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Enhancing Excellence:

Trade-off Between Socially Motivated and Profit Motivated Private Schools in Nepal

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Abstract: Investment in schooling is central to enhancing excellence in education and in turn productivity. This paper provides new evidence questioning the unconditional superiority of any private schools from a national school-leaving examination database of Nepal. Using IV identification strategy to minimise the selectivity bias of school choice, we compare student performance in heterogeneous private schools in pooled cross-sections, subject fixed effects and value-added models over time, with a view to assess their absolute as well as relative efficiency reflecting the value for money spent per student. It is the not-for-profit trust-run private schools that outperform others because they invest more in teaching and learning related infrastructure, thus highlighting the benefits of social motivation for private provision of schooling. As expected, the full sample results are driven by the results for the urban areas where it is easier for trust school to enhance excellence by hiring good teachers as well as ensuring efficient utilisation of good teachers through greater parental involvement. While profit can be good driver of private investment in starting new schools, it may fail to generate high test scores over longer time horizon. Undoubtedly, the quality of education matters which is unlikely to be sustained by the profit motive alone.

JEL classification: H44, I22

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1. Introduction

Investment in schooling is central to development, and private sector can be an important provider of investment directly or through partnership with government. This view has gained ground since 1990s, in light of the fact that a vast majority of the papers in the education literature show that private schools are superior to public schools (Jimenez et al 1991; Kingdon 1996; Desai et al., 2009; Sharma, 2011; Muralidharan and Sundararaman, 2013; Singh, 2015). However, there is also considerable evidence to the contrary (Newhouse and Beegle, 2006; Somers et al., 2004; Chudgar and Quin, 2012)[3] particularly in developing countries where private schools appear to be extremely heterogeneous (EdInvest, 2000; Tooley and Dixon, 2003)[4], thus necessitating a cautionary view. Using a unique data-set from Nepal[5] in this paper, we therefore re-examine the effect of school choice on school performance. We depart from this literature in two important ways: (i) we take account of the diversity of private schools. (ii) In addition to considering the absolute efficiency of private schools as in the existing literature, we consider their relative efficiency (in relation to the expenditure that the school incurs per student) that reflects the value for money invested. We find that in terms of test performance, private schools in Nepal as a whole are more efficient than public schools, which is in conformity with the dominant view of the literature. But among the private schools, profit motivated company-run schools are

[3] Newhouse and Beegle (2006) showed that Indonesian public schools outperform the private schools at grades 7-9; the authors attribute the success of the public schools to unobserved higher quality of inputs used in public schools. Similarly, using comparable surveys across 10 Latin American countries, Somers et al. (2004) failed to find a strong and consistent private school effect once household, student and the peer group characteristics are taken into account. Chudgar and Quin (2012) show that low-fee paying private schools in India are no better than the public schools. They emphasize the need for recognizing heterogeneity among profit-motivated schools.

[4] In its global report EdInvest identified six tiers of private schools in developing countries ranging from very inexpensive schools for the poor to very costly schools for the rich. Tooley and Dixon (2003) makes an observation that there are certain private schools in India that cater mainly to the poor.

[5] Nepal was a federal, democratic Republic in the Himalayas to the north of India; in 2015, the country has changed its constitution to declare itself as a secular state.

outperformed by their close cousin – trust-run schools, a type of socially motivated private schools. Further, superiority of trust run schools persists even when we consider relative efficiency per unit of school expenditure per student, something, which remains little understood in the literature. Thus, when school diversity is taken into account, a combination of non-profit objective and private delivery seems to be the most efficient.

We study Nepal's School Leaving Certificate (SLC) exam score data of nearly 7000 non-boarding students from 432 schools from 2002 to 2004.[6] Students in Nepal go to one of the four types of schools, -- government, partially aided (PA in short), trust-run and company-run. Of these the first two can be classified as public schools. The PA schools receive partial support from the government in the form of teachers' salary, but are self-managed by local non-governmental bodies, while the government schools are directly run by the public administration. The trust-run and company-run schools are two types of unaided private schools, which are managed and financed privately. But they differ in their stated objectives; due to 1992 legislation, all private schools in Nepal must register themselves either as a trust school (i.e. not-for-profit) or a company (and thus being eligible to make profit and pay tax on it). The vast majority of the private schools are company-run; in our sample out of 122 private schools 108 schools are company-run. Despite being minority the trust schools in Nepal have a long history in providing inexpensive but good quality education. We interpret this variation in private school types as a variation in their objectives, while sharing the same delivery mode.

The conventional approach in the literature is to estimate students' test scores as a function of school types (private, government etc.), after controlling for a range of characteristics of the student, his/her family and also that of the schools they attend. As such school efficiency is measured by the estimated coefficient of the school type dummy which we label as the absolute efficiency (AE). We, however, argue that accurate estimates school types in the student test score regression (actual or

[6] The full data set contains over 11,000 observations. But due to lack of information on all of our relevant variables we lose nearly 1/3rd of these.

standardised) reveal nothing about efficiency; this is because they do not account for the costs incurred by schools or the efficiency with which these costs are incurred for the services they provide. In principle, all school systems use the funds at their disposal to hire teachers, principals and other staff, and also construct and maintain schools, and purchase educational and supporting materials. As such the relative performance of schools (public, company, trust schools) would not only depend on the differences in school resources per student, but also how efficiently these resources are used by different types of schools to provide education services that determine students' learning. Accordingly, we differentiate absolute efficiency from relative efficiency (RE); the latter is measured here by the students' aggregate standardized test scores per unit of school's expenditure per student. For each of the efficiency measures, absolute and relative, we estimate the effect of school type, after controlling for other possible covariates (observable and some unobservable). Our estimation runs along two dimensions – broader school types (i.e. public vs. private) and individual school types (i.e. the four types mentioned above).

Potentially, there are a number of potential biases in the context of school choice and we do not have any *a priori* guidance from theory about the direction of the endogeneity bias in this respect. Generally, wealthy households would prefer to select most expensive private schools, such as the company-run schools, for their 'status value'. At the same time, households also care for school's academic reputation. High ability students will then be sorted into reputed schools. In the context of Nepal, such schools are more likely to be the trust-run or the company-run private schools. Hence, overall there is likely to be a positive selection bias for private schools in general. But for fee-paying schools, parents will have to ask: is it really 'value for money'? High fees with limited information can be a discouraging factor for relatively new private schools, and for such case there may be a negative selection bias. Further, parents may choose differently for each of their children, partly on the basis of unobservable individual child and/or community characteristics. To a large extent, these potential biases are a reflection of the unobservables, which is more of a problem when some of these

unobservables are correlated with the error term of the student test score regressions. In line with the previous literature (e.g., see Newhouse and Beegle, 2006), we attempt to limit these concerns using an instrumental variable (IV) approach. (see further discussion below and also in Section 3.2).

We find that relative to the IV estimates the OLS estimate overstates the private school effect for 'absolute efficiency' or AE (i.e. absolute aggregate standardized score), though the extent of overstatement is small (nearly 7%). But when we consider 'relative efficiency' or RE (i.e. AE per unit of log per capita school expenditure), the OLS estimate seems to understate the private school effect by a substantial margin, -- as large as 60%.[7] So the private schools are more 'value for money'.

While the superiority of the private schools is not surprising, the detailed picture that emerges when the diversity within private and public schools is taken into account is surprising, at least to us. To correct for selection bias in individual types of school choices we use three different instruments, and the IV estimates show that the trust-run school is the best school and the company-run school comes a distant second, followed by the government school and the PA school; in fact, the PA school is significantly inferior to the government school. This pattern holds for both the AE scores and RE scores. In the case of the AE scores the trust-run school yields 2.685 standard deviation higher score than the government school and 1.83 standard deviation higher score than the company-run school.

