Impact of Private Tutoring on Learning Levels: Evidence from India

Ambrish Dongre (Corresponding Author),
Fellow,
Centre for Policy Research,
Dharam Marg, Chanakyapuri,
New Delhi – 110 021,
India.
Email: ambrish@cprindia.org; ambudon@gmail.com
Phone: 91-11-26115273-76

Vibhu Tewary
Email: vibhutewary@gmail.com

Acknowledgement

This research has been funded by Accountability Initiative (New Delhi) and was carried out when both the authors were with Accountability Initiative. The authors would also like to thank Yamini Aiyar, Dr. Rukmini Banerjee and Dr. Wilima Wadhwa for continuous support and simulating discussions.

Abstract

Despite widespread and substantial household expenditure on private tutoring in many developing countries, not much is known about their effects on learning outcomes. The main challenge in estimating such an effect is that the decision to send the child for private tutoring is endogenous.

This paper utilises a large household survey conducted in rural India, and employs Fixed Effect estimation to control for the effect of unobserved variables. We find positive and significant effect of private tutoring on learning outcomes for students in grades one to eight. This effect is equivalent to an additional year of schooling or being in a private school instead of a government school. The effect is stronger for the disadvantaged students – those who are less wealthy, and those whose parents are relatively less educated.

These are, to our knowledge, the first estimates of impact of private tutoring on learning outcomes in the Indian context.

JEL Classification: I20, I21
Keywords: ASER, Private tutoring, India

1. Introduction

Realising the importance of education in development of human capital and economic growth, policy makers in developing countries have given substantial attention to education, especially school-based education in the last two decades. This commitment is reflected in the second Millennium Development Goal (MDG), which states that all children, whether boys and girls, should be able to complete a full course of primary schooling[1]. Consequently, critical and rigorous analysis of policies surrounding provision of school-based education has received much-deserved attention (Glewwe et al 2013; Muralidharan 2013; Hanushek 2003). But in the process, role of additional educational inputs provided by the households, such as private tutoring, has remained neglected.

Private tutoring can be defined as fee-based tutoring that provides supplementary instruction to children in academic subjects that they study in the mainstream education system (Dang and Rogers 2008). It is widespread across many developing as well as developed countries[2]. A substantial fraction of household expenditure on education is devoted to spending on private tutoring. In Korea, for example, households spent 2.8% of GDP on private tutoring in 2006, equivalent to 80% of government expenditure on public education for primary and secondary schooling (Kim and Lee 2010). In Turkey, aggregate expenditure on private tutoring is 1.44% of GDP, and is comparable to total public sector educational spending (Tansel and Bircan 2006).

Does private tutoring improve outcomes? The main challenge in estimating impact of private tutoring is non-random selection of students in it. Students who attend private tutoring are likely to differ systematically from those who don't take tuitions on various observable and unobservable dimensions. Differences along the observable dimensions can be controlled but differences along the unobservable dimensions such as ability, motivation, parental concern for

[1] http://www.un.org/millenniumgoals/education.shtml

[2] Paviot et al (2008) analyze phenomenon of private tutoring in Kenya, Malawi, Mauritius, Namibia, Zambia and Zanzibar. They find proportion of students taking private tuitions ranged from 44.7% in Namibia to 87.7% in Kenya. Countries such as Japan, Malaysia and Korea also have large proportion of students in the middle school and above attending private tuitions (Bray 2007; Bray 2011; Dang and Rogers 2008; Kim and Lee 2010).

education etc., by their nature, are difficult to account for. More importantly, these factors are correlated with both, learning outcomes and likelihood of attending tuitions. As a result, if we find any difference in learning levels of students who attend private tuition and those who don't, it's not clear whether this difference is due to private tuitions alone or the unobservable factors also play a role. Only a few papers have recognized this problem and findings from these papers are mixed. Dang (2007), and Ono (2007) find substantial effects of private tutoring, while Briggs (2001), Gurun and Millimet (2008), and Kang and Ryu (2013) find negligible effects[3,4].

Our paper contributes to this nascent literature by providing effect of private tutoring on learning outcomes of students in elementary grades (grades one to eight) in India. We employ Fixed Effects (FE) estimation technique to control for heterogeneity between clusters of data. In cross-sectional data, clusters mean households, schools or villages that have heterogeneous effect on the outcome of interest, which can be netted out using FE estimation[5]. We are well-placed to employ this technique due to availability of a dataset whose underlying sampling strategy is such that pre-determined number of villages from each district and pre-determined number of households from each selected village were to be surveyed (details below). But it must be noted that even the household FE can't control for heterogeneity between children within the same

[3] I do not mention here the studies that don't attempt to control for endogeneity. See Dang and Rogers (2008) for details on these studies.

[4] Dang (2007) estimates effects of expenditure on tutoring in Vietnam using a nationally representative survey data. Since expenditure on tutoring is not reported for all the households, and dependent variable (i.e. academic ranking) is discrete and ordered, he esimates joint Tobit and ordered Probit model, with tutoring prices as an instrument. He finds significant effects of tutoring on academic performance. Students in Japan invest substantial time and money in *ronin* (spending additional years to prepare for entrance examinations through specialised entrance preparatory schools) to get selected in top universities. Ono (2007) estimates an instrument variable regression which shows that *ronin* investments improve the probability of attending better quality university, which in turn, improves earnings. Thus, investment in *ronin* pays off from the individual student's point of view. Briggs (2001) investigates effect of tutoring on scores in standardised tests for college admissions in the US using a nationally representative sample of students from 8th grade through high school and beyond. But his estimates using Heckman approach suggest that tutoring helps but by a rather small amount. Findings from Turkey are also similar as shown by Gurun and Millimet (2008) through bivariate probit estimation. They show that expenditure on tutoring has no effect on probability of university placement when positive selection is taken into account. Kang and Ryu (2013) employ a variety of estimation methods to a panel data set from South Korea, and find that expenditure on tutoring has modest effect on test scores of middle school students (grades seven to nine).

[5] French and Kingdon (2010) use similar approach.

household. Hence we use the procedure developed by Altonji et al (2005) and Oster (2014) to estimate the extent of bias in our estimates.

