \\ Private_{hi} = 0 \text{ otherwise} \end{cases}$$

### 3.2. Econometric issue

This specification raises several econometric issues. Firstly, *Private* is observed only if parents send their child to any school (private or public) (84% of the initial sample). Enrolled children have specific characteristics: they are more likely to be boys and to come from richer households (Table A1, Appendix). Enrollment is a non-random choice made by parents that could also be modeled using utilities. If enrollment depends on unobserved factors that affect the probability of attending private schools, we face an endogenous selection bias. The estimated effects are therefore based on observed school choice behaviors and not on potential behaviors. Nothing can be said about the potential decisions made for out-of-school children in the hypothetical situation where they would have gone to school. In the absence of a convincing exclusion variable, we chose not to use a probit

<sup>6</sup>As parents make their decision by differentiating utilities, if consumption is entered in a simple linear form, attributes that are constant across alternatives, such as income, are differentiated out of the decision rule. Indeed, a linear utility function can be represented by  $U_{hij} = \alpha_0 H_{hij} + \alpha_1 Y_h - \alpha_2 P_{ij} + \epsilon_{hij}$ . Parents will opt for option  $G$  (rather than option  $NG$ ) if  $U_{hiG} > U_{hiNG}$ , which is equivalent to  $\alpha_0(H_{hiG} - H_{hiNG}) + \alpha_1(Y_h - Y_h) - \alpha_2(P_{iG} - P_{iNG}) + (\epsilon_{hiG} - \epsilon_{hiNG}) > 0$ . Hence the term  $Y_h$  is eliminated.



selection model.<sup>7</sup> Nevertheless, the panel dimension of the database allows us to include household fixed effects, which partly alleviates this potential selection bias. We therefore control for factors that do not vary over time within a household and could explain enrollment (preference for education for instance). Moreover, as robustness checks, we also use a multinomial logit model that estimates both the probability of being enrolled and of enrollment in a private school.

Secondly, it is likely that several specific variables are subject to endogeneity. Theoretically, residence and school quality could be endogenous if parents chose a certain location or move to specific villages to be closer to certain schools. However, in the sample, less than 4% of households report having moved in the previous five years. Of those who moved, less than 1% of them claim it was for educational reasons.<sup>8</sup> The number of private schools and their localization could also be endogenous if the decision to open a new establishment is conditioned by the number and the quality of public schools available. While tests of equality of means and of distributions show that private schools are not located where public schools are of poor quality, private schools are found in areas where there are more public schools.

More generally, coefficient estimates are biased if explanatory variables are correlated with unobserved factors that influence school choice. These omitted variables could relate to the household (parental preferences for schooling type) or to the child (child's innate ability, motivation, health, future career prospects, etc). It is possible that the variables of interest - subjective (mothers' and peers' opinions) and objective (schools' added value) quality - are correlated with unobserved household-specific variables. This would be the case if schools respond to parents' schooling preferences by improving their quality. For instance, if private schools respond to parents' preferences for private education by increasing their quality, coefficients associated with the private school quality variables would have an upward bias. On the contrary, if private schools increase their quality to attract parents with a preference for public education, these coefficients would have a downward bias. Estimates of the effect of the lack of information on school quality could also be biased if parents with preferences for private education do not collect information on the quality of public schools. If so, the coefficient associated with the share of public schools whose quality is unknown will have an upward bias. Estimates of the effect of school characteristics will also be biased if parents with a strong preference for private education provide direct financial support to private schools or if they exert pressure on political authorities to provide more educational resources (Glick and Sahn, 2006). However, only 6% and 11% of men and women, respectively, have ever participated in school committees or parent-teacher meetings.<sup>9</sup> Moreover, as very few schools (6%) receive funding other than from government or school fees, direct financial funding by parents is unlikely to bias our estimates.<sup>10</sup> If the government invests more educational re-

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<sup>7</sup>Different instruments - dummies indicating whether a member of the household left or died in the past five years - were considered but these variables are not entirely satisfying from a theoretical point of view and relatively weak from an empirical perspective. Consequently, the results from the Heckman and simple probit models are quite similar.

<sup>8</sup>Excluding these households does not change the results.

<sup>9</sup>These statistics are quite similar in both private and public schools.

<sup>10</sup>Excluding these schools does not change the results.



sources in certain areas, for instance in villages where enrollment and quality of education are low, this could also bias the estimates. However, the level of government investment received by public institutions of poorer quality is not significantly higher or lower.<sup>11</sup>

Quality variables may not only be correlated with unobserved household-specific factors but also with child-specific characteristics. Enrollment of children with higher innate abilities, for example, may cause schools to seek to increase their quality to meet their needs. If there is a higher likelihood of these children enrolling in private schools, then estimates of the effect of private school quality will be biased upwards. Parents may also be more likely to consider enrollment in a private school and therefore to seek information on them if their child's innate ability is higher.

To address the potential bias due to omitted variables, the panel dimension of the data is used. As multiple children from the same household are observed and as the same households are surveyed several times, it is possible to include household fixed effects and control for household-specific unobserved characteristics that are constant over time (parental preferences for private or public education for instance).

Finally, school choice can directly influence parental opinions if, to justify their choice, parents evaluate a school highly (*ex-post* rationalization), leading to an upward endogeneity bias (reverse causality) that cannot be ruled out by household fixed effects. This issue is minimized by focusing on parental perceptions of schools in the year prior to enrollment of their children.

#### 4. DATABASE AND VARIABLES

##### 4.1. *Description of the database*

The data used are taken from the Learning and Educational Achievement in Punjab Schools (LEAPS) project. Over the course of three years (2004-2006), the survey gathered information on all the schools, both private and public, in 112 villages in three districts of the Punjab province in Pakistan: Attock (North), Faisalabad (Central) and Rahim Yar Khan (South). The original (first round) sample covers 823 schools (60% of them are public), with 26 additional schools entering the sample over the next two years. The survey is not nationally representative as villages were randomly chosen from a list of rural villages with both public and private schools.<sup>12</sup> These villages - with both private and public schools - are wealthier, larger and their population is more educated than the average. All private and public schools within the village boundary and within a short walking distance were surveyed. Questionnaires were distributed to different groups (school principals, teachers and children) to obtain a complete picture of the educational environment.

During the first round, in each school, all the students enrolled in third grade (13,735 children) were tested in three different subjects (Mathematics, Urdu and English). They were tracked and retested in grades four and five. 87% of these children were retested in either wave two or three and 67% of them were tested in all three waves. These tests are used to measure the academic level of the schools. More precisely, the extent to which schools contributed to improved students' academic performance over time (value-added) is measured.

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<sup>11</sup>When the amount of public financing is regressed on school test scores, no significant effect is found.

<sup>12</sup>At the time of the LEAPS survey, around half of the rural population in Punjab lived in a village with at least one private school (Andrabi, Das, Khwaja, Vishwanath, and Zajonc, 2007).