As is clear now, our strategy of identifying the school effect depends on the instrument of school choice. To instrument the whole group of private schools (as in the standard literature) we choose the number of private schools in the vicinity of the student's chosen school, where the vicinity is defined by the village development council (VDC). The number of private schools in a VDC cannot directly affect the student's test performance; rather it captures the choice parents have and thus it determines the parents' school selection. It is reasonable to assume that the variations in the number of private schools in the neighbourhood of the chosen school are beyond the control of the context school or its

[7] After correction private schools yield .94 standard deviations higher absolute score, and 0.80 standard deviation higher 'score per rupee spent by the school', than the public schools.

students and as such can be regarded as exogenous in our context. For example, faith schools may be set up to meet a specific community's need, or certain type of schools teach a specific foreign language course to an immigrant community. Schools in Nepal are, however, not particularly geared to any specific linguistic or religious group; their choice of location is, by and large, determined by transport links (as in Pal 2010) and/or policies/incentives offered by the local government (Caddell, 2007), which are beyond the control of individual parents or individual schools.

In the most general case that distinguishes government schools from private aided, company run and trust run private schools, we need to have at least three IVs to identify the system of equations. These are the number of private schools in the vicinity of the school a student is attending, a dummy variable for the school's head teacher being the founder, and also the time taken to walk from home to the chosen PA school. We find that the head teacher's identity as the school's founder is an important determinant for trust school choice, and in this type of trust schools pupil-teacher ratio is significantly lower on average than any other type of schools – 22 as opposed to 40. Intuitively, if the founder himself is the head the agency problem is likely to be minimised. This variable is also unlikely to correlate to specific areas or parental demand. When it comes to a choice between a PA school against any other school, the distance of the school appears to be an important consideration. If PA schools are regarded as slightly superior (for whatever reasons) parents may be willing to have their children walk a bit far to attend the PA school than go to the nearest available school. Also PA schools are more prevalent in rural areas where school choice is limited than in urban areas. As such time to walk to PA schools remains an important consideration for school choice among non-boarding students. Like the number of private schools in the vicinity of the student's school, other two instruments also cannot directly affect the test scores. There may be indirect effects occurring through the local area, which we control for through VDC fixed effects, and/or through school affecting all students of the school equally. Since we cannot do the school fixed effect, the latter type of potential bias remains uncorrected, though we

hope this is to be of small order. Further we test the relevance and the exclusion restrictions for these IVs in order to establish the validity of the instruments.

At the second stage we determine the students' total standardised SLC test scores as a function of the three IVs for school type chosen, among other possible covariates with a view to answer the following questions: why do trust-run schools outperform all other schools and why do PA schools perform the worst? One plausible reason for the trust schools' relative superiority over the company-run schools is that their spending is possibly directed to learning and test score enhancing resources (e.g., use of more trained teachers), while the company-run schools may divert some spending to marketing (to appeal to richer students) and to extra-curricular activities. It is also the case that the company-run schools pay very poorly to their teachers, while the trust schools not only pay very well, but also spend more than any other school on library and other facilities. They also have smaller classes and greater parental involvement.

We could not test for social motivation of the trust schools. However, their registered trust status exposes them to additional regulation and scrutiny; they are also much older, often with histories of social patronage and philanthropy. Our result on trust schools is similar to observations made for faith schools (Dahejia et al., 2007) and resonate with the theme of corporate social responsibility (Besley and Ghatak, 2007). While bulk of the education literature focuses on the private provision of education, we show that social motivation can make the private provision even more effective.

We also check if the efficiency ranking of schools varies between regions. Splitting the data for rural and urban regions we see that the superiority of the trust schools mainly holds in the urban areas of Nepal; in the rural areas the company-run schools are the best performer, whether we measure efficiency by AE scores or the RE scores. This suggests that socially motivated provision works better in urban settings with better infrastructural and communication facilities, where good teachers are somewhat easily available and where motivated parents get involved (Pal 2010).

Finally, we run some robustness checks. We run subject fixed effects (that allows us to exploit the unobserved subject-level omitted factors for a given individual that may also influence SLC scores) and lagged value-added models (which is possible because we observe student performance in grade 9 and send up exam at the end of grade 10 and also the final SLC scores), which allow us to control for the unobserved students' ability as well as persistence of learning (Andrabi et al. 2011). In all these regressions, the rural-urban disparity in the efficiency ranking of schools continue to hold.

The paper is organized as follows. Section 2 discusses the context of our study and the data. Section 3 presents the econometric model. In Section 4 we discuss the results and various robustness checks. Section 5 concludes.

2. Background and Data Description

2.1 Background

The history of modern schooling in Nepal began after 1950 when the government started schools for the general public; prior to this education was largely confined to the royal family members and elites. Alongside community level initiatives resulted in many 'non-government' schools (Khaniya, 2007). After going through a phase of school nationalization, private investment in education was officially welcomed through an amendment of the Education Act 2028 in 1980, and the number of private schools began to grow (Save the Children, UK, South and Central Asia, 2002). Meanwhile, Nepal made transition from monarchy to multi-party democracy in 1990, providing further boost to private schools.[8] However, violent conflicts erupted between the government and the Maoist rebels who were initially opposed to private schools. The conflict ended in 2006 with some reconciliation.[9]

[8] More importantly, the English-medium instruction offered in most private schools emerged as an important source of differentiation, as Liechty (2003) notes: 'English proficiency is simultaneously the key to a better future, an index of social capital, and part of the purchase price for a ticket out of Nepal'. Nevertheless, Nepal's multilingual, multi-ethnic and multicultural character presents a great challenge to achieving the target of education for all with a view to ensure decent job opportunities and better lives for young people.

[9] The conflict ended with the Communist Party joining mainstream politics. One of the Maoist demands was to impose a tuition fee cap in private schools, which the government accepted in May 2002. This is known as the Private and Boarding

The Seventh Amendment of the Education Act 2028 (passed in 1992) decreed that the private schools be registered as either a private limited company or a trust (Gautam, 2008; Khaniya, 2007). Hence the private schools in our dataset are called either company-run schools or trust schools. There is yet another type of school, partially aided (PA) by the government that we consider in our analysis.

2.2 Data

Our dataset is taken from a national survey commissioned by the Ministry of Education of Nepal to assess student- and school-level determinants of success on the SLC from 2002 to 2004 (see Bhatta 2005 for further details about the survey).[10] We focus on all four types of schools and all students therein. But we restrict our attention to students who are non-boarding (i.e. commute to school daily) and attempting the SLC exams for the first time. This gives us over 7000 students distributed over 432 schools. The reason for choosing only the non-boarding students is that their school choice decision can be analysed by proximity to other schools, which our data permit. To maintain consistency we also drop schools that admit students exclusively on boarding basis. The reason for excluding the SLC repeaters is to avoid an excessive 'low ability' bias in our sample.[11]

When grouping the schools, on the basis of funding we club the government and PA schools as public, and the trust- and company-run schools as private. The PA schools charge slightly higher fees than the government schools, but substantially less than the private schools.[12] Fifty percent of our schools are government sharing nearly 67% of the SLC students; the PA schools constitute 22% of the schools accounting for 18% of the students, while the company-run schools hold a sizable share of 25%

School Organisation (PABSON) Code of Conduct. In general, in the post-conflict Nepal education has received greater attention, perhaps to prevent future rebellion (ILO, 2008).

[10] The SLC exam consists of tests in six compulsory subjects (Nepali, English, Mathematics, Science, Social Studies, and Health/Physical Education) and two optional subjects.