The results indicate consistently positive and statistically significant effect of private tuitions on learning levels of students at elementary level (grades one to eight) in rural India. The FE estimation indicates 0.14 standard deviation effect of private tutoring on learning outcomes. This effect is equivalent to an additional year of schooling or being in a private school instead of a government school. We also find that the effect of private tuition is stronger for the students who have lower learning outcomes, i.e. the students enrolled in government schools compared to the students enrolled in private schools, the children who are from economically disadvantaged background, and the children whose parents are relatively less educated. The results if we consider math and language scores separately, and for various sub-samples (children in the age group of six to ten years, and restricting sample to a few states) are also in similar direction.

To our knowledge, this is the first research work which attempts to rigorously estimate impact of tuitions on learning outcomes in the rural Indian context, where almost one-fourth students in elementary grades attend private tuitions.

2. Background

2.1 Elementary Education in India

The landscape of elementary education in India has transformed dramatically in the last decade. The governments, at the central and at the level of states, have increased allocation on elementary education more than two fold from Rs. 68,853 crore in 2007-08 to Rs. 147,059 crore in 2012-13 (Accountability Initiative 2012). Increased allocation has translated into higher expenditure which in turn, has led to increased access to schools, and improved physical and human infrastructure in schools. Enrollments have shot up, and proportion of out of school children has come down to less than four per cent even in rural areas in 2013 (ASER 2013). In 2010, the Indian parliament passed the Right to Education (RTE) Act, which declared elementary education as a fundamental right, i.e. it is now obligation of the government to ensure that every child between six and fourteen years of age is in school and in 'age-appropriate' class.

Despite these input improvements, it has been repeatedly shown that learning levels of Indian students are alarmingly low. For example, only 47% students in grade five could read grade two level text, and only 52.3% students in grade five could solve two-digit subtraction problem, in rural India (ASER 2013). Partly as a response to this, share of private schools in total enrollment has been increasing in both rural and urban areas. A substantial body of literature has analyzed impact of private schools on learning outcomes[6].

Most of the literature has focused on issues surrounding public and private provision of school-based education. Role of other private educational inputs provided by the household toward children's education, including private tuitions, and their impacts, has remained unexplored.

2.2 Private Tuitions in India

It is widely known that a large proportion of students attend private tuitions in India. This phenomenon is not restricted to higher grades, and urban areas. Approximately one-fifth of rural Indian children in grades one to eight also attend private tuitions (ASER (2009-2013))[7]. There is substantial variation among states in terms of proportion of children attending tuition (figure 1). Almost three-fourth of children at elementary level in rural West Bengal and Tripura, and close to half of children in rural Bihar and Odisha attend private tuitions[8]. Children attending tuition spend, on an average, nine hours in tuitions per week (IHDS 2004-05), which is equivalent to one and a half school day[9]. They pay on average, Rs. 170 per month, amounting to slightly above Rs. 2000 per annum to attend these tuitions (ASER 2013)[10].

[6] The key problem in estimating effect of private schools is that of selection bias. See Chudgar and Quin (2012), Desai et al (2008), French and Kingdon (2010), Goyal (2009), Kingdon (1996), Muralidharan and Sundararaman (2013), and Singh (2013) for more detailed discussion.
[7] Numbers are likely to be much higher for children in urban areas. ASER doesn't survey children in urban area. As per India Human Development Survey (IHDS), carried out in 2003-04, 26% per cent children in grades one to eight attend tuition.
[8] For more on private tutoring in West Bengal, see Majumdar (2014), Pratichi Education reports (2002, 2009) and SCERT, West Bengal (2009).
[9] IHDS stands for India Human Development Survey. See Desai et al (2010) for more details.
[10] NSS 64th round (2007-08), which is quite dated now, indicated that at an all India level, on an average, expenditure on private tutoring constituted 8% and 14% of household expenditure on education, for primary and middle school classes. For rural areas, it was 7.6% and 13.1%, and for urban areas, it was 8.5% and 15.1%. For the age group 5-29 years, expenditure on private tutoring constituted 0.19% of GDP in 2007-08.

Why might these children attend private tuitions?[11] For one, parents might feel that they are not in a position to guide their child in studies, and hence prefer to send the child to a tutor. An academically weak child might fall behind of what is being taught in the class, and hence might need more individual attention, which can be provided by private tutors. This might be especially true in the Indian context where an 'ambitious' curriculum leaves many students behind[12]. In many developing countries, schools in general, and government schools in particular, may not deliver 'quality' education[13]. Parents might prefer private school but private schools may not be available or affordable. In these instances, parents might feel the need to supplement school-based education with private tutoring (Banerjee and Wadhwa 2013; Dang and Rogers 2008). The private tutors are said to provide notes on specific chapters and topics to the students, as well as conduct mock tests regularly. This helps reduce 'exam phobia' among students (Majumdar 2014). In many instances, it has been observed that government school teachers shirk their responsibilities in school in order to increase demand for private tutoring (Biswal 1999; Jayachandran 2014)[14]. As a consequence, private tutoring is now considered 'essential', and unless it is beyond the parent's capability, tutoring has become as necessary as going to school (Majumdar 2014).

3. Empirical Strategy

Consider a 'full' model of determining learning level of a child as shown below in equation I,

$$Y_i = \beta_0 + \beta_1 * P_i + \pi * \mathbf{X_i} + \varepsilon_i, \quad \text{(I)}$$

[11] We mention here the reasons relevant in the context of private tutoring for children in elementary sections. Analysis by Kim and Lee (2010) indicates that among other things, high prevalence of private tuition in South Korea can be explained by increased demand for education with increased income, and real or perceived advantage of elite universities. In fact, they suggest that expenditure on private tutoring is driven by academically better students who have a good chance of being admitted to the prestigious universities. The same applies in case of Japan and Turkey as well (Ono 2007; Gurun and Millimet 2008).
[12] It is acknowledged that curriculum in many developing countries is quite ambitious in terms of coverage and pace (Muralidharan and Zieleniak 2013; Pritchett and Beatty 2012).
[13] See Glewwe and Kremer (2006) and Chaudhury et al (2006) for more on state of government schools in developing countries.
[14] It is important to note that the Right to Education (RTE) Act explicitly prohibits private tutoring by school teachers.

where dependent variable Y_i is a measure of learning level for child i (in this context, standardized aggregate score for child i, details in section four). P_i is an indicator for whether child i attends private tuition, while $\mathbf{X_i}$ is a vector of all other factors that affect learning levels of child i, including child, household and village level factors. ε is the error term. In this 'full' model, β_1 is the true causal effect of private tuition on learning levels. But in reality, not all factors affecting private tuition are observed. Hence,

$$Y_i = \beta_0 + \beta_1 * P_i + \pi_1 * \mathbf{X_{1,i}} + \pi_2 * \mathbf{X_{2,i}} + \varepsilon_i, \quad \text{(II)}$$

where $\mathbf{X_1}$ indicates vector of observable characteristics affecting learning levels, and $\mathbf{X_2}$ indicates vector of unobservable characteristics. Since only $\mathbf{X_1}$ are observable, what is estimated is

$$Y_i = \beta_0 + \beta_1 * P_i + \pi_1 * \mathbf{X_{1,i}} + \xi_i, \quad \text{(III)}$$

where ξ consists of X_2 and ε.