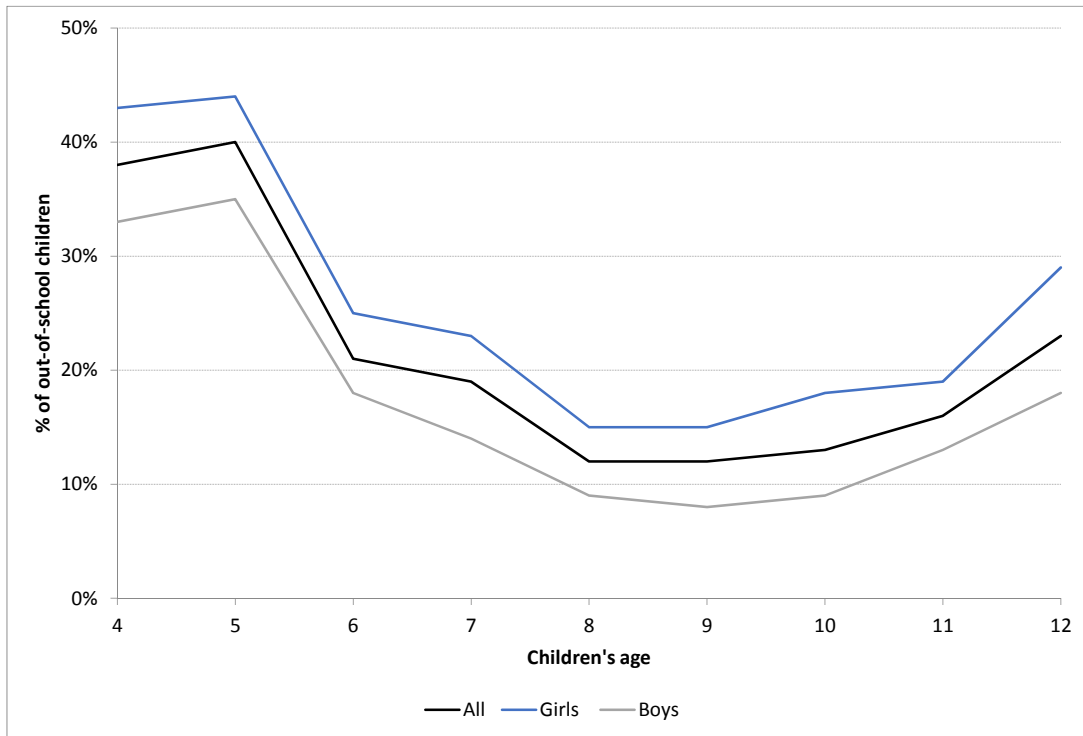


Figure 2: Out-of-school children by age

In addition, 16 households from each village were surveyed. Twelve households with at least one child enrolled in grade three were randomly chosen. Four households with at least one child eligible for grade three, aged between 8 and 10 years old, but not enrolled in any school were randomly selected.<sup>13</sup> Each household was asked to rate the quality of all the schools located in their village. This allows us to include a subjective measure of school quality.

In this paper, we focus on children eligible for primary education and therefore restricted our sample to children aged between 6 and 12. Although this age range was chosen because many children start school at age 6 (Figure 2), smaller age ranges are used as a robustness check. The final sample gathers information on 2,601 enrolled children living in 1,275 households, with 72% and 28% attending public and private schools, respectively. In order to avoid repetition of observations in the main probit model, only one observation per child is retained as very few of them changed school over the span of the survey.<sup>14</sup> In the discussion section of this paper, school transfers are nevertheless investigated.

<sup>13</sup>96% of the households in the selected villages were tested during all three waves. The remaining 4% were tested during two waves.

<sup>14</sup>When the child was surveyed more than once, we only kept the first available observation for mothers' perceptions and schools' value-added.

## 4.2. Descriptive statistics

Each parent was asked to rank the quality of each school in his village on a Likert scale, which allows us to compute an indicator of perceived school quality. Mothers' opinions are used because, when parents disagree, the school selected is more often the one preferred by the mother. Moreover, when only fathers' perceptions are added or when they are considered along with mothers' beliefs, coefficients associated with fathers' opinions are not significant. This remains true even if the value added by schools is removed from the regression. This suggests that fathers' perceptions contribute less than mothers' beliefs to the decision to select a private or public school for their children. Since there are very few responses in the two extreme categories (very poor and excellent), they are grouped together with the poor and good categories. On average, private schools are perceived as better than public institutions: 36% of private schools are considered to be of good quality compared to only 21% of public schools. Parents are not able to rate a significant portion of the schools in their village, suggesting that access to information may be an issue (Table I). On average, parents are unable to rate the quality of 36% of private schools and 29% of public schools.

TABLE I  
DESCRIPTIVE STATISTICS - PERCEIVED QUALITY

	(1) All households	(2) At least 1 child enrolled in a private school	(3) No child in private schools	(4) Diff: (3)-(2)
% of public schools: high quality	0.21 (0.30)	0.16 (0.27)	0.23 (0.32)	0.074*** (0.02)
% of private schools: high quality	0.36 (0.40)	0.44 (0.39)	0.32 (0.40)	-0.112*** (0.02)
% of public schools: average quality	0.38 (0.33)	0.37 (0.34)	0.39 (0.32)	0.018 (0.02)
% of private schools: average quality	0.25 (0.34)	0.27 (0.32)	0.24 (0.35)	-0.031 (0.02)
% of public schools: low quality	0.11 (0.24)	0.14 (0.27)	0.10 (0.22)	-0.040*** (0.01)
% of private schools: low quality	0.03 (0.12)	0.03 (0.12)	0.03 (0.13)	0.001 (0.01)
% of public schools: unknown quality	0.29 (0.34)	0.33 (0.37)	0.27 (0.32)	-0.051*** (0.02)
% of private schools: unknown quality	0.36 (0.41)	0.27 (0.33)	0.41 (0.44)	0.143*** (0.02)
Observations (hh-year observation)	1320	437	883	2162
Unique households	1275	431	855	1275

Notes: In columns 1 to 3, standard deviations are reported in parentheses. In column 4, t-statistics are reported in parentheses: \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Perceptions are those of the mother. Only households with at least one enrolled child.

How parents feel about a specific school may be due to its reputation and the opinions of peers. To distinguish between the part of perceived quality that comes from the individual's beliefs and those of peers, a control for the average opinions of other parents in the village is included in the estimates.

The objective measure of school quality is based on a value-added model. This is preferred to raw test scores since the latter may reflect the composition of the student body and not the true quality of the school. Value-added indicators measure how schools contribute to improved learning over time, while controlling for individual and peer characteristics. This identification strategy can be represented using the following equation:

$$(6) \quad A_{itm} = \delta A_{i,t-1} + \beta H_{it} + \alpha C_{it} + \gamma H_{mt} + \Phi C_{mt} + s_m + e_{itm}$$