[11] The number of repeaters would be nearly half of the first time sitters of SLC. Majority of SLC repeaters (about 65%) come from the government schools. Their inclusion would automatically make the government school more inefficient.

[12] The average annual fees (which include tuition fees, exam fees, library fees etc.) are 911 Rupee in government schools, 5588 rupees in PA schools, 46852 rupees in trust schools and 62425 rupees in Company schools. All schools, particularly the government schools waive fees for the poor.

among all schools but they have only 11% of the SLC students. Trust schools are a minority, having a school share of 3% and a student share of 4%.

Table 1 provides some key school characteristics. Company-run schools are expectedly smaller in class sizes as they register the smallest pupil teacher ratio – 19.21 as opposed to 43.12 in government schools. They also spend the most – 6000 Rupee per student two-third higher than the government school. Closely behind are the trust schools; PA schools are the least spender. Interestingly, the average salary of the teachers is highest in the government school, twice that of company-run schools. The trust schools also pay well to teachers.

Teachers in both types of public schools are highly unionised (69% in PA schools and 80% in government schools) and head teachers in public schools enjoy far less autonomy than their counterparts in private schools. Possibly due to this management freedom and also sizeable share of non-teacher expenses the company run schools produce the highest test score on average. We derive the total raw and standardized scores by aggregating marks of six compulsory subjects (which include Nepalese, English, Maths and Science). The mean test score of both the trust and the company-run schools are substantially higher than the public schools – more than 1 standard deviation higher. Figure 1 shows the distribution of standardised SLC scores against school's log expenditure for each type of public and private schools; while most of these bivariate relations are rather flat, panel f highlights the steep increase in trust school performance as expenditure per student increases monotonically.

Since diversity among private schools is of special interest to us, we highlight further differences between the company and trust schools in Table 2. Few things are noticeable here. Teachers in trust schools are far more unionised – more than in government schools --, and also the head teachers enjoy very little autonomy in enforcing discipline, compared to the company schools. On an average, a significantly higher proportion of teachers in trust (as opposed to company) schools are trained and the proportion is significantly higher in urban areas. Further trust schools flourish in involving parents, providing library, water and toilet across both rural and urban regions without any noticeable bias. The

company schools seem to be more biased toward the urban region and less considerate in providing physical resources; parental involvement is also insignificant.

3. Empirical Strategy

The present paper analyses the efficiency (both absolute and relative) of private schools (relative to public schools) and in this context explores the implication of private school diversity. As such, the issues pertaining to government allocation of funds to schools do not arise (Hanushek, 1997; Krueger, 2003). Similarly, Nepalese government schools are different from those in the US and the UK (e.g., see Steele et al. 2007) as school funding is not a function of school performance. Nevertheless, head teachers are expected to care about school performance in both trust and company run schools, but more so in trust-run schools.

3.1 Test score determination

We assume the following education production function, which is standard in the literature:

$$T_{is} = T(sc_s, fc_i) + u_{is} \quad (1)$$

where T_{is} is the test score of student i in school s, sc_s is a vector of the characteristics of the school s the student goes to (sometimes accounted for by a school type dummy variable), and fc_i are the family and child characteristics of student i, and u is the random noise varying across s and i.

Even the best surveys cannot collect data on all the variables in sc_s and fc_i, so in practice the unobserved components of sc_s and fc_i will end up in the error term. This will result in the error term being correlated with the observed school and child characteristics, and so will lead to biased results. If all the school characteristics (sc_s) in equation (2) were observed, there should be no statistically significant impact of adding a dummy variable indicating which schools are private since all the differences between public and private schools are already accounted for in the sc_s variables, which can include things such as access to various school facilities (teaching and non-teaching), pupil-teacher

ratio, etc. Following the existing literature, we first proxy sc_s by a homogenous private school dummy variables S (keeping the government school and PA schools as the base), [13] which would capture the effect of various observable (but not accounted for) and unobservable school characteristics. This gives equation (2) as

$$T_{is} = T(S, fc_i) + u_{is} \; . \qquad (2)$$

We next introduce school diversity by denoting the dummy variable for the company-run school as S_1, for the trust-run school as S_2 and the PA school as S_3, using the fully funded government schools as the reference category. Thus, we express the characteristics of the school attended by the i-th student as follows:

$$sc_{is} = f(S_{1i}, S_{2i}, S_{3i}) \qquad (3)$$

Where s=1,2,3 respectively for three types of private schools in our sample. Thus after substituting for sc_{is} from equation (3) into equation (2) for all schools taken together, the total score of the i-th student attending s-th school type in our sample would be given as follows:

$$T_{is} = F(S_{1i}, S_{2i}, S_{3i}, fc_i) + u_{is} \qquad (4)$$

Finally, for estimation purposes, we linearize equation (4) for the diverse type of schools as

$$T_{is} = b_0 + b_1 S_{1i} + b_2 S_{2i} + b_3 S_{3i} + \gamma(fc_i) + u_{is} \qquad (5)$$

The parameters of particular interest are the estimated coefficients b_1, b_2, and b_3, which yield the estimates of absolute efficiency, where efficiency is measured by the marginal gain in total standardised score (aggregated over six compulsory subjects) for each school type. A related measure of efficiency is T_{is}/S_x, what we call relative efficiency (RE), where S_x is per student expenditure incurred by the school. School expenditure captures school's effort to hire good teachers or create infrastructure, which are clearly endogenous. While we study efficiency in both measures, in the model section we confine

[13] Otherwise, the unobserved components of sc_s and fc_i will end up in the error term.

our discussion to AE. Note however that we could just replace the dependent variable T_{is} by T_{is}/S_x to develop a parallel argument for the RE as well.

3.2 School Choice

Note, however, that the estimates of b_1, b_2, and b_3 would be biased if the school choice of specific type of school by students/parents is correlated with unobserved factors that determine test scores, thus making school type dummies S_1, S_2 and S_3 potentially endogenous. While we do not have any *a priori* guidance from theory about the direction of the endogeneity bias in this respect, the correlation between observable characteristics and school choice (as shown in Table 4) seems to suggest that private schools benefit from positive selection from more educated and richer households, for example. Further, parents may choose differently for each of their children, partly on the basis of unobservable individual child and/or community characteristics. In line with the previous literature, we attempt to limit these concerns using a two stage instrumental variable (IV) method.

An IV, say z, must satisfy two conditions: (i) relevance condition and (ii) exclusion condition. First, z is relevant to explaining the problematic regressors S_{1i}, S_{2i} and S_{3i}, after partialling out the effect of **all** other regressors x in equation (5). Given that there are three school types in the most general equation we estimate, we need to have at least three IVs to identify these equations. Accordingly, we regress each of S_{1i}, S_{2i} and S_{3i} respectively on instrument z_1, z_2, z_3 and all the other x's as in (5) with a view to see if z_s, s=1,2,3 explains *the individual school choice variables.*

In particular, we use the availability of number of private schools in the vicinity of the chosen school as the relevant instrument, which is observed in our data. For diverse types of private and public school choice, we use three instruments, as described earlier. These are the number of company-run schools in the VDC for company-run schools, the founder of the school being the head teacher for the trust-run schools, and distance from home to the school for PA school. The choice of our IVs is fairly consistent with the literature not only for the developed countries like the United States (e.g., Figlio

and Ludwig, 2000), but also for the developing country context (e.g., see Alderman et al. 2001; Newhouse and Beegle 2006). As such we estimate the following school choice equations:

For homogenous private school choice of the *i*-th student from the *j*-th household residing in the *v*-th village development council (VDC) and attending s-th school type:

$$Y^*_{ijsv} = a_0 + a_1 z_{ijs} + a_2 W_{ijv} + u_{ijsv} \qquad (6)$$

For any given type of school s, the dependent variable *Y** is unobservable, but it is related to an observable variable S_s, which takes a value 1 if the student goes to a particular type of school *s*, *s*=0,1,2,3, and 0 otherwise. *S*=0 refers to the case of homogenous private schools, trust-run or company run taken together. But s=1,2,3 refers to the case of heterogeneous private schools including company run, trust-run and private aided schools respectively. The set of variables, *W* includes a set of individual (e.g. gender, age) and household (e.g. parents' education, income and caste) characteristics as included in equation (5). But the key identifying variable of interest is z_s, which is our instrument for the s-th school choice, s=0,1,2,3. When the schools are broadly divided between public and private schools, the crucial variable z is the number of private schools in the VDC of the child's school. Thus, our identification exploits the variation in the number of private schools in the vicinity, which offers greater choice, thus enhancing the probability of selecting a private school. When we consider individual types of school choice, the variable z_s for the s-th school choice represents the number of private schools in the VDC for company-run school choice, the founder of the school being the head of school for trust-run school choice and the walking time from home to school for the PA school choice. Thus, we have three different instruments for three different school choices. Given the discrete nature of the dependent variable in equation (1), we use linear probability models to estimate the parameters of the set of equations (6).

This is what is called the 'first stage' of the IV estimation. We test the significance of the IVs in determining each school choice to test for the relevance of the IVs. Second, using the first stage estimates of individual school choice regressions, we predict the value of the potentially endogeneous

variables, namely S_0 IV for S_0 (case of homogenous private schools) or $S_{1i}\,IV$, $S_{2i}\,IV$ and $S_{3i}\,IV$, respectively for S_{1i}, S_{2i}, S_{3i}(case of heterogeneous private schools), which are then used as the relevant instruments to estimate the IV counterparts of the linearized equation (5) for the following cases:

Homogenous private schools: $T_{is} = a_0 + a_1 S_{IVi} + \theta(fc_i) + u_{is}$ (7)

Heterogeneous private schools: $T_{is} = b_0 + b_1 S_{1IVi} + b_2 S_{2IVi} + b_3 S_{3IVi} + \gamma(fc_i) + u_{is}$ (8)

While equations (7) and (8) refer to the determination of test scores T_{is} with a view to determine AE, we also estimate the corresponding equations T_{is}/S_x with a view to estimate RE.

We pool observations for three years 2002-04 and we take only one observation per student at their first appearance in the SLC exam. As such, all standard errors are clustered at the school level to minimise autocorrelation of errors, if any.

While school type dummies S_s account for the unobserved school-level characteristics, we include a range of observable characteristics pertaining to the individual/family characteristics (*fc*): we include characteristics of the child (male, age at SLC, square of age, if received any peer group help, if no grade repetition in year 9, which is an approximate measure of unobserved ability of the student)[14], years of schooling of each parent, log of annual cash earnings of the household and the rural/urban residence. Note that the set of instruments z_s are excluded from the test score equations (7 and 8). Our tests of exclusion restrictions validate the argument that these variables do not influence SLC test scores (see further discussion in the results section including exclusion tests). Further we include the dummies for the SLC years and VDCs to account for the unobserved SLC year-level (common to all students in a particular year, e.g., standard of exam papers, exam invigilation or exam marking issues that may be specific to the particular years) and VDC-level factors (common to all students living in a VDC, which may affect student performance) that may also influence student SLC test scores.

To control for the unobserved parental preferences on school choice and student performance,

[14] Later we also consider the subject fixed effects estimates that exploits the subject level variation of test scores for a given individual, which will be an alternative way to control for individual ability.

ideally we needed a household fixed effects model. But we were unable to do this as we did not have SLC information for all the siblings living in a household over the sample years 2002-04. Hence, we control for all observable and relevant parental characteristics including education, income and caste, residential location (rural/urban) to account for parental school choice. We also control for the unobserved VDC-level characteristics (which may influence the nature of public schools, both fully funded and partially aided) by VDC dummies.

Over-identification test: Finally, note that for the case of homogenous private schools, we have one instrument (private school choice dummy pvtsch) to determine one potentially endogenous variable, i.e., standardised SLC test scores T_i or its counterpart T_{is}/S_x. As such the equation is exactly identified. However, for the case of heterogeneous private schools, we have three instruments for three school choice variables S_{1i}, S_{2i} and S_{3i} to determine one potentially endogenous variable, i.e., standardised SLC test scores T_{is} or T_{is}/S_x In this case, the performance equation is over-identified and hence we need to conduct a test for over-identification. Intuitively, the test of the over-identifying restrictions evaluates whether all possible subsets of IVs that facilitate identification provide the same estimates. In the population, these different subsets should produce identical estimates if the instruments are all truly exogenous. We use Hansen's *J*-test in this respect.

3.3 Robustness tests

We not only estimate student performance for the full sample, but also split them into rural and urban areas to capture the differential effects, if any. We conduct two further robustness tests: First, we convert our 2004 sample of students into a pseudo panel for each individual student observing his/her performance in grade 9 examination, send up examination and also SLC examination. We use this data to estimating a lagged value-added model (*a la* Andrabi et al. 2011) to determine SLC test scores in terms of their performance in the previous school examinations at year 9 and also in the send up examination taken before the final SLC examination. This allows us to exploit the variation in student

performance across different examinations, thus enabling us to account for the unobserved individual-level factors as well as the persistence in the school learning effect, if any. While the year 9 and send up examinations are conducted internally by the school and the SLC examination by the external board, all three examinations follow similar syllabus and similar examination papers as they are all mock examinations geared towards the preparation of final SLC examination.

Second, we also observed final SLC performance scores of sample students across six compulsory subjects which we use to generate a second pseudo panel for each individual with a view to determine the subject fixed effects estimates of standardised test scores. While students may have different aptitudes in different SLC subjects, this would also allow us to control for the individual level omitted factors across different SLC subjects (compulsory ones), thus helping to minimise the omitted subject-level bias, if any.

4. Results

4.1 Determinants of school choice

At the first stage, we identify the determinants of school choice equations (6) using linear probability models. The key identifying variable for private school choice (as opposed to public school) is the number of private schools in the vicinity of the student's current school.[15] Assuming that the student will commute from home to school, the student's choice set must have more than one school nearby.

Our linear probability model uses a whole range of school, household and student characteristics as well as dummies for VDC and SLC years. The resultant marginal effects of the main variables of interest are shown in Table 3 column 1. We see that the number of private schools in VDC positively affects the choice of private schools (as a group).

Among the household characteristics, household income is surprisingly not a significant determinant of private school choice, but parental education is -- especially mother's education. Being

[15] An implicit assumption is that the same number of schools existed in the past when the parents made the school choice.

in a rural area reduces the likelihood of choosing a private school. High ability students (who have not repeated a year at grade 9) are also attracted to the private schools, as expected. Except for the company-run schools, there is no gender bias in school selection.

Next, we extend the school choice model to individual school types, where the probability of each type of school's choice is estimated against the choice of all other schools combined. Columns (2) - (4) of Table 3 report these estimates. The number of private schools in VDC is retained as the determinant for the company-run school's choice, for the trust-school we use a dummy variable for the head teacher being the founder and for the PA school time taken to walk to the school. All these instruments have positive effect on the respective school choice.