Factors such as a child's inherent ability or motivation, emphasis a family places on education, school environment are some of the examples of variables in $\mathbf{X_2}$. A key feature of these variables is that they are cor-related not only with the learning levels but also with whether a child attends private tuition. As a result, OLS estimation yields biased estimate of effect of private tuitions on learning levels.

3.1 Fixed Effects (FE) Estimation

We use FE estimation to control for observable and unobservable factors at various levels affecting learning outcomes. We start with OLS estimation, and then introduce state FE, district FE, village FE and household FE successively. State FE controls for factors varying across states, district FE controls for factors varying across districts within the same state, village FE controls for factors varying across villages, while household FE controls for factors which vary

across households (but not within households) that affect learning levels. Each successive level of FE estimation yields an estimate of effect of private tuition on learning level, which is closer to the 'true' causal effect. The equation with household FE is

$$Y_{ij} = \beta_0 + \beta_1 * P_{ij} + \mu_j + \pi_1 * \mathbf{X_{1,ij}} + \xi_{ij},$$

(IV)

where μ_j captures household level factors affecting learning levels. $\mathbf{X_{1,ij}}$ indicates *child level* factors affecting learning levels.

As noted, even the household FE can't control for factors such as differences in intrinsic abilities and motivation of children, and differential parental support to children within the same household. And to the extent that these factors are correlated with child attending tuition, even the household FE estimates will remain biased. Can we quantitatively assess size of this bias? Can the bias alone explain positive correlation we find between private tutoring and learning outcomes? To answer these questions, we use the procedure suggested by Altonji et al (2005) based on the idea that amount of selection on the observed explanatory variables provide a guide to the amount of selection on the unobservables.

3.2 Differential Effect of Private Tuition

Next, we allow the effect of tuition to vary as per the type of school child attends (government or private), economic status of the household (captured through condition of the building of the house), parental schooling (mother's and father's schooling, separately), and finally gender of the child. Note that when the variable of interest is at child-level (type of school attended, parental schooling, and gender), we use household FE, and when the variable of interest is at the household level (condition of the building of the house), we use village FE. The equations of both types are indicated below.

$$Y_{ij} = \beta_0 + \beta_1 * P_{ij} + \beta_2 * \text{CHARACTERISTIC1}_{ij} + \beta_3 * (P_{ij} * \text{CHARACTERISTIC}_{ij}) + \mu_j + \pi_1 * \mathbf{X_{1,ij}} + \xi_{ij},$$

(V)

where the variable 'CHARACTERISTIC1' is the child-level variable of interest – type of school attended, parental schooling, and gender of the child.

$$Y_{ijk} = \beta_0 + \beta_1 * P_{ijk} + \beta_2 * \text{NON-PUCCA}_{ijk} + \beta_3 * (P_{ijk} * \text{NON-PUCCA}_{ijk}) + \mu_k + \pi_1 * \mathbf{X_{1,ijk}} + \xi_{ijk}, \quad \text{(VI)}$$

where Y_{ijk} indicates learning level of child *i* in household *j* and village *k*. The variable 'NON-PUCCA' takes value of one if the building is poorly constructed.

In both these equations, sign and magnitude on the interaction term indicates whether attending tuition has a differential impact on learning levels.

4. Data

4.1 Sampling Methodology

We have used 2011 and 2012 waves of ASER survey conducted by ASER Centre, Delhi, India[15]. Initiated in 2005, the main objective of ASER survey is to generate reliable estimates of the status of children's schooling and basic learning (reading and arithmetic level) at the district level. The sample size is 600 households per district – 30 villages per district and 20 households in each village. This sampling strategy yields large sample size, running into slightly more than half a million observations at an all India level, which is the main strength of the data. We have restricted our analysis to children in the age-group of six to fourteen years, which yields a sample size of slightly less than half a million[16].

For 2011 round, villages were randomly selected using the village directory of 2001 census through probability proportional to size (PPS) techique..

[15] This paper reports and discusses results from ASER 2011. The results from ASER 2012 are broadly along the same lines, and are available on request from the authors.
[16] RTE Act guarantees 'age-appropriate' school-based education for children in the age-group of six to fourteen years. Previous research using ASER data have also focused on this age-group (French and Kingdon 2010). Results don't change if we relax this restriction.

The survey process in each village consisted of household survey, village survey, and survey of a government school in the village. Household survey involved gathering information about the schooling status of all children between three to sixteen years of age, whether the child attended private tuition, both parents' background (age, schooling status) and certain household indicators such as availability of electric connection, toilet, whether house is *pucca* (ceiling, walls and flooring built using cement or stone), possession of television, mobile phone, vehicle, availability of newspaper or other reading material etc. Village survey involved collecting information on existence of basic infrastructure such as roads, electricity, health centres and health providers (both, public and private), and schools (both, public and private), through observation.

The key feature of the data set is the assessment of reading and math level of all children between five to sixteen years of age in the sampled household. To measure the reading level, the child had to start with a paragraph (of grade one level). If the child could read the paragraph, then he/ she was asked to read a short story (of grade two level). If the child could not read the paragraph, then he/ she was asked to read any five words. If the child could not read words, he/she was asked to read any five letters. The child then was categorized into five categories: those who couldn't read the letters, those who could read letters but not the words, those who could read words but not the paragraph, those who could read paragraph but not the short story, and finally those who could read the short story (equivalent to grade two level). These categories have been coded as zero, one, two, three and four respectively. Similarly, for arithmetic, the children could belong to any of the categories – those who can't recognize numbers one to nine, those who can recognize numbers one to nine but not 11 to 99, those who can recognize numbers between 11 to 99 but couldn't solve a simple subtraction problem (two digit numerical problem with borrowing), those who could solve subtraction problem but not the division problem (three digit number divided by one digit number), and finally those who could solve the division problem. These categories have been coded as zero, one, two, three and four respectively. Same tests were used for all the children tested.