where  $A_{itm}$  refers to the score of pupil  $i$ , in year  $t$  and in school  $m$ .  $A_{i,t-1}$  is the score of the student in the previous year.<sup>15</sup>  $H_{it}$  and  $H_{mt}$  are vectors that include the characteristics of the student’s household and those of his peers’ households, respectively.  $C_{it}$  and  $C_{mt}$  are vectors that include the characteristics of the student and those of his peers, respectively.  $s_m$  are the school fixed effects. Finally,  $e_{itm}$  is the error term. Standard errors are clustered at the school level. The coefficients associated with school fixed effects,  $s_m$ , measure the extent to which the improved results between two periods for similar children with similar peers is explained by the school. Estimates of equation (6) are presented in Appendix (Table A2). Each estimate of value-added is standardized by survey year and then averaged by school type. Descriptive statistics reported in Table II suggest that private schools are of higher quality than public ones, even after controlling for student composition. The added value of private schools amounts to 0.40 against -0.21 for public schools. This finding is consistent with other studies in Pakistan (Andrabi, Das, and Khwaja, 2008; Das, Pandey, and Zajonc, 2006), India (Chudgar and Quin, 2012; Goyal, 2009; Kingdon, 2008; Muralidharan and Sundararaman, 2013; Pal, 2010) and other developing countries (Anand, Mizala, and Repetto, 2009; Tooley, Bao, Dixon, and Merrifield, 2011; Thapa, 2015). This better-than-average performance of private schools has been attributed to a higher quality of teaching, due to lower teacher absenteeism (Andrabi, Das, and Khwaja, 2008; Muralidharan and Sundararaman, 2015; Tooley, Bao, Dixon, and Merrifield, 2011), more time spent on teaching activities (rather than administrative tasks) (Muralidharan and Kremer, 2008; Tooley, Bao, Dixon, and Merrifield, 2011), more effective teaching methods (Aslam and Kingdon, 2011) and a higher accountability of teachers to employers (Aslam and Kingdon, 2011; Muralidharan and Kremer, 2008). This higher quality of education is later translated to the labor market in Pakistan as graduates from private schools earn more than graduates from public schools (Asadullah, 2009). Private schooling could thus represent a rational choice given the subsequent life prospects.

TABLE II  
DESCRIPTIVE STATISTICS - OBJECTIVE QUALITY

Sample	(1) All	(2) Public schools	(3) Private schools	(4) Diff: Public-private
School’s value-added	0.02 (0.76)	-0.21 (0.67)	0.40 (0.74)	-0.614*** (0.04)
Observations (school-year obs)	1417	887	530	1417
Unique schools	828	501	327	828

Notes: In columns 1 to 3, standard deviations are reported in parentheses. In column 4, t-statistics are reported in parentheses: \* p < .1, \*\* p < .05, \*\*\* p < .01.

Other control variables at the child, household and school levels are described in the appendix (Table A3).

<sup>15</sup>Scores in the three subjects were averaged to obtain an overall score.

5. EMPIRICAL RESULTS

5.1. Main results

Turning to the main results, the average marginal effects of private enrollment are reported in Table III.<sup>16</sup>

TABLE III  
PRIVATE VS. PUBLIC ENROLMENT

Estimator	(1) Probit AME	(2) Probit AME	(3) Probit AME	(4) Probit AME
Dep. Var.	Being enrolled in a private school			
% of public schools considered as poor quality		0.117*** (0.03)	0.109*** (0.03)	0.102*** (0.03)
% of private schools considered as poor quality		-0.131* (0.08)	-0.135* (0.08)	-0.141* (0.07)
% of public schools for which not able to assess quality		0.164*** (0.03)	0.170*** (0.04)	0.150*** (0.04)
% of private schools for which not able to assess quality		-0.157*** (0.03)	-0.165*** (0.03)	-0.213*** (0.03)
Public schools' value-added	-0.072** (0.03)		-0.067** (0.03)	-0.072*** (0.03)
Private schools' value-added	0.009 (0.02)		0.011 (0.02)	0.012 (0.02)
Peers' opinions : % of public schools considered as poor quality				0.220* (0.12)
Peers' opinions : % of private schools considered as poor quality				0.076 (0.17)
Girl	-0.068*** (0.02)	-0.065*** (0.02)	-0.064*** (0.02)	-0.064*** (0.02)
First born	0.019 (0.02)	0.014 (0.02)	0.012 (0.02)	0.009 (0.02)
Father's years of schooling	0.004* (0.00)	0.003* (0.00)	0.004* (0.00)	0.004* (0.00)
Mother's years of schooling	0.013*** (0.00)	0.012*** (0.00)	0.013*** (0.00)	0.012*** (0.00)
2nd quintile of wealth asset	-0.019 (0.03)	-0.013 (0.03)	-0.015 (0.03)	-0.015 (0.03)
3rd quintile of wealth asset	-0.011 (0.03)	-0.008 (0.02)	-0.013 (0.03)	-0.007 (0.02)
4th quintile of wealth asset	0.002 (0.03)	0.016 (0.03)	0.002 (0.03)	0.003 (0.03)
5th quintile of wealth asset	0.071** (0.03)	0.070** (0.03)	0.069** (0.03)	0.068** (0.03)
Observations	2469	2601	2469	2469
Pseudo R <sup>2</sup>	0.327	0.344	0.351	0.360
Mean outcome	0.288	0.283	0.288	0.288
No. of clusters	99	102	99	99

Notes: Clustered (at the village level) and robust standard errors are reported in parentheses: \* p < .1, \*\* p < .05, \*\*\* p < .01. Average marginal effects are reported. Other control variables not reported are described in Table A3.

How mothers feel about schools partly explains educational choices: when mothers think that public education is of poor quality, their children are more likely to be enrolled in a private school. When the percentage of public schools considered to be of poor quality increases by one point, the probability of choosing a private school increases by around 10 percentage points. On the contrary, when private schools are considered to be of poor

<sup>16</sup>Results from a linear probability model are close to the ones obtained with the probit model.

quality, parents are less likely to choose this option. These findings remain true even after controlling for the objective quality of the schools (column 3) and for other parents' opinions (column 4). The lack of information on the quality of one alternative decreases its relative utility: when mothers are not able to assess the quality of public schools, they are more likely to opt for a private institution. On the contrary, when they are unaware of the quality of private schools, they are less likely to choose such a school. Individual beliefs matter, but so does the reputation of public schools: when other parents in the village think that public schools are bad, it increases the probability that a specific household will send their child to a private institution.

The objective quality of public schools also explains schooling decisions: when public schools fail to show improvement in students' results (low value-added), parents are more likely to enroll their children in a private school. Quality therefore matters to parents: they are more likely to choose private schooling when they think public schools are bad (perceived quality), when public schools really are of lower quality (value-added) and when the reputation of public schools is low (peers' opinions). These results support the differentiated demand model where private schools are picked because public schools provide an education of lower quality, or because parents believe this to be the case. The poor quality (perceived or actual) of public schools seems to provide a stronger explanation of private school choice than the high quality of private schools (less significant coefficients). These results suggest that "push" factors away from low quality are stronger than "pull" factors towards higher quality.

The results raise concern regarding the potential consequences of private schooling expansion on inequalities. First, consistently with Nishimura and Yamano (2013) and Maitra, Pal, and Sharma (2016), being a girl decreases the probability of attending a private school by 6 percentage points. Economic considerations partly explain this bias against girls' education. With a female labor participation rate of 25% in Pakistan, parents may prefer to invest in boys' education. When girls get married, they leave their natal homes and when they get older, they tend to support their parents-in-law rather than their parents. Therefore, parents may not see girls' education as a worthwhile investment (Purewal and Hashmi, 2015; Sawada and Lokshin, 1999). In addition to economic considerations, this gender gap also reflects the socio-cultural gender norms of rural Pakistan. The seclusion of women and their limited mobility in Pakistan is a factor explaining the lower female schooling participation: education is often seen as a corrupting force that drives girls away from their traditional gender roles (Purewal and Hashmi, 2015). School characteristics could also explain this result, as fewer private schools are single-sex than public schools.<sup>17</sup> When interacted variables are added, results confirm this assumption: when more public schools in a particular village are single-sex, it reduces even more the odds of girls being enrolled in private institutions. Therefore, both supply and demand explain why girls are less likely to go to a private school. Second, private schooling is conditioned by household wealth. Coming from a wealthier household significantly increases the relative utility of private enrollment: belonging to the highest wealth quintile increases the probability of being enrolled in a private school by 7 percentage points. This result raises equality concerns since the poorest children may remain in the lower quality public schools.