As said earlier, the number of private schools in VDC widens the parental choice and this effect is felt primarily for company-run schools, as was for the private schools as a whole. The head being the founder of the school provides credibility (by eliminating any agency problems within the school) and reputation effect of the school and it is the most important variable for choosing a trust-run school. It is also the case that the magnitude of the marginal effect of this variable is the largest of all variables. Our data confirms that where the founder is head of a trust school, the average pupil-teacher ratio is nearly 50% smaller than the whole sample average. Thus, a founder being the head adds a quality dimension to a trust school, which is not the case with any other schools. Our third instrument, distance to the school is a significant determinant for the PA school; however, its effect is rather weak. Parents are likely to choose a PA school located farther from home, possibly when that school is superior to a nearby government school. It is also the case that PA school's choice is more likely in rural areas. Note that each of the instruments is statistically significant in the specific school choice regression, thus validating the condition for IV relevance. Also, Appendix Table A1 shows that even when we include all the IVs in all the possible school choice regressions, only the chosen one remains statistically significant. Finally, formal tests of exclusion restrictions, as discussed in Section 4.2, also validates the choice of our IVs.

4.2 Effect of School Choice on School Performance: Absolute efficiency measure

Public vs. Private. We start with two broad groupings of schools, with trust and company schools clubbed as private and the PA and government schools clubbed as public, as if within each group these schools are homogenous. Columns 1 and 2 of Table 4 gives the school effect estimates for AE scores. In column 1 we have the school effect of the private school dummy, which shows that private schools as a group yield 1.006 standard deviation higher test scores than public schools. It is also seen that certain student and household characteristics, such as being male, not repeating grade 9 (which is an indicator of ability), peer help and household income, have strong positive effect on the test scores. While educated parents tend to significantly opt for company-run schools they cannot provide much help in securing higher test scores. There is also a strong gender bias in test scores.

However, as students of certain characteristics might have sorted themselves into private schools, these (unobservable) characteristics would be correlated to the school type. The IV estimates that have tried to correct this bias are presented in column 2 of Table 4. Here we see that the private school effect has fallen to 0.944. So this suggests that there was a positive selection bias, occurring through student's ability and household's unobservable characteristics. The IV estimates of other factors are more or less similar to the OLS estimates.

Next, we consider the validity of the IV exclusion restrictions: *z* satisfies the exclusion condition if cov(z, u)=0 in equation (7) for homogenous private schools case. The latter requires that z is uncorrelated with the disturbance, u in equations (7), i.e. *z* has no explanatory power with respect to T_i , after conditioning on other x's. It is difficult to test this condition because u is unobservable; we develop a test using the estimated residuals for student performance respectively for equation (7) which is reported in Table 5 for AE. Clearly the relevant F-stat is low with a very high p-value, thus allowing us to accept the null hypothesis that IV, number of private schools in the vicinity of the chosen school of the student is not statistically significant to explain the estimated residuals of the test score regression (7). This validates the exclusion restriction of the IV.

Diversity among schools. Now we introduce heterogeneity among schools. The school effect estimates for AE scores are presented in columns 3 and 4 of Table 4. Assuming the government schools as the omitted category we introduce first simple dummies for PA, trust and company schools (column 3), and then replace them by their respective IVs (column 4). From the OLS estimates we see that the company-run schools are the best, closely followed by the trust-run schools and the PA schools are marginally better than the government school. But when we correct the school selection bias the ranking of schools drastically changes. The trust-run school comes on top yielding 2.685 standard deviation higher test scores than the government school, and 1.85 standard deviation higher than the company-run school. Moreover, there is negative selection bias in the trust school choice, while for the other two schools there is the usual positive selection bias. As with homogenous schools, the F-stat for the exclusion restriction satisfies the IV exclusion restriction in this case of heterogeneous schools too. In other words, the chosen IVs are not directly correlated with the estimated residuals of the test score regression (8) in our sample. Further, Hansen's J-statistic is zero in both column (2) and (4). In view of the diagnostic tests, we accept the null hypothesis for student performance that J =0 (for homogenous and heterogeneous private schools respectively), that is, the over-identification restrictions are valid.

Why do the trust schools do so much better than the company schools? Our explanation is that though the trust schools charge a smaller tuition fee, their quality of education is superior to the company-run schools. We have seen from Table 2 that compared to the company schools, most trust schools are better equipped with library, drinking water and toilet facilities. Parent teacher associations meet in most trust schools, unlike in company schools. Teachers are more likely to be trained and hence are much better paid in trust schools. So one can argue that social motivation of the trust schools encourages them to direct resources to learning and enhancing excellence. They probably attract relatively less able students (compared to the company-run schools) and transform them into excellent test performers, as suggested by the negative selection bias.

4.3 School effects: Relative efficiency

We now ask if the private schools are 'value for money'. Examining the school expenditure data we see that though the trust- and company-run schools spend similar amount of money per student, their composition of inputs on which the money is spent is vastly different. As noted above, the trust-run schools pay more to the teacher, have better trained teachers and better learning infrastructure, though they charge smaller tuition fee. Clearly, to the parents which school is value for money is an important question though the existing literature is rather silent in this respect.

We address this question by estimating the school effect in relative efficiency units, which is defined as the standardised scores per rupee spent by the school per student. These estimates are reported in Table 5. The private school premium and the ranking of individual school types are very similar to that of the AE scores. However, there are some interesting differences. As with AE cases, here too the IV exclusion and over-identification restrictions are satisfied, thus validating the choice of IVs in our sample.

First of all, both the OLS and IV estimates of private school and individual school types are much smaller than the respective AE estimates. This is probably the consequence of the fact that the per capita expenditure in government schools is sufficiently less; so a part of its absolute score disadvantage is compensated by smaller expenditure. Secondly, the IV estimates of RE exhibit a negative selection bias present in the OLS estimates. This suggests that they are 'more value for money' than they appear. This is particularly so for the trust schools. The OLS estimates make the trust schools worse than the government schools, but the IV estimates make it the best school. Thirdly, the difference between the company school and trust school is slightly less than that found for AE scores.

The third observation is not surprising given our earlier observation that both types of schools spend a similar amount of money per student, but they differ in composition. The trust schools appear to spend almost all of their money on performance enhancing inputs, while the company schools probably spend a sizeable proportion of their money on marketing and on extra-curricular activities that do not matter

for SLC exams, but are nonetheless valued by parents.

4.4 Rural urban divide

Our OLS and IV estimates of Tables 4 and 5 included a rural dummy which confirm that both AE and RE scores in rural areas are lower. Probably the most important reason for lower score is the unavailability of good teachers in rural areas. So will the ranking of schools be different between rural and urban areas? To answer this question, we split the data in rural and urban samples and estimate the school effect. For these regressions we merge the PA schools with the government schools.

Table 6 reports the IV estimates. The rural-urban divide is striking. In the rural areas not only is the trust school inferior to the company school but inferior to the government school, while the company schools are significantly superior to any other schools. On the other hand, in urban areas the trust school is the supreme, and the ranking of schools is the same as the one seen for all of Nepal.

This divide suggests that the success of the trust school must be coming from its hiring and efficient utilisation of good teachers, which is expectedly difficult in the rural areas. The latter could be driven by the access to better infrastructure, transport and communications (Pal, 2010). Accordingly, trust schools in urban areas are able to implement its strategy more effectively, not only through good hiring, but also by communicating to parents its social objective by various channels such as word of mouth, local media and endorsement by educationist etc., which are clearly not possible in rural areas. The latter may result in greater parental involvement in Trust schools. The company school is probably able to fill the vacuum left by non-performing government schools and its strategy of ensuring a minimum quality of education, along with profit maximisation, can be implemented despite the teacher supply constraint in the rural areas.

5. Ruling out competing explanations

We now try to rule out several competing explanations. What if the estimates are contaminated by

persistence of learning effects, or student's subject-level aptitudes? We check the robustness of our estimates by addressing these issues.