We have summed up the reading and math scores for each child, and then standardized it by subtracting a child's aggregate score from the mean aggregate score of all students, and then

dividing by the standard deviation of aggregate score for that year. This standardized aggregate score has been used as dependent variable in our empirical analysis.

4.2 Descriptive Statistics

Table 1 presents basic statistics based on data collected through ASER 2011. Children are, on average, 10 years old which means they would be in grades four or five. 47% of these are girl children. 73% of students attended government schools in ASER 2011[17]. Learning levels of children are dismal – on an average, children are able to read words but not the paragraph, and can recognize numbers 11 to 99 but can't solve the subtraction problem[18]. 20% children attend private tuitions in this sample. On average, mothers are 34 years of age, and have completed education till grade four, while fathers are 39 years of age and have completed education till grade six. Only 36% of the households stay in *pucca* houses. Interestingly, proportion of households with television is higher than proportion of households with toilets in the house. Hardly 10% households get newspaper daily. Most of the villages have electricity connection, and close to three-fourth villages have *pucca* road leading to the village, and a PDS shop. 43% of the villages have private schools.

********** (Table 1 here) **********

Table 2 compares children attending private tuition and those who don't with respect to various characteristics. Column 3 shows results without State FE, while column 5 shows results with State FE. Column 5 shows that children attending private tuition have more privileged background than children who don't attend private tuitions. Being in a government school, being a girl child and being in a lower grade, each reduce the probability of attending tuition. Parents of children attending tuition are more educated, i.e. they have completed two more grades of education. Children attending tuition belong to relatively affluent households, as indicated by nature of house (*pucca, semi-pucca or kutcha*), availability of toilet, ownership of television set, mobile phone, and computers, and availability of newspapers and other reading material in the

[17] This proportion has come down to 70% in ASER 2012.
[18] Comparison of ASER 2011 and ASER 2012 indicates decline in learning levels.

house[19]. Children who belong to economically active or larger villages have higher probability of attending private tuition–children from villages which have banks, primary health centre, private health centre, private school, and internet café have higher probability of attending private tuitions.

********** (Table 2 here) **********

We also estimate a linear probability model where dependent variable equals unity if the student attends tuition and zero otherwise. The results are broadly similar to that of table 2[20].

5. Results[21]

5.1 Private Tuition and Learning Level

Table 3 shows the results from FE estimations. Baseline is a child that attends government school, and doesn't attend private tuition. Keeping space constraint in mind, we have shown the coefficients for tuition variable and other child level controls only. Column (1) shows the results with no controls other than variable of interest– whether the child attends private tuition. In column (2), we add child, household and village level controls. In columns 3 to 6 we successively add state FE, district FE, village FE and finally, household FE.

********** (Table 3 here) **********

Column (1) shows that attending private tuition is associated with 0.36σ increase in standardized aggregate score. Once other control variables are added, the magnitude drops to 0.15σ (column 2). As we add State FE, district FE and Village FE, and finally Household FE, the coefficient on private tuition doesn't change much, remaining around 0.14σ-0.15σ[22]. How large is this effect? Comparing coefficient on private tuition with that of grade in which child is studying or that of

[19] These results are similar to what is found in Korea (Kim and Lee 2010).
[20] Complete results are available on request from the authors.
[21] The paper displays only the key results. Complete results are available on request from the authors.
[22] We obtain similar results when we use propensity score matching (PSM) technique (nearest neighbour matching with replacement, with caliper values being 0.001, 0.0001 and 0.00001).

type of school reveals that the effect of attending tuition is as large as moving one grade up or attending a private school (Household FE in column 6).

As far as other variables are concerned, the direction of effect is on anticipated lines. Higher the age of the child, higher the standard in which the child is studying, and higher the affluence of the household, higher is the learning levels. Being in a government school is associated with lower learning levels. Village characteristics don't play an important role.

We also run similar regressions with dependent variable being a binary variable which takes value of one if a student has a particular level of reading or math competency (say, being able to read grade one level text; being able to perform two digit subtraction). The results are on the similar lines.

5.2 Robustness Checks

As mentioned, even the household FE estimates are likely to be biased. Hence, we use procedure suggested by Altonji et al (2005)[23]. Our results indicate that estimated size of the bias is less than 30% of the estimated coefficient. What this means is even after taking into bias into account, learning outcomes of the children attending private tuitions are 0.1 SD higher.

In table 4, we provide results separately, for standardized math score (column 1) and standardized language score (column 2). Columns (1a) and (2a) show the village FE results, while columns (1b) and (2b) show household FE results. In each case, the effect of private tuition is positive and statistically significant. Effect is higher for math compared to language score.

In table 5, we restrict the sample to include only those students who are in the age-group of 6-10 years. Coefficient on private tuition is positive and significant. In fact, effects are much higher for the younger age-group[24].

[23] STATA code was specifically written to carry out this procedure. Special thanks to Soham Sahoo (Doctoral student at ISI (Delhi)) for his help on this aspect.

[24] This can partly be explained by the fact that the highest level of language and math skills tested in ASER surveys correspond to standard 2 level. The older students have greater probability of doing better whether they attend tuition or not.

As mentioned before, prevalence of private tuition is quite high in states like Bihar, West Bengal and Orissa. Columns 1 to 4 in table 6 show the results when we restrict the sample to students in these States. Effect of private tuition on learning outcomes is higher in these states compared to the rest of the country.

Thus, the main result, that of positive and significant effect of private tuition on learning outcome holds even within various sub-samples.

5.3 Heterogeneous Effects

Tables 7A and 7B display the result where we allow the effect of tuition to vary as per the school type, condition of the building of the house, and gender of the child (in table 7A), and mother's and father's schooling (in table 7B). In table 7A, those who attend private school but not private tuition are at the baseline in column 1, those who stay in pucca houses and not attend private tuition are at the baseline in column 2, and finally, male students not attending private tuition are at the baseline in column 3. Results in columns 1 and 3 are based on household FE, while results in column 2 are based on Village FE. In table 7B, children whose mothers and fathers have zero years of schooling, and not attend private tuition are at the baseline. Results in table 7B are based on Household FE.