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<sup>17</sup>Almost none of the private schools are single-sex, whereas nearly 25% of public schools are.

### 5.2. Household heterogeneity

Wealthy parents appear to be more sensitive to both observed and perceived school quality (Figure 3). When the percentage of poor quality public schools increases by one point, the probability of choosing a private school increases by 4 and 11 percentage points for the poorest and the richest households, respectively. When public schools are of poor quality (or considered as such), poorer parents are less likely to send their children to private schools than richer parents. This may lead to further inequalities with children from disadvantaged backgrounds being left in poor quality schools. School reputation and peers' opinions tend to matter more for uneducated households, which suggests that inequalities in terms of access to information may be in play (Figure 4).

We also observe heterogeneous effects depending on the gender of the child. Quality signals - both objective and subjective - are more important for parents when choosing their daughters' school (Figure 5). When the percentage of public schools considered to be of poor quality increases by one point, the chances of choosing a private school increases by 4 and 12 percentage points for boys and girls, respectively.<sup>18</sup> Similarly, when the added value of public schools increases by one, the probability of choosing a private institution decreases by 10 percentage points for girls and only by 4 percentage points for boys.<sup>19</sup> Private schooling may not be their first choice for girls but if the quality of public schools is poor (or perceived as such), many parents will consider this option. Parents are more prone to choose a private school for their sons, regardless of the quality of public alternatives available.

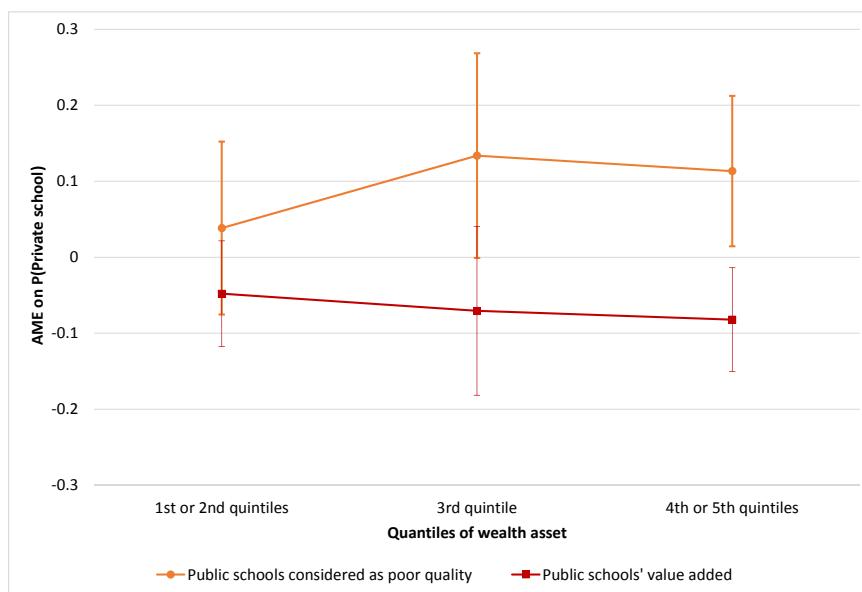


Figure 3: Wealth heterogeneity

Notes: Average marginal effects (AME) are only significant for the richest households (4th or 5th wealth quintiles). Vertical bars represent 95% confidence intervals. Results obtained from a probit model including interactions between wealth and quality indicators. Confidence intervals are computed using the Delta method.

<sup>18</sup>Note that the coefficient is not significant for boys

<sup>19</sup>Note that the coefficient is not significant for boys



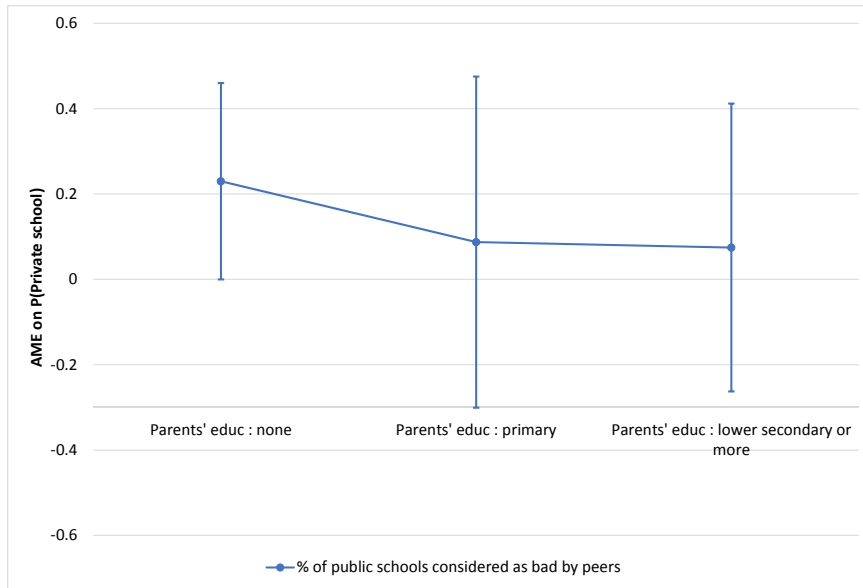


Figure 4: Parents' education heterogeneity

Notes: Average marginal effects (AME) are only significant for uneducated parents. Vertical bars represent 95% confidence intervals. Results obtained from a probit model including interactions between parents' education and quality indicators. Parents' education is the maximum achieved by either father or mother. Confidence intervals are computed using the Delta method.

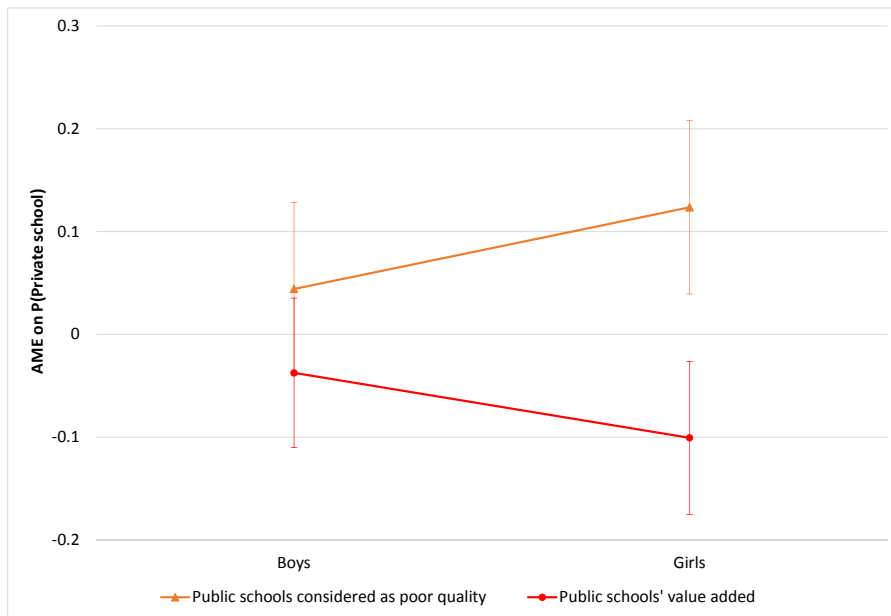


Figure 5: Gender heterogeneity

Notes: Average marginal effects (AME) are only significant for girls. Vertical bars represent 95% confidence intervals. Results obtained from a probit model including interactions between gender and quality indicators. Confidence intervals are computed using the Delta method.