5.1 Persistence of learning

It is important to examine if the relative superiority of trust schools holds if we control for the persistence of learning through a lagged value added model (VAM). Although we have cross-section data, we observe three test scores for each student: SLC test score, send up test score in the school's own exam (conducted 3 to 6 months prior to the SLC exam) and also the end of year 9 test score. This allows us to construct a panel of three observations per student. We then follow Andrabi et al. (2011) and Singh (2015) to estimate the following dynamic version of our model.

$$T_{it} = b_0 + b_1 S_{1IVi} + b_2 S_{2IVi} + b_3 S_{3IVi} + b_4 T_{it-1} + \gamma(fc_i) + u_{it} \qquad (9)$$

where T_{it-1} is the lagged test score for the i-th student in the sample.

We estimate this model for both AE and RE scores along with the rural-urban split using the 2004 sample for whom we can observe the grade 9 scores. The estimates of this model are given in Table 7. The estimated coefficient of the lagged score indicates 63% - 78% persistence of learning from grade 9 depending on the AE score or RE score and rural or urban regions. Interestingly, for either type of scores the difference between rural and urban regions is more or less same – 10%, though the ranking of the two regions is reversed between AE and RE scores. Further, it is reassuring to see that this model also confirms the rural-urban divide in the ranking of schools that we have seen earlier. In the urban areas the trust school is the best and in the rural areas it is the company school that is the best. The PA school is the worst performer in both areas. As for the national picture, the trust school's superiority holds only for the AE scores while the effect is insignificant for the RE scores; it is possible that the positive and negative effects of trust schools respectively in urban and rural areas exactly outweigh each other to make the total effect insignificant in the full sample in this respect.

5.2 Subject fixed effects (FE)

We rearrange the student-level data for 2004 to generate subject-level standardised scores for six compulsory SLC subjects for each student. This allows us to exploit the inter-subject variation in the test scores for a given student, thus eliminating student-level time-invariant omitted factors, if any. The IV estimates for both AE and RE scores as well as for rural and urban areas are shown in Table 8.

The ranking of schools for all of Nepal for AE and RE scores as shown in column 1 and 3 is almost exactly the same as that we have seen earlier, with the trust school on top, with one difference. That is, the PA school does not come out as the worst in the RE scores. In fact, it does pretty well in both rural and urban areas, in terms of the RE scores, and in terms of the AE scores it does not do worse than the government school. The rural urban divide is similar to what we have seen earlier; the company schools rule in the rural areas and the trust schools rule in the urban areas.

6. Conclusion

This paper utilizes a unique database from Nepal to determine if there is private school premium when one takes account of diversity of private and public schools as well as value for money spent per student. We see that private schools as a whole perform better both in terms of an absolute scores and relative scores. However, among the private schools, it is the socially motivated trust schools that do systematically better than the profit motivated company-run schools. This is borne out by OLS estimates, and more so by the IV estimates after the school types are instrumented with a view to minimise the selectivity bias. However, this national picture of the superiority of the trust school above all other schools hides a severe regional disparity. It turns out that the supremacy of the trust school holds only in the urban areas, while in the rural areas the company-run schools perform the best.

Our finding suggests that trust-run schools, which appear to be socially responsible and have the efficient technology to hire and utilize good teachers, present an ideal mode of delivering education to a low income country. This argument gains more ground when we compare the trust school's

performance with the PA schools, which are largely financed by the government and managed by local people. PA schools always perform poorly. It may be the case that such schools lack teacher incentive and at the same fall prey to local interest groups. The bottom line is while profit can be good driver of private investment in starting new schools, its profit motivation as the key driving force is unlikely to be sustained long enough to generate sustainable excellence.

Our study has another implication. Nepal's success in education is crucial to the rehabilitation of the Maoist rebels who gave up arms ending its decade long civil war. Some states of India have also been affected by the Maoist conflict, and then there are similar reconciliation process going in Sri Lanka and Myanmar. Lessons from Nepal can be useful to these countries and others elsewhere in the world.

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Tables and Graphs

Table 1. Descriptive statistics of key (non-boarding) school characteristics 2002-04

Variables	Govt. schools	PA schools	Trust schools	Company schools
Mean aggregate (raw) test scores	373.46	370.83	487.13	489.39
	(81.70)	(90.57)	(112.95)	(83.29)
Mean aggregate standardized test scores	-0.10	-0.13	1.04	1.06
	(0.82)	(0.91)	(1.13)	(0.84)
Mean pupils per teacher*	43.12	43.42	24.83	19.21
	(22.98)	(21.49)	(9.60)	(3.59)
Mean annual expenditure per student ('000 Re)*	3.87	2.65	5.36	6.00
	(5.51)	(2.72)	(5.32)	(3.844)
Mean annual salary of teacher ('000 Re)	117.13	80.09	85.86	53.75
	(231.17)	(43.90)	(71.13)	(20.00)
Mean share of teacher's salary in total expenditure	0.82	0.83	0.68	0.74
	(0.21)	(0.47)	(0.15)	(0.24)
Share of schools in total schools	0.50	0.22	0.03	0.25
Share of schools in total students	0.67	0.18	0.04	0.11

Source: Sample data, our own calculation. Standard deviations are in parentheses.
* To arrive at these figures all students of the schools (not just SLC) have been taken into account.

Table 2. Company and trust-run private schools (non-boarding) – rural and urban

	Company schools			**Trust-run schools**		
In percentage of schools	Urban	Rural	T-stat	Urban	Rural	T-stat
Teachers are unionised	0.57	0.51	1.93*	0.87	0.78	1.10
Head teacher has autonomy	0.97	0.83	6.98***	0.37	0.43	0.71
Trained teachers	0.20	0.19	0.6357	0.63	0.48	5.4947***
Parent-teacher association exists	0.02	0.11	-5.45***	0.32	0.20	1.38
There is library	0.89	0.78	4.70***	0.93	0.83	2.01*
There is drinking water	0.72	0.79	-2.72***	0.93	0.93	-0.04
Students have access to toilet	0.85	0.80	2.01**	0.87	0.93	1.6

Note: T-stat measures significance of urban-rural difference. *** denotes that the variable is significant at 1% or lower level.

Table 3. Linear probability regression estimates of school choice

VARIABLES	(1) Pvt sch.	(2) Company sch.	(3) Trust sch.	(4) PA sch.
Number of Pvt sch.	0.0251**	0.0384***		
	(0.0100)	(0.0109)		
Founder is the head	-		0.109**	-
			(0.0506)	
Minutes to walk to Sch.	-			0.000850*
			-	(0.000479)
Male	0.0145**	0.0169**	-0.00446	-0.0130
	(0.00715)	(0.00762)	(0.00517)	(0.0132)
Student's age	7.86e-05	0.000189	-0.000109	0.00548
	(0.00618)	(0.00549)	(0.00426)	(0.0108)
Student's age squared	1.75e-05	1.04e-05	2.00e-06	-6.48e-05
	(5.43e-05)	(4.97e-05)	(3.87e-05)	(9.34e-05)
No repetition of grade 9	0.0607*	0.0518*	-0.00393	-0.0664
	(0.0353)	(0.0283)	(0.0140)	(0.0470)
School's age	-0.0660***	-0.0594***	-0.000235	0.00372
	(0.00628)	(0.00697)	(0.00616)	(0.00870)
School's age squared	0.000758***	0.000707***	-1.39e-05	-3.78e-05
	(9.46e-05)	(9.50e-05)	(8.85e-05)	(0.000137)
Father's schooling years	0.000542**	0.000255	0.000126	-0.000113
	(0.000264)	(0.000333)	(0.000300)	(0.000372)
Mother's schooling years	0.00202***	0.00120*	0.000373	-0.00151***
	(0.000541)	(0.000678)	(0.000459)	(0.000525)
Log annual income	0.00970	0.00864	-0.00148	0.0149
	(0.0140)	(0.0118)	(0.0111)	(0.0121)
Janajati	-0.0447**	-0.0378**	0.00596	0.0611*
	(0.0189)	(0.0172)	(0.0161)	(0.0333)
Dalit	-0.0446**	-0.0381*	-0.00569	0.0352
	(0.0202)	(0.0199)	(0.0128)	(0.0351)
Chhetri	-0.0211*	-0.0126	-0.00900	0.0106
	(0.0117)	(0.0121)	(0.00656)	(0.0226)
Rural	-0.0813**	0.0346	-0.101***	0.104***
	(0.0386)	(0.0371)	(0.0379)	(0.0366)
Constant	1.354***	1.060***	0.117	-0.0318
	(0.183)	(0.180)	(0.0975)	(0.214)
SLC year dummies	Yes	Yes	Yes	Yes
VDC dummies	Yes	Yes	Yes	Yes
Observations	7,070	7,070	7,573	7,573
R-squared	0.633	0.576	0.150	0.044