Both, 7A and 7B indicate that, female students, as well as those students who attend government schools, those who stay in non-pucca households, and those whose parents have relatively less years of schooling have lower learning outcomes. Interestingly, coefficients on interaction terms indicate that these are the students who benefit more from private tuitions, with exception of female students. For example, effect of tuition is almost twice as high for children enrolled in government schools compared to those who are enrolled in private schools (table 7A). Thus, interaction effects clearly suggest that private tuitions benefit more to those who have lower learning levels, and thus they are actually leveling the playing field.

********** (Table 7A, 7B here) **********

6. Conclusion

Private tutoring is fee based tutoring that provides supplementary instruction to students in academic subjects that they study in the mainstream education system. Private tutoring is widely prevalent in many developing and some of the developed countries as well, including India.
Results in this paper indicate positive and statistically significant effect of private tuitions on standardized aggregate score (consisting of math and language scores) for students in grades one to eight in rural India. Bias can't account for all the effect. We also find that private tuitions benefit more to those students who have lower learning levels. These results also hold when we analyze subsequent round of the same dataset.

Why do private tuitions have a positive effect on learning outcomes? Those who attend tuition spend more time studying. Analysis of IHDS data indicates that those who attend tuition spend, on average, 9 hours per week in tuitions, i.e. one and half extra school days per week. Another explanation could be that tutors might be making some efforts to identify the child's weakness, and teach accordingly which might explain why effects of private tuition are higher for relatively disadvantaged students. And finally, the link between incentives and accountability – if someone is paying for a service, the onus is on the service provider to deliver..

What policy implication does this have? Clearly there is demand for private tutoring. Curbing or banning tutoring is not the solution, which is near impossible to enforce. Tutoring improves learning outcomes. But tutoring is available only for those who can afford it. Thus, tutoring can lead to widening existing inequalities in learning outcomes. But private tutoring benefits more to those students who have lower learning levels. Hence, one possible public policy response could be provision of remedial education in schools itself. Majumdar (2014) also stresses the need for reforming the mainstream education system – reducing the weight of curricula, stopping the practice of 'home tasks' at least for very young children and recruiting adequate number of teachers.

References

Accountability Initiative (2012): *PAISA Report*. Centre for Policy Research, New Delhi.

Altonji, A, T Elder and C Taber (2005): "Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools", *Journal of Political Economy,* Vol. 113, No. 11

ASER Centre (2010): *Annual Status of Education Report*. New Delhi.

ASER Centre (2011): *Annual Status of Education Report*. New Delhi.

ASER Centre (2012): *Annual Status of Education Report*. New Delhi.

ASER Centre (2013): *Annual Status of Education Report*. New Delhi.

Banerjee, R and W Wadhwa (2013): "Every Child in School and Learning Well in India: Investigating the Implications of School Provision and Supplemental Help" in *India Infrastructure Report 2012: Private Sector in Education*, edited by IDFC FOUNDATION, India: Routeledge, 2013.

Biswal, B (1999): "Private Tutoring and Public Corruption: A Cost-effective Education System for Developing Countries", *The Developing Economies,* 37(2), pp 222-240.

Bray, M (2007): *The Shadow Education System: Private Tutoring and Its Implications for Planners*, Second edition, UNESCO: International Institute for Education Planning, Paris.

Bray, M (2011): *The Challenge of Shadow Education: Private Tutoring and Its Implications for Policy Makers in the European Union*, European Commission, Luxembourg (downloaded from *http://hdl.handle.net/10722/138568*).

Briggs, D C (2001): "The Effect of Admission Test Preparation: Evidence from NELS - 88", *Chance,* Vol. 14(1), pp 10-18.

Chaudhury, N, J Hammer, M Kremer, K Muralidharan and F H Rogers (2006): "Missing in Action: Teacher and Health Worker Absence in Developing Countries", *Journal of Economic Perspectives,* 20(1), pp 91-116.

Chudgar, A and E Quin (2012): "Relationship between Private Schooling and Achievement: Results from Rural and Urban India", *Economics of Education Review*, 31, 376-390.

Dang, H (2007): "The Determinants and Impact of Private Tutoring Classes in Vietnam", *Economics of Education Review*, 26(6): 684-699.

Dang, H and F H Rogers (2008): "How to Interpret the Growing Phenomenon of Private Tutoring: Human Capital Deepening, Inequality Increasing, or waste of resources?", *Policy Research Working Paper 4530*, Development Research Group, The World Bank, Washington DC.

Desai, S, A Dubey, R Vanneman and R Banerjee (2008): "Private Schooling in India: A New Educational Landscape", *Brookings-NCAER India Policy Forum*, Vol. 5, The Brookings Institution.

Desai, S, A Dubey, B Joshi, M Sen, A Shariff, and R Vanneman (2010): "Human Development in India: Challenges for Society in Transition", Oxford University Press.

French, R and G Kingdon (2010): "The Relative Effectiveness of Private and Government Schools in Rural India: Evidence from ASER Data", *DoQSS Working Paper*, No. 10-03, Institute of Education, University of London.

Glewwe, P and M Kremer (2006): "Schools, Teachers, and Education Outcomes in Developing Countries" in Eric Hanushek and Finis Welch. (ed). *Handbook of the Economics of Education,* North Holland.

Glewwe, P, E Hanushek, S Humpage, and R Ravina (2013): "School Resources and Educational Outcomes in Developing Countries: A Review of the Literature from 1990 to 2010" in Glewwe P. (ed) *Education Policy in Developing Countries*, University of Chicago Press, Chicago.

Goyal, S (2009): "Inside the House of Learning: The Relative Performance of Public and Private Schools in Orissa", *Education Economics*, 17(3), pp 315-327

Hanushek, E (2003): "The Failure of Input-based Schooling Policies", *The Economic Journal*, 113(February), F64-F98.

Jayachandran, S (2014): "Incentives to Teach Badly: After-School Tutoring in Developing Countries", *Journal of Development Economics*, Vol. 108, pp 190-205

Kang, C (2007): "Does Money Matter? The Effect of Private Educational Expenditures on Academic Performance", Working Paper No. 0704, Department of Economics, National University of Singapore.