To partly alleviate a potential omitted variable bias, we add household fixed effects and focus on intra-household schooling choices. This helps rule out potential endogeneity due

to unobserved household-specific variables (parental schooling preferences). To identify the model, we rely on observations with within-household variation in schooling choice. These households are those whose children changed school type over the study period and households with one or more children enrolled in a public school and one or more in the private sector. For this purpose, only 19% of initial households are retained (Table A4). In addition, to identify the coefficients associated with quality variables, they must vary within households over the survey period. As some school quality variables vary little over time (Table A5), the estimates of their coefficient need to be considered with caution because they are based on a small number of observations. To estimate the intra-household gender gap in private school choice, we rely on households with at least one girl in one type of institution and at least one boy in the other type (9% of the initial household sample). The sample is therefore quite reduced and could be subject to a selection bias if the selected households are richer and more educated.

Results from a linear probability model (column 1) and a conditional logit specification (column 2) with household fixed effects are reported in Table IV. Perceived quality explains intra-household schooling choices. When the perception is that the quality of public schools has deteriorated over time, the probability of private enrollment increases.<sup>20</sup> The likelihood of enrollment in a private institution is almost 4 times greater when the percentage of public schools perceived as of poor quality increased by one point. In line with previous results, we also find some evidence supporting the presence of an effect due to a lack of information. The effect of objective quality is no longer significant, probably because this variable varies little over time.

In line with similar studies in India (Maitra, Pal, and Sharma, 2014; Sahoo, 2016), the existence of an intra-household gender gap in private school enrollment is confirmed. On average, being a girl reduces the probability of attending a private school by 7.5 percentage points.

### 5.3. Dealing with ex-post rationalization

Even in the presence of household fixed effects, estimates of the impact of perceived quality could still be biased if parents justify their choice afterwards by overestimating the quality of the type of school attended by their children. The panel dimension is used to counteract this issue of ex-post rationalization. We focus on children that were not enrolled in  $t - 1$  and use the perceptions in  $t - 1$  to explain school choices in  $t$ . By construction, enrollment choices in  $t$  cannot directly influence previous perceptions. Nevertheless, there could still be ex-post rationalization due to enrollment of older siblings.<sup>21</sup> The sample was slightly changed to include all children that were not enrolled in  $t - 1$  and enrolled in  $t$ . Children that were not enrolled in  $t - 1$  represent 21% of the initial sample. Of them, 70% are still not attending any school in  $t$  and 30% are now enrolled. Of these latter, 81% attend a public school and 19% a private institution. The sample is therefore significantly reduced. Results confirm that both perceived and observed low quality of public schools drive private enrollment (Table V).

<sup>20</sup>Identification of the coefficients associated with subjective quality relies on the variation in perceptions over the period. This is not an issue as the variation in perceptions among mothers is similar to that observed within a mother over time.

<sup>21</sup>The sample cannot be reduced to include only first born children as it would be too small (81 observations).

TABLE IV  
INTRA-HOUSEHOLD PRIVATE SCHOOL CHOICE

Estimator	(1) LPM	(2) Conditional Logit Odd Ratio
Dep. Var.	Enrolled in private school	
% of public schools considered as poor quality	0.093 (0.06)	3.823* (3.04)
% of private schools considered as poor quality	-0.237** (0.11)	0.062** (0.07)
% of public schools for which not able to assess quality	0.112* (0.06)	4.661* (4.00)
% of private schools for which not able to assess quality	-0.060 (0.05)	0.153** (0.12)
Public schools' value-added	-0.016 (0.04)	1.900 (1.01)
Private schools' value-added	-0.015 (0.04)	1.911 (0.98)
Peers' opinions : % of public schools considered as poor quality	0.077 (0.16)	2.088 (3.92)
Peers' opinions : % of private schools considered as poor quality	0.006 (0.29)	0.401 (1.86)
Peers' opinions : % of public schools for which not able to assess quality	0.063 (0.09)	1.775 (2.07)
Peers' opinions : % of private schools for which not able to assess quality	0.128* (0.07)	6.555* (6.63)
Girl	-0.075*** (0.03)	0.448*** (0.11)
Observations	3966	1041
Unique children	2872	685
Unique households	1277	239
Pseudo R <sup>2</sup>	0.626	0.145
Mean outcome	0.301	0.442
No. of clusters	99	89
Household FE	Yes	Yes

Notes: Clustered and robust standard errors are reported in parentheses: \* p < .1, \*\* p < .05, \*\*\* p < .01. In column 2, odd-ratios are reported. Other control variables not reported are described in Table A3 in Appendix.

TABLE V  
PAST PERCEPTIONS AND SCHOOL CHOICE

Estimator	(1) Probit AME
Dep. Var.	Enrolled in private school
% of public schools considered as poor quality in t-1	0.119** (0.06)
% of private schools considered as poor quality in t-1	0.121 (0.11)
% of public schools for which not able to assess quality in t-1	0.062 (0.06)
% of private schools for which not able to assess quality in t-1	-0.058 (0.05)
Public schools' value-added	-0.080* (0.05)
Private schools' value-added	0.026 (0.03)
Observations	315
Pseudo R <sup>2</sup>	0.445
Mean outcome	0.181
No. of clusters	90
Unique individuals	315

*Notes:* Clustered and robust standard errors are reported in parentheses: \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Perceptions are those of the mother and when not available, those of the father. Other control variables not reported are described in Table A3 in Appendix.

#### 5.4. Additional robustness checks

In the benchmark results, only one observation per child is kept because few children changed from one type of school to another over time. However, transfers from public to private schools could be driven by the poor quality of the previous school. When investigating school transfers, the sample used is slightly different: only children in surveyed schools are selected and only those who were enrolled and surveyed at least twice. Relatively few children left public schools to attend private schools or the opposite (12%), probably because of the limited time span of the survey. Therefore, our results are based on a small sample size of children and findings must be interpreted carefully. Nevertheless, Table A6 presents the results from probit models that estimate the probability of transferring from one type of school to the other. Surprisingly, when the reputation, the perceived and observed quality of the public school attended by the child in  $t - 1$  is good, it increases the probability of sending him to a private school. This result may reflect a selection process where parents think that their child would be more likely to succeed in a private school. It could also be that parents are more likely to invest in private schooling when they perceive their child as being of higher ability because he has higher scores. However, even when students' scores are added to the regression, the coefficient associated with school value added is still positive and significant.<sup>22</sup> Private schools may also be more prone to accept children coming from good public schools. In any case, although dissatisfaction with public schools seems to explain school choice it does not explain why some children are leaving public schools. When looking at transfers from private to public schools, the situation is quite different. While the coefficients associated with objective and perceived quality are not significant, children enrolled in private schools that have a good reputation are less likely to transfer to a public school. Finally, analysis of transfers also confirms the existence of schooling inequalities with girls and poor children being less likely to leave a public institution for a private one.