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. Absolute efficiency (AE measured by standardised total SLC scores) estimates

VARIABLES	(1) OLS AE	(2) IV AE	(3)OLS AE	(4) IV AE
Pvt Sch.	1.006***			
	(0.0245)			
Pvt Sch. IV		0.944***		
		(0.0975)		
PA Sch.			0.0760***	
			(0.0268)	
Company Sch.			1.026***	
			(0.0250)	
Trust Sch.			0.978***	
			(0.0558)	
PA Sch. IV				-0.991***
				(0.276)
Company Sch. IV				0.855***
				(0.0564)
Trust Sch. IV				2.685***
				(0.211)
Male	0.200***	0.251***	0.201***	0.191***
	(0.0164)	(0.0192)	(0.0164)	(0.0186)
Student Age	-0.204***	-0.196***	-0.204***	-0.190***
	(0.0119)	(0.0139)	(0.0119)	(0.0138)
Student Age squared	0.00177***	0.00170***	0.00177***	0.00163***
	(0.000106)	(0.000125)	(0.000106)	(0.000125)
Ill health	-0.646***	-0.784***	-0.646***	-0.680***
	(0.0243)	(0.0272)	(0.0243)	(0.0277)
Peer help received	0.228***	0.256***	0.226***	0.220***
	(0.0255)	(0.0306)	(0.0255)	(0.0291)
No repetition of grade 9	0.179***	0.273***	0.180***	0.102***
	(0.0239)	(0.0281)	(0.0239)	(0.0346)
Rural	-0.222***	-0.307***	-0.226***	0.117***
	(0.0219)	(0.0262)	(0.0220)	(0.0448)
Constant	2.262***	1.789***	2.247***	2.178***
	(0.179)	(0.215)	(0.179)	(0.209)
Other controls	Yes	Yes	Yes	Yes
VDC dummies	Yes	Yes	Yes	Yes
SLC year dummies	Yes	Yes	Yes	Yes
IV exclusion: F-stat		0.02 (0.89)		2.539 (0.15)
IV over-id F (p-val)		0.00 (1.00)		0.00 (1.00)
Observations	8,701	7,829	8,701	7,464
R-squared	0.448	0.330	0.449	0.417

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 5. Relative efficiency (RE: Standardised total SLC scores/Log Exp. per student) estimates

VARIABLES	(1) OLS RE	(2)IV RE	(3) OLS RE	(4) IV RE
Pvt Sch.	0.497***			
	(0.0434)			
Pvt Sch. IV		0.803***		
		(0.0518)		
PA Sch.			-0.458***	
			(0.154)	
Company Sch.			0.549***	
			(0.0473)	
Trust Sch.			-0.312***	
			(0.114)	
PA Sch. IV				-1.655***
				(0.522)
Company Sch. IV				0.626***
				(0.0740)
Trust Sch. IV				1.209***
				(0.295)
Male	0.371***	0.273***	0.358***	0.248***
	(0.0528)	(0.0371)	(0.0522)	(0.0388)
Student age	-0.227***	-0.252***	-0.221***	-0.241***
	(0.0355)	(0.0317)	(0.0356)	(0.0316)
Student age squared	0.00204***	0.00226***	0.00199***	0.00215***
	(0.000319)	(0.000290)	(0.000320)	(0.000290)
Ill health	-1.481***	-1.010***	-1.469***	-0.999***
	(0.162)	(0.0731)	(0.160)	(0.0732)
Peer help received	0.343***	0.261***	0.349***	0.257***
	(0.0706)	(0.0506)	(0.0703)	(0.0504)
No repetition of grade 9	0.118	0.254***	0.0956	0.148**
	(0.0743)	(0.0545)	(0.0742)	(0.0615)
Rural	-0.485***	-0.195***	-0.526***	0.0313
	(0.0688)	(0.0415)	(0.0664)	(0.0766)
Constant	1.915***	2.550***	1.965***	2.691***
	(0.554)	(0.465)	(0.547)	(0.473)
Other controls	Yes	Yes	Yes	Yes
VDC dummies	Yes	Yes	Yes	Yes
SLC year dummies	Yes	Yes	Yes	Yes
IV exclusion: F-stat		0.05 (0.81)		2.41 (0.12)
IV over-id: F-stat (p)		0.00 (1.00)		0.00 (1.00)
Observations	8,701	7,464	8,701	7,464
R-squared	0.136	0.155	0.143	0.157

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 6. Absolute and relative efficiency by regions, IV estimates only

VARIABLES	(1) Rural AE	(2)Urban AE	(3) Rural RE	(4)Urban RE
PA Sch. IV	-0.766**	-1.228***	-1.376**	-1.514**
	(0.329)	(0.459)	(0.681)	(0.622)
Company Sch. IV	1.225***	0.403***	1.257***	0.0547
	(0.0764)	(0.0787)	(0.120)	(0.0847)
Trust Sch. IV	0.320	5.387***	-0.619	3.038***
	(0.282)	(0.322)	(0.453)	(0.356)
Male	0.163***	0.211***	0.258***	0.213***
	(0.0229)	(0.0304)	(0.0574)	(0.0387)
Student age	-0.193***	-0.202***	-0.257***	-0.198***
	(0.0168)	(0.0235)	(0.0431)	(0.0376)
Student age squared	0.00165***	0.00181***	0.00226***	0.00186***
	(0.000149)	(0.000213)	(0.000388)	(0.000368)
Ill health	-0.608***	-0.780***	-0.997***	-0.772***
	(0.0308)	(0.0578)	(0.0911)	(0.0868)
Peer help received	0.219***	0.208***	0.269***	0.207***
	(0.0345)	(0.0504)	(0.0708)	(0.0598)
No repetition of grade 9	0.0184	0.170***	0.0617	0.234***
	(0.0399)	(0.0596)	(0.0807)	(0.0796)
Constant	2.697***	2.019***	3.232***	2.065***
	(0.270)	(0.355)	(0.732)	(0.556)
Other controls	Yes	Yes	Yes	Yes
VDC dummies	Yes	Yes	Yes	Yes
SLC year dummies	Yes	Yes	Yes	Yes
Observations	4,595	2,869	4,595	2,869
R-squared	0.355	0.436	0.158	0.309

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7. Value added IV estimates of absolute and relative efficiency (2004 sample)