Kang, C & D Ryu (2013): "Do Private Tutoring Expenditures Raise Academic Performance? Evidence from Middle School Students in South Korea", *Asian Economic Journal*, Vol. 27, Issue 1, pp 59-83.

Kim, S & J Lee (2010): "Private Tutoring and Demand for Education in South Korea", *Economic Development and Cultural Change*, Vol. 58, No. 2, pp 259-296.

Kingdon, G (1996): "The Quality and Efficiency of Public and Private Education: A Case Study of Urban India", *Oxford Bulletin of Economics and Statistics*, 58(1), pp 57-82

Majumdar, M (2014): "The Shadow School System and New Class Divisions in India", Working Paper Series, TRG Poverty and Education, Max Weber Stiftung

Muralidharan, K (2013): "Priorities for Primary Education in India's 12th Five Year Plan", *India Policy Forum 2012-13*, Vol. 9, pp 1-46

Muralidharan, K and V Sundararaman (2013): "The Aggregate Effect of School Choice: Evidence from a Two-Stage Experiment in India", *NBER Working Paper* no. 19441, National Bureau of Economic Research, Cambridge, MA.

Muralidharan, K and Y Zieleniak (2013): "Measuring Learning Trajectories in Developing Countries with Longitudinal Data and Item Response Theory", Presentation at *Inequalities in Children's Outcomes in Developing Countries*, University of Oxford (July 8-9).

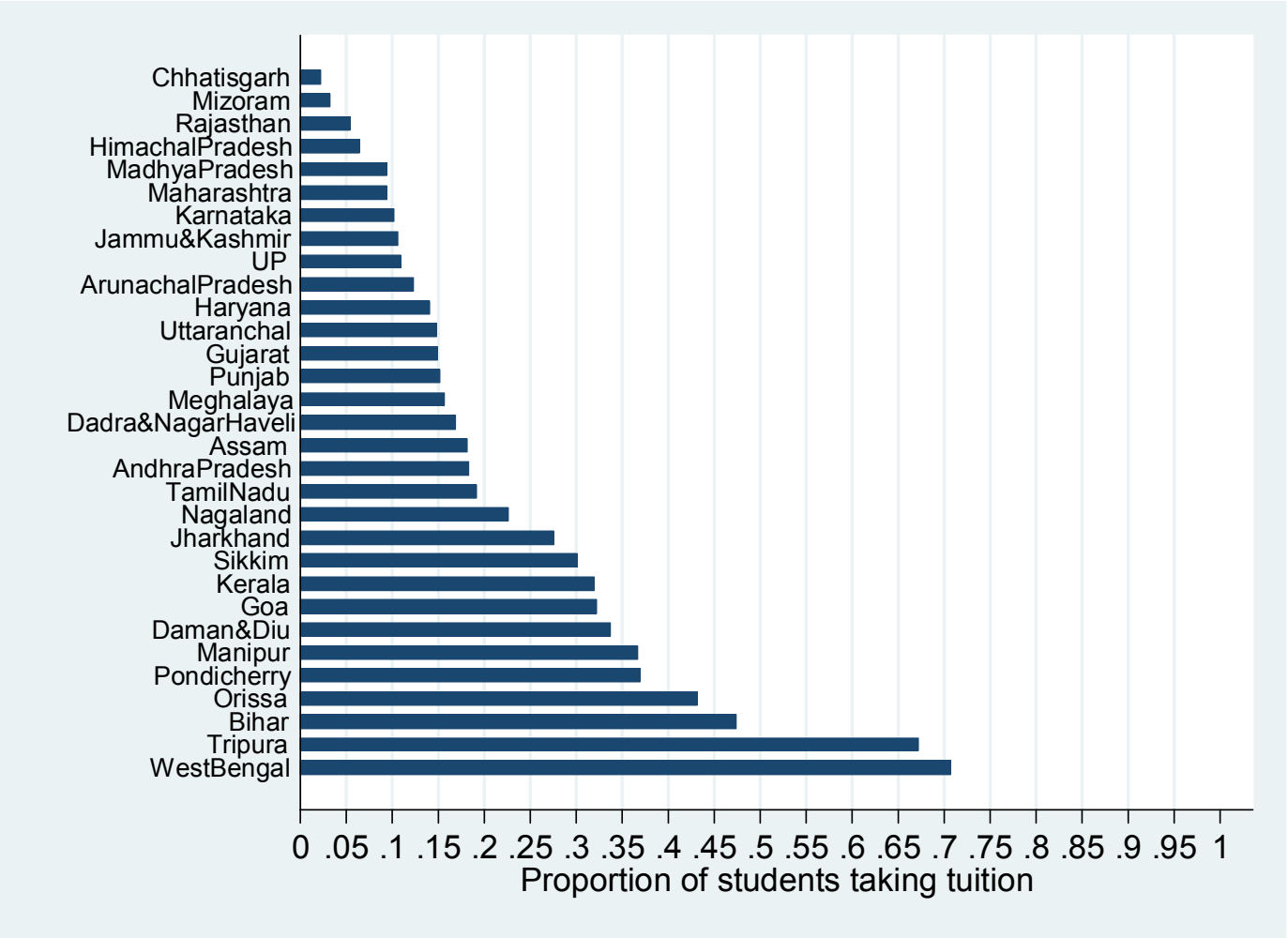
Paviot, L, N Heinsohn and J Korkman (2008): "Extra Tuition in Southern and Eastern Africa: Coverage, Growth, and Linkages with Pupil Achievement", *International Journal of Educational Development,* 28: pp149-160.

Pritchett, L and A Beatty (2012): "The Negative Consequences of Overambitious Curricula in Developing Countries", *Working Paper 293*¸ Center for Global Development, Washington DC.

Singh, A (2013): "Size and Source of the Private School Premium in Test Scores in India", *Mimeo,* University of Oxford.

Tansel, A and F Bircan (2006): "Demand for Education in Turkey: A Tobit Analysis of Private Tutoring Expenditures", *Economics of Education Review,* 25(3): 303-313.