A multinomial logit model is used to simultaneously model enrollment both overall and in private schools (Table A7, Appendix). While previous findings remain true, these results also suggest that when parents have less information about either type of school, it increases the likelihood of not sending children to school at all. When parents' perception is that public schools are of poor quality it negatively impacts overall enrollment. Enrollment reaches a peak for children between the ages of 8 and 11 (Figure 2), and so we ran a probit model on children in this age category only. Results for this age category are the same as for all the children combined (Table A8, Appendix).

Several alternative measures of distance from home were considered. Based on the fact that most private schools are located close to the main road (Andrabi, Das, Khwaja, Vishwanath, and Zajonc, 2007), we use the time taken to reach the main road from the household as a proxy for distance from a private school. However, this information does not allow us to estimate the distance between the household and a public school. A second alternative proxy for distance used is data from the school survey, in which principals estimate the distance between the school and the health center, the community center and the bank. However, these measures do not include any information on the household. Never-

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<sup>22</sup>Results are available on demand. Note that for this estimate, we have to drop subjective quality otherwise the sample is too small.

theless, no matter which distance variable is used, the main findings remain unchanged.<sup>23</sup>

## 6. CONCLUSION

Private schooling has grown considerably in recent decades in many developing countries, including Pakistan. While this has led to debates about the consequences for schooling inequalities, the reasons for this surge remain unclear. In this paper, we try to fill this void in the literature.

The main objective was to assess whether parents choose private education in Pakistan because of perceived or objective differences in quality between public and private schools. Our results suggest that the poor quality of the public sector may explain the growth of private education. More specifically, what matters is not only the objective quality of schools but also how parents perceive this quality. Dissatisfaction with public schooling partly explains why children are sent to private institutions. Parents' lack of information also drives preferences: when they have no idea about the quality of public schools, it increases the odds of choosing a private institution.

The secondary objective of this paper was to expand our understanding of the impact of private enrollment on gender and socioeconomic inequalities. We find that, in spite of relatively low school fees, socio-economic barriers still prevent some children - mainly girls and poor children - from accessing private schools. Even within households, we observe a preference for investment in the education of boys over their sisters.

Expanding market-based education could provide an option to parents who are dissatisfied with public schooling but there are signs that it could aggravate educational inequalities with poorer children and girls forced to stay in public institutions. Eliminating these socio-economic barriers is crucial before developing private schooling. A better understanding of what contributes to better quality in private schools and why parents are not satisfied with public education would help design policies to increase the attractiveness of public schools.

Given the importance of parents' perceptions, more research is needed to specify a proper theoretical model that could explain how perceptions affect schooling decisions. These types of models have been developed to assess perceived returns of education, but it would be useful to explicitly explore the impact of parents' opinions about schools.

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<sup>23</sup>Results are available on demand.

APPENDIX

TABLE A1  
ENROLMENT DECISION

Estimator	(1) Probit AME
Dep. Var.	Being enrolled in any school
% of public schools considered as poor quality	-0.030 (0.02)
% of private schools considered as poor quality	-0.058 (0.06)
% of public schools for which not able to assess quality	-0.034 (0.03)
% of private schools for which not able to assess quality	-0.049*** (0.02)
Public schools' value-added	0.010 (0.01)
Private schools' value-added	-0.003 (0.02)
Girl	-0.061*** (0.01)
First born	0.069*** (0.02)
Father's years of schooling	0.010*** (0.00)
Mother's years of schooling	0.010*** (0.00)
2nd quintile of wealth asset	0.060*** (0.02)
3rd quintile of wealth asset	0.076*** (0.02)
4th quintile of wealth asset	0.062*** (0.02)
5th quintile of wealth asset	0.078*** (0.02)
Observations	3102
Pseudo R <sup>2</sup>	0.218
Mean outcome	0.855
No. of clusters	105
District FE	Yes
Year FE	Yes

Notes: Clustered (at the village level) and robust standard errors are reported in parentheses: \* p < .1, \*\* p < .05, \*\*\* p < .01. Average marginal effects are reported. Other control variables not reported are described in Table A3.



TABLE A2  
ESTIMATES OF SCHOOL VALUE-ADDED

Estimator	(1) OLS
Dep. Var.	Std scores
L.Std total score	0.733*** (0.012)
Child age	-0.023*** (0.004)
Girl	0.060*** (0.017)
Wealth index	0.008** (0.004)
Dad educ: less primary	0.018 (0.021)
Dad educ: primary to high secondary	0.041*** (0.011)
Dad educ: more than high sec	0.099*** (0.021)
Mum educ: less primary	-0.002 (0.018)
Mum educ: primary to high secondary	0.002 (0.012)
Mum educ: more than high sec	0.042 (0.040)
Mean age in school	-0.122 (0.105)
% of girls in school	0.015 (0.249)
Average wealth index in school	-0.524 (0.370)
Observations	13058
R <sup>2</sup>	0.800
School FE	Yes
No. of clusters	752

Notes: Robust and clustered (at the school level) standard errors are reported in parentheses: \* p < .01, \*\* p < .05, \*\*\* p < .01.

TABLE A3  
SUMMARY OF VARIABLES

<b>Perceived school quality</b>	
% of public/private schools: high quality	% of public and private schools in the village that are considered of high quality by the mother
% of public/private schools: average quality	% of public and private schools in the village that are considered of average quality by the mother
% of public/private schools: low quality	% of public and private schools in the village that are considered of low quality by the mother
% of public/private schools: unknown quality	% of public and private schools in the village whose quality is unknown by the mother
<b>Objective school quality</b>	
Value added	Average value added for public and private schools in the village
<b>School reputation</b>	
High	Average % of public and private schools that are considered of high quality by other mothers in the village
Average	Average % of public and private schools that are considered of average quality by other mothers in the village
Low	Average % of public and private schools that are considered of low quality by other mothers in the village
Unknown	Average % of public and private schools whose quality is unknown by other mothers in the village
<b>Child characteristics</b>	
Girl (d)	Indicates whether the child is a girl
Age	Child age
First child (d)	Indicates whether the child is the first born
<b>Household characteristics</b>	
Mother's education	Mother's years of schooling
Father's education	Father's years of schooling
Wealth <sup>a</sup>	Quintiles of wealth based on a wealth asset index
Structure of the household	Number of household members who are less than 5 years old Number of household members who are between 5 and 15 years old Number of household members who are more than 15 years old
Older hh children enrolled in public (d)	Indicates whether another older child in the household is enrolled in a public school
Older hh children enrolled in private (d)	Indicates whether another older child in the household is enrolled in a private school
<b>School variables</b>	
School supply	Number of public and private schools in the village
Distance	% of public and private schools in the village that are hard to reach
Fees	Logarithm of average fees in private schools in the village
Size	Logarithm of average number of students in public and private schools in the village
Class size	Logarithm of average pupil-teacher ratio in public and private schools in the village
Expenditures	Logarithm of average expenditures in public and private schools in the village

Notes: <sup>a</sup>Following Filmer and Pritchett (2001), we implement a Principal Component Analysis (PCA) to construct a wealth index derived from household asset indicators because consumption data are missing for the second round. The asset indicators used are a radio, a TV, a fridge, a motorcycle or a scooter, a car, taxi, van or pickup and a telephone.