VARIABLES	(1) All AE	(2)Rural AE	(3)Urban AE	(4) All RE	(5) Rural RE	(6) Urban RE
PA Sch. IV	-0.301	0.159	-1.095**	-2.063**	-1.198	-2.427
	(0.209)	(0.357)	(0.443)	(0.985)	(0.791)	(1.558)
Company Sch. IV	0.106	1.156***	-0.132	0.373	0.540**	-0.073
	(0.658)	(0.160)	(0.321)	(0.373)	(0.234)	(0.431)
Trust Sch. IV	0.875***	-1.157**	2.983**	0.200	-0.538	1.906**
	(0.172)	(0.568)	(1.208)	(1.598)	(2.097)	(0.762)
Lagged score	0.677***	0.628***	0.738***	0.730***	0.781***	0.683***
	(0.030)	(0.041)	(0.026)	(0.071)	(0.064)	(0.131)
Constant	1.052***	0.891***	0.855	1.563**	1.967**	-8.146
	(0.235)	(0.309)	(2.030)	(0.663)	(0.778)	(6.214)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
VDC dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,715	3,097	1,618	3,764	2,619	1,145
R-squared	0.680	0.640	0.757	0.314	0.468	0.368

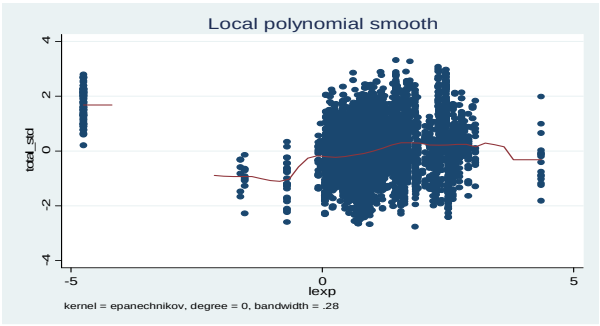
Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 8. Subject Fixed effects estimates of AE and RE (2004 sample)

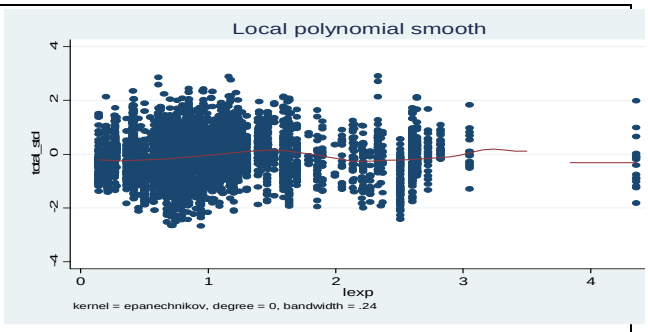
VARIABLES	(1) All AE	(2) Rural AE	(3) Urban AE	(4)All RE	(5) Rural RE	(6) Urban RE
PA Sch. IV	0.113	0.113	-0.095	0.918**	0.870**	1.889
	(0.113)	(0.113)	(0.265)	(0.360)	(0.367)	(1.515)
Company Sch. IV	0.905***	0.879***	0.966***	0.620***	0.798***	0.411
	(0.120)	(0.126)	(0.221)	(0.225)	(0.278)	(0.364)
Trust Sch. IV	1.077***	0.620*	1.897***	1.555**	0.957	2.577**
	(0.292)	(0.316)	(0.372)	(0.778)	(0.698)	(1.187)
Constant	2.081***	1.789***	3.382	1.701***	1.636**	-5.636
	(0.233)	(0.277)	(3.260)	(0.586)	(0.692)	(5.685)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Subject dummies	Yes	Yes	Yes	Yes	Yes	Yes
VDC dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,875	15,310	6,565	21,875	15,310	6,565
R-squared	0.653	0.645	0.683	0.240	0.245	0.286

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

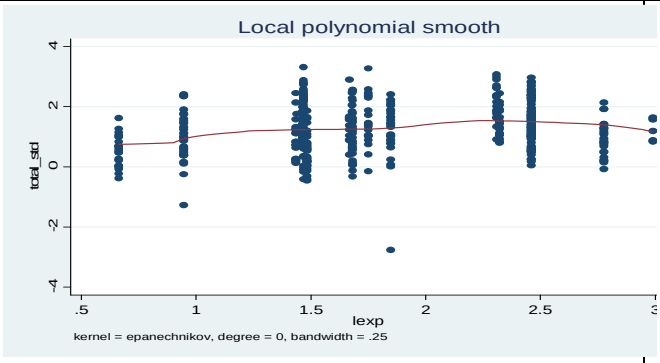
Figure 1. Bivariate Kernel Fit of Standardized Total Test Scores against Log Expenditure per Student by School Types (non-boarding)



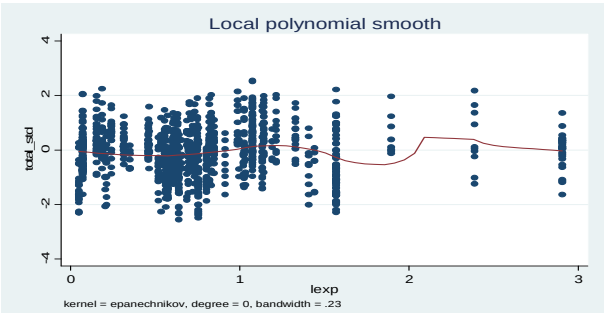
Panel a. All schools



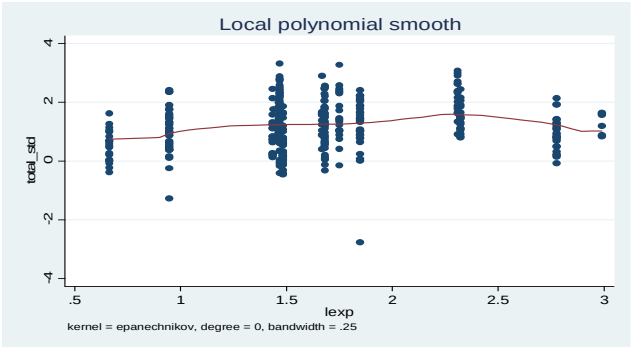
Panel b: All government schools



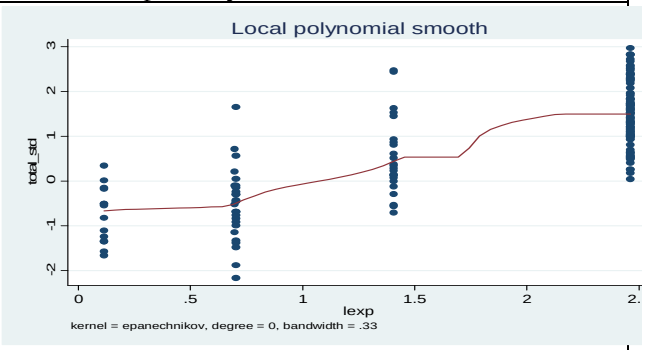
Panel c. All private schools



Panel d: All partially aided schools



Panel e: All company-run private schools



Panel f: All trust-run private schools

Appendix

Appendix Table A1: Robustness check for the instrument for PA school

VARIABLES	(1) Trust Sch.	(2) Company Sch.	(3) PA Sch.
Founder is the head	0.117**	0.147***	-0.00836
	(0.0571)	(0.0472)	(0.0706)
Number of Pvt. Sch.	-0.0170	0.0423***	-0.0180
	(0.0125)	(0.00970)	(0.0128)
Minutes to walk to school	-5.40e-05	-0.000171	0.000964**
	(9.70e-05)	(0.000138)	(0.000416)
Constant	0.111	0.933***	-0.127
	(0.111)	(0.178)	(0.208)
Other controls	Yes	Yes	Yes
VDC dummy	Yes	Yes	Yes
SLC Year dummy	Yes	Yes	Yes
Observations	7,070	7,070	7,573
R-squared	0.254	0.664	0.228

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1