Figure 1: Proportion of Students taking tuition- State-wise (Age 6-14)



Source: Author calculations from ASER 2011

Table 1: Descriptive statistics – ASER 2011

Variables	ASER 2011
Sample Size (children between ages six to fourteen)	439168
Children	
Mean Age (years)	9.98
Proportion of female students (%)	46.81
Proportion of students attending government schools (%)	72.73
Mean Language Score (range zero to four)	2.63
Mean Math Score (range zero to four)	2.39
Proportion of children attending tuition (%)	19.61
Household	
Mother's Education (Grades completed)	3.82
Mother's Age (years)	34.26
Father's Education (Grades completed)	6.25
Father's Age (years)	39.32
Proportion of households (%) which	
stay in *Pucca* houses	36
have toilet facility	40.92
have TV	48.01
get newspaper daily	10.64
Proportion of Villages (%) with	
Pucca road	74.98
Electricity	93.02
Post Office	44
STD booth	36.7
Bank	23.21
PDS	71.28
PHC	43.47
Private Health Clinic	33.61
Internet Café	13.39
Private school	43.99

Table 2: Characteristics of children attending private tuition (ASER 2011)

	Without State fixed effects				with State fixed effects	
	Tuition=1	Tuition=0	Difference	Standard Errors	Difference	Standard Errors
	(1)	(2)	(3)	(4)	(5)	(6)
Child Characteristics						
Grade	5.076	4.57	0.506	(0.010)***	0.653	(0.011)***
Total Score	5.886	4.925	0.961	(0.011)***	1.106	(0.011)***
Age	10.339	9.945	0.394	(0.010)***	0.476	(0.011)***
Whether attend government school	0.668	0.729	-0.061	(0.002)***	-0.155	(0.002)***
Female	0.434	0.474	-0.04	(0.002)***	-0.051	(0.002)***
Standard till which mother has been educated	5.266	3.6	1.666	(0.019)***	1.816	(0.019)***
Standard till which father has been educated	7.547	6.111	1.436	(0.021)***	1.905	(0.022)***
Mother's Age	34.141	34.301	-0.16	(0.030)***	-0.371	(0.031)***
Father's Age	39.548	39.254	0.294	(0.033)***	-0.355	(0.035)***
Household Characteristics						
Proportion staying in *pucca* households	0.397	0.307	0.09	(0.002)***	0.137	(0.002)***
Proportion staying in semi-*pucca* households	0.303	0.33	-0.027	(0.002)***	-0.004	(0.002)**

Proportion who has electricity connection in the house	0.748	0.729	0.019	(0.002)***	0.098	(0.002)***
Proportion who has toilet in the house	0.517	0.395	0.122	(0.002)***	0.157	(0.002)***
Proportion who has TV in the house	0.551	0.473	0.078	(0.002)***	0.17	(0.002)***
Proportion who has mobile in the house	0.805	0.726	0.079	(0.002)***	0.144	(0.002)***
Proportion who get newspaper daily	0.17	0.095	0.075	(0.001)***	0.091	(0.001)***
Proportion who has any reading material	0.274	0.222	0.052	(0.002)***	0.08	(0.002)***
Proportion who has computer at home	0.169	0.1	0.069	(0.001)***	0.087	(0.001)***
Village Characteristics						
Is the Village connected by a *pucca* road	0.756	0.756	0	-0.002	0.065	(0.002)***
Does the Village have electricity	0.921	0.937	-0.016	(0.001)***	0.026	(0.001)***
Does the Village have a post office	0.494	0.432	0.062	(0.002)***	0.083	(0.002)***
Does the Village have a bank	0.283	0.225	0.058	(0.002)***	0.078	(0.002)***
Does the Village have a PDS system	0.722	0.722	0	-0.002	0.058	(0.002)***
Does the Village have a Primary Health Centre	0.46	0.432	0.028	(0.002)***	0.071	(0.002)***
Does the Village have a Private Health Centre	0.379	0.335	0.044	(0.002)***	0.082	(0.002)***

Does the village have an internet Café	0.186	0.125	0.061	(0.001)***	0.064	(0.001)***
Does the Village have a Private school	0.467	0.447	0.02	(0.002)***	0.089	(0.002)***

Table 3: Private Tuitions and Standardized Aggregate Score (Math+Reading)

	No controls	Adding Child, household and village controls	Col.(2) + State FE	Col. (2)+District FE	Child & Household Controls + Village FE	Child Controls +HH FE
	1	2	3	4	5	6
Whether child attends tuition	0.359	0.147	0.133	0.146	0.15	0.138
	(0.004)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.010)***
Grade in which the child is studying		0.168	0.174	0.172	0.168	0.138
		(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.002)***
Age of the child		0.077	0.072	0.075	0.079	0.118
		(0.001)***	(0.001)***	(0.001)***	(0.001)***	(0.002)***
School type (1 = government school)		-0.128	-0.177	-0.187	-0.199	-0.134
		(0.003)***	(0.003)***	(0.003)***	(0.005)***	(0.007)***
Gender of the child (1 = female)		-0.039	-0.036	-0.033	-0.028	-0.034
		(0.003)***	(0.003)***	(0.003)***	(0.002)***	(0.003)***
Grade up to which mother studied		0.018	0.014	0.014	0.012	0.005
		(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.002)**
Grade up to which father studied		0.011	0.013	0.013	0.012	0.004
		(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.002)**
Mother's age		0.002	0.002	0.001	0	-0.001
		(0.000)***	(0.000)***	(0.000)**	(0)	(0.002)
Father's age		-0.002	-0.002	-0.001	0	0.001
		(0.000)***	(0.000)***	(0.000)***	(0)	(0.001)
Constant	-0.046	-1.757	-1.686	-1.664	-1.647	-1.751

	(0.002)***	(0.012)***	(0.012)***	(0.012)***	(0.013)***	(0.056)***
N	342477	245138	245138	245138	266056	281970
R-squared	0.02	0.49	0.48	0.49	0.51	0.57
Child Controls	N	**Y**	**Y**	**Y**	**Y**	**Y**
Household Controls	N	**Y**	**Y**	**Y**	**Y**	N
Village Controls	N	**Y**	**Y**	**Y**	N	N
State FE	N	N	**Y**	N	N	N
District FE	N	N	N	**Y**	N	N
Village FE	N	N	N	N	**Y**	N
Household FE	N	N	N	N	N	**Y**

Note: All columns are estimated using OLS; robust standard errors in parentheses (clustered at village level);

Dependent variable: Standardized score (Math + Reading);