TABLE A4  
SAMPLE WITH WITHIN-HOUSEHOLD VARIATION

	Initial sample for intra-household estimates	Sample with within-household variation in enrolment choices	
		Observations	% of initial sample
Observations	3966	1041	26%
No. of unique children	2872	685	24%
No. of unique households	1277	239	19%

TABLE A5  
SAMPLE WITH WITHIN-HOUSEHOLD VARIATION - FOCUS ON QUALITY VARIABLES

	Within household variation in:		
	No. of unique households	Mean variation	% of initial sample
% of public schools considered as poor quality	95	0.08	7%
% of private schools considered as poor quality	48	0.01	4%
% of public schools for which not able to assess quality	133	-0.27	10%
% of private schools for which not able to assess quality	136	-0.28	11%
Public schools' value-added	225	0.78	18%
Private schools' value-added	223	0.78	17%
Peers' opinions : % of public schools considered as poor quality	174	0.02	14%
Peers' opinions : % of private schools considered as poor quality	127	0	10%
Peers' opinions : % of public schools for which not able to assess quality	175	-0.18	14%
Peers' opinions : % of private schools for which not able to assess quality	176	-0.22	14%
Any quality variables	236		18%

TABLE A6  
SCHOOL TRANSFERS

Estimator	(1) Probit AME	(2) Probit AME
Dep. Var.	Change from:	
	pub to priv	priv to pub
Sample	In pub in t-1	In priv in t-1
School in t-1 - Considered as good quality	0.080*** (0.02)	0.030 (0.05)
School in t-1 - Value-added	0.078*** (0.02)	-0.010 (0.04)
School in t-1 - % of other mothers' considering the school as good	0.102* (0.05)	-0.159** (0.07)
Girl	-0.055** (0.02)	0.030 (0.03)
Wealth asset index	0.019** (0.01)	-0.008 (0.01)
Observations	673	277
Pseudo R2	0.307	0.329
Mean outcome	0.095	0.123
No. of clusters	101	69

Notes: Clustered and robust standard errors are reported in parentheses: \*  $p < .1$ , \*\*  $p < .05$ , \*\*\*  $p < .01$ . Average marginal effects (AME) are reported. Other control variables are child age, a dummy indicating whether the child is the first born, the number of elder siblings in public and private schools, parents' education, household structure, school size and fees.

TABLE A7  
MULTINOMIAL LOGIT

Estimator	(1)	(2)	(3)
	Multinomial Logit AME	Multinomial Logit AME	Multinomial Logit AME
Outcome	Out-of-school	Public school	Private school
% of public schools considered as poor quality	0.044* (0.02)	-0.125*** (0.03)	0.082*** (0.03)
% of private schools considered as poor quality	0.057 (0.07)	0.078 (0.09)	-0.135* (0.07)
% of public schools for which not able to assess quality	0.063** (0.03)	-0.174*** (0.03)	0.112*** (0.03)
% of private schools for which not able to assess quality	0.080*** (0.02)	0.111*** (0.03)	-0.191*** (0.02)
Public schools' value-added	0.009 (0.02)	0.050* (0.03)	-0.059** (0.02)
Private schools' value-added	0.000 (0.01)	-0.009 (0.02)	0.009 (0.02)
Peers' opinions : % of public schools considered as poor quality	0.043 (0.07)	-0.236* (0.12)	0.193** (0.09)
Peers' opinions : % of private schools considered as poor quality	-0.036 (0.11)	-0.121 (0.18)	0.156 (0.13)
Girl	0.066*** (0.01)	-0.003 (0.02)	-0.063*** (0.02)
Father's years of schooling	-0.011*** (0.00)	0.006** (0.00)	0.005** (0.00)
Mother's years of schooling	-0.009*** (0.00)	-0.004 (0.00)	0.013*** (0.00)
2nd quintile of wealth asset	-0.046*** (0.02)	0.054** (0.03)	-0.007 (0.02)
3rd quintile of wealth asset	-0.075*** (0.02)	0.065** (0.03)	0.010 (0.02)
4th quintile of wealth asset	-0.072*** (0.02)	0.061** (0.03)	0.010 (0.02)
5th quintile of wealth asset	-0.057** (0.02)	-0.009 (0.03)	0.066*** (0.03)
Observations	2882	2882	2882
Pseudo R <sup>2</sup>	0.300	0.300	0.300
Mean outcome	2.104	2.104	2.104
No. of clusters	99	99	99

Notes: Clustered and robust standard errors are reported in parentheses: \* p < .1, \*\* p < .05, \*\*\* p < .01. Other control variables not reported are described in Table A3.

TABLE A8  
FOCUS ON CHILDREN AGED 8 TO 11

Estimator	(1) Probit AME
Dep. Var. Sample	Being enrolled in private school Aged 8 to 11
% of public schools considered as poor quality	0.107*** (0.04)
% of private schools considered as poor quality	-0.089 (0.07)
% of public schools for which not able to assess quality	0.133*** (0.04)
% of private schools for which not able to assess quality	-0.204*** (0.03)
Public schools' value-added	-0.072** (0.03)
Private schools' value-added	0.006 (0.02)
Peers' opinions : % of public schools considered as poor quality	0.280** (0.13)
Peers' opinions : % of private schools considered as poor quality	0.228 (0.19)
Girl	-0.065*** (0.02)
First born	0.002 (0.03)
Father's years of schooling	0.004 (0.00)
Mother's years of schooling	0.012*** (0.00)
2nd quintile of wealth asset	-0.017 (0.03)
3rd quintile of wealth asset	0.014 (0.03)
4th quintile of wealth asset	0.022 (0.03)
5th quintile of wealth asset	0.088*** (0.03)
Observations	1569
Pseudo R <sup>2</sup>	0.375
Mean outcome	0.292
No. of clusters	99

Notes: Clustered and robust standard errors are reported in parentheses: \* p < .1, \*\* p < .05, \*\*\* p < .01. Children aged 8 to 11 years old. Other control variables not reported are described in Table A3 in Annex.

## REFERENCES

- ALDERMAN, H., P. F. ORAZEM, AND E. M. PATERNO (2001): "School quality, school cost, and the public/private school choices of low-income households in Pakistan," *Journal of Human Resources*, 36(2), 304–326.
- ANAND, P., A. MIZALA, AND A. REPETTO (2009): "Using school scholarships to estimate the effect of private education on the academic achievement of low-income students in Chile," *Economics of Education Review*, 28(3), 370 – 381.
- ANDRABI, T., J. DAS, AND A. I. KHWAJA (2008): "A dime a day: The possibilities and limits of private schooling in Pakistan," *Comparative Education Review*, 52(3), 329–355.
- (2015): "Delivering education : a pragmatic framework for improving education in low-income countries," Policy Research working paper WPS 7277, World Bank Group, Washington, D.C.
- (2017): "Report Cards: The Impact of Providing School and Child Test Scores on Educational Markets," *American Economic Review*, 107(6), 1535–63.
- ANDRABI, T., J. DAS, A. I. KHWAJA, T. VISHWANATH, AND T. ZAJONC (2007): "Learning and Educational Achievements in Punjab Schools (LEAPS): Insights to inform the education policy debate," Discussion paper, World Bank, Washington, D.C.
- ANDRABI, T., J. DAS, A. I. KHWAJA, AND T. ZAJONC (2011): "Do value-added estimates add value? Accounting for learning dynamics," *American Economic Journal: Applied Economics*, 3(3), 29–54.
- ASADULLAH, N. (2009): "Returns to private and public education in Bangladesh and Pakistan: A comparative analysis," *Journal of Asian economics*, 20(1), 77–86.
- ASLAM, M. (2009): "The relative effectiveness of government and private schools in Pakistan: are girls worse off?," *Education Economics*, 17(3), 329–354.
- ASLAM, M., AND G. KINGDON (2011): "What can teachers do to raise pupil achievement?," *Economics of Education Review*, 30(3), 559–574.
- CARNEIRO, P., J. DAS, AND H. REIS (2016): "The Value of Private Schools: Evidence from Pakistan," Discussion Paper 9960, IZA.
- CHUDGAR, A., AND E. QUIN (2012): "Relationship between private schooling and achievement: Results from rural and urban India," *Economics of Education Review*, 31(4), 376 – 390.
- DAS, J., P. PANDEY, AND T. ZAJONC (2006): "Learning levels and gaps in Pakistan," Policy Research Working Paper Series 4067, The World Bank, Washington, D.C.
- FENNELL, S. (2013): "Low-fee private schools in Pakistan: a blessing or a bane?," in *Low-fee Private Schooling: aggravating equity or mitigating disadvantage?*, chap. 3, pp. 65–82. Oxford, Symposium Books.
- FILMER, D., AND L. H. PRITCHETT (2001): "Estimating wealth effects without expenditure Data-Or tears: An application to educational enrollments in states of India," *Demography*, 38(1), 115–132.
- FRIEDMAN, M. (2009): *Capitalism and freedom*. University of Chicago Press.
- GERTLER, P., AND P. GLEWWE (1990): "The willingness to pay for education in developing countries: Evidence from rural Peru," *Journal of Public Economics*, 42(3), 251–275.
- GLEWWE, P., AND K. MURALIDHARAN (2016): *Improving Education Outcomes in Developing Countries: Evidence, Knowledge Gaps, and Policy Implications* vol. 5 of *Handbook of the Economics of Education*, pp. 653–743. Elsevier, Netherlands.
- GLICK, P., AND D. E. SAHN (2006): "The demand for primary schooling in Madagascar: Price, quality, and the choice between public and private providers," *Journal of Development Economics*, 79(1), 118–145.
- GOYAL, S. (2009): "Inside the house of learning: The relative performance of public and private schools in Orissa," *Education Economics*, 17(3), 315–327.
- HARTWIG, K. A. (2013): "Using a social justice framework to assess educational quality in Tanzanian schools," *International Journal of Educational Development*, 33(5), 487–496.
- HEYNEMAN, S. P., AND J. M. STERN (2014): "Low cost private schools for the poor: What public policy is appropriate?," *International Journal of Educational Development*, 35, 3 – 15.
- HOLMES, G. M., J. DESIMONE, AND N. G. RUPP (2003): "Does School Choice Increase School Quality?," Working Paper 9683, National Bureau of Economic Research.
- HOXBY, C. M. (2007): *The Economics of School Choice*. University of Chicago Press.
- JIMENEZ, E., AND J.-P. TAN (1985): "Educational development in Pakistan: the role of user charges and private education," Education and training series discussion paper EDT16, The World Bank, Washington, D.C.



- JIMENEZ, E., AND J. P. TAN (1987): "Decentralised and private education: The case of Pakistan," *Comparative Education*, 23(2), 173–190.
- KINGDON, G. (2008): "School-sector effects on student achievement in India," in *School Choice International: Exploring Public–Private Partnerships*, chap. 6, pp. 111–142. MIT Press, Cambridge, MA.
- KINGDON, G. G. (1996): "Private Schooling in India: Size, Nature, and Equity-Effects," *Economic and Political Weekly*, 31(51), 3306–3314.
- KITAEV, I. (1999): "Private Education in Sub-Saharan Africa: A Re-Examination of Theories and Concepts Related to Its Development and Finance.," Mechanisms and strategies of educational finance, UNESCO, Paris.
- (2007): "Education for all and private education in developing and transitional countries," in *Private Schooling in Less Developed Countries*, chap. 5, pp. 89–110. Oxford, Symposium Books.
- MAITRA, P., S. PAL, AND A. SHARMA (2014): "What Explains the Gender Gap in Private School Enrollment? Recent Evidence from India," .
- (2016): "Absence of Altruism? Female Disadvantage in Private School Enrollment in India," *World Development*, 85(Supplement C), 105 – 125.
- MURALIDHARAN, K., AND M. KREMER (2008): "Public and private schools in rural India," in *School Choice International*, ed. by R. Chakrabarti, and P. E. Peterson, chap. 5, pp. 65–82. MIT Press, Cambridge, MA.
- MURALIDHARAN, K., AND V. SUNDARARAMAN (2013): "Contract Teachers: Experimental Evidence from India," Working Paper 19440, National Bureau of Economic Research, Cambridge, MA.
- (2015): "The Aggregate Effect of School Choice: Evidence from a Two-Stage Experiment in India," *The Quarterly Journal of Economics*, 130(3), 1011–1066.
- NGUYEN, Q., AND D. RAJU (2014): "Private school participation in Pakistan," Policy Research Working Paper Series 6897, The World Bank.
- NISHIMURA, M., AND T. YAMANO (2013): "Emerging Private Education in Africa: Determinants of School Choice in Rural Kenya," *World Development*, 43(0), 266 – 275.
- PAL, S. (2010): "Public infrastructure, location of private schools and primary school attainment in an emerging economy," *Economics of Education Review*, 29(5), 783–794.
- PUREWAL, N., AND N. HASHMI (2015): "Between returns and respectability: parental attitudes towards girls' education in rural Punjab, Pakistan," *British Journal of Sociology of Education*, 36(7), 977–995.
- ROSE, P. (2006): "Collaborating in education for all? Experiences of government support for non-state provision of basic education in South Asia and Sub-Saharan Africa," *Public Administration and Development*, 26(3), 219–229.
- SAHOO, S. (2016): "Intra-Household Gender Disparity in School Choice: Evidence from Private Schooling in India," *The Journal of Development Studies*, pp. 1–17.
- SAWADA, Y., AND M. LOKSHIN (1999): "Household Schooling Decisions in Rural Pakistan," Policy Research Working Paper Series 2541, The World Bank.
- SRIIVASTAVA, P. (2007): "For philanthropy or profit? The management and operation of low-fee private schools in India," in *Private Schooling in Less Developed Countries*, chap. 8, pp. 153–186. Oxford, Symposium Books.
- THAPA, A. (2015): "Public and private school performance in Nepal: an analysis using the SLC examination," *Education Economics*, 23(1), 47–62.
- TOOLEY, J., Y. BAO, P. DIXON, AND J. MERRIFIELD (2011): "School choice and academic performance: Some evidence from developing countries," *Journal of School Choice*, 5(1), 1–39.
- TOOLEY, J., AND P. DIXON (2003): "Private schools for the poor: A case study from India," Discussion paper, Educational Development Trust.
- (2007): "Private schooling for low-income families: A census and comparative survey in East Delhi, India," *International Journal of Educational Development*, 27(2), 205 – 219.
- WATKINS, K. (2004): "Private education and 'education for all'-or how not to construct an evidence-based argument: A reply to Tooley," *Economic Affairs*, 24(4), 8–11.