Independent variables: **Child control variables** include whether the child attends private tuition; class in which the child is studying at present; age of the child; sex of the child; type of school attended by the child (government or private); age and education of the child's parents; **Household control variables** include type of housing; electricity connection; availability of toilets; ownership of TV and mobile phone; whether gets newspapers or other reading material; knowledge of using computers; **Village control variables** include whether village has paved road; electricity connection; post office; telephone connection; bank branch; public or private health facility; government or private school;

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Private Tuitions and Standardized Score in Math & Reading

	Standardized Math Score		**Standardized Language Score**	
	Child & Household Controls + Village FE	Child Controls +HH FE	Child & Household Controls + Village FE	Child Controls +HH FE
	(1a)	(1b)	(2a)	(2b)
Whether child attends tuition	0.164	0.16	0.127	0.11
	(0.005)***	(0.010)***	(0.005)***	(0.010)***
N	266,421	282,363	267,749	283,827
R-squared	0.47	0.52	0.46	0.5
Child Controls	**Y**	**Y**	**Y**	**Y**
Household Controls	**Y**	N	**Y**	N
Village Controls	N	N	N	N
State FE	N	N	N	N
District FE	N	N	N	N
Village FE	**Y**	N	**Y**	N
Household FE	N	**Y**	N	**Y**

Note: All columns are estimated using OLS; robust standard Errors in parentheses (clustered at village level);

Dependent variable: Standardized score in Math (col. 1a & 1b); Standardized score in Language (col. 2a & 2b);

Independent variables: **Child control variables** include whether the child attends private tuition; grade in which the child is studying at present; age of the child; sex of the child; type of school attended by the child (government or private); age and education of the child's parents; **Household control variables** include type of housing; electricity connection; availability of toilets; ownership of TV and mobile phone; whether gets newspapers or other reading material; knowledge of using computers;

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Private Tuitions and Standardized Aggregate Score (Math+Reading) for students aged 6-10 years

	Age group 6-10 years	
	Child & Household Controls + Village FE	Child Controls +HH FE
	(1)	(2)
Whether child attends tuition	0.186	0.236
	(0.007)***	(0.020)***
N	147,272	147,272
R-squared	0.44	0.6
Child Controls	**Y**	**Y**
Household Controls	**Y**	N
Village Controls	N	N
State FE	N	N
District FE	N	N
Village FE	**Y**	N
Household FE	N	**Y**

Note: All columns are estimated using OLS; robust standard Errors in parentheses (clustered at village level);

Dependent variable: Standardized score in Math (col. 1a & 1b); Standardized score in Language (col. 2a & 2b)

Independent variables: **Child control variables** include whether the child attends private tuition; grade in which the child is studying at present; age of the child; sex of the child; type of school attended by the child (government or private); age and education of the child's parents; **Household control variables** include type of housing; electricity connection; availability of toilets; ownership of TV and mobile phone; whether gets newspapers or other reading material; knowledge of using computers;

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Private Tuitions and Standardized Aggregate Score (Math+Reading) for state-specific Samples

	Bihar		**West Bengal**		**Orissa**		**Bihar+West Bengal+Orissa**	
	Child & Household Controls + Village FE	Child Controls +HH FE	Child & Household Controls + Village FE	Child Controls +HH FE	Child & Household Controls + Village FE	Child Controls +HH FE	Child & Household Controls + Village FE	Child Controls +HH FE
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)	(4a)	(4b)
Whether child attends tuition	0.177	0.223	0.185	0.216	0.237	0.182	0.198	0.228
	(0.012)***	(0.022)***	(0.026)***	(0.055)***	(0.020)***	(0.053)***	(0.010)***	(0.019)***
N	25,158	27,311	6,038	6,411	9,888	10,286	41,084	44,008
R-squared	0.53	0.58	0.47	0.53	0.51	0.59	0.51	0.57
Child Controls	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Household Controls	**Y**	N	**Y**	N	**Y**	N	**Y**	N
Village Controls	N	N	N	N	N	N	N	N
State FE	N	N	N	N	N	N	N	N
District FE	N	N	N	N	N	N	N	N
Village FE	**Y**	N	**Y**	N	**Y**	N	**Y**	N
Household FE	N	**Y**	N	**Y**	N	**Y**	N	**Y**

Note: All columns are estimated using OLS; Standard Errors in parentheses (clustered at village level); * significant at 10%; ** significant at 5%; *** significant at 1%

Dependent variable: Standardized score (Math + Reading);

Independent variables: **Child control variables** include whether the child attends private tuition; grade in which the child is studying at present; age of the child; sex of the child; type of school attended by the child (government or private); age and education of the child's parents; **Household control variables** include type of housing; electricity connection; availability of toilets; ownership of TV and mobile phone; whether gets newspapers or other reading material; knowledge of using computers;

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7 A: Private Tuition and Learning Outcomes: Interaction Effects

	School Type		House Type		Gender of Child
	(1)		(2)		(3)
Whether child attends tuition	0.063	**Whether child attends tuition**	0.119	**Whether child attends tuition**	0.137
	(0.013)***		(0.006)***		(0.010)***
School type (1 = government school)	-0.153	House Type (=1 if non-pucca)	-0.047	Gender of the child (1 = female)	-0.035
	(0.008)***		(0.004)***		(0.003)***
Private Tuition * School Type	0.117	**Private Tuition * House Type**	0.054	**Private Tuition * Gender**	0.002
	(0.015)***		(0.008)***		-0.008
Observations	281970	Observations	266056	Observations	281970
R-squared	0.57	R-squared	0.51	R-squared	0.57
Child Controls	**Y**	Child Controls	**Y**	Child Controls	**Y**
Household Controls	N	Household Controls	**Y**	Household Controls	N
Village Controls	N	Village Controls	N	Village Controls	N
State FE	N	State FE	N	State FE	N
District FE	N	District FE	N	District FE	N
Village FE	N	Village FE	**Y**	Village FE	N
Household FE	**Y**	Household FE	N	Household FE	**Y**

Table 7 B: Private Tuition and Learning Outcomes: Interaction Effects

	Mother's Schooling		**Father's Schooling**
Whether child attends tuition	0.222	**Whether child attends tuition**	0.245
	(0.015)***		(0.020)***
Mother's Schooling		***Father's Schooling***	
Category 1 (Grades 1-5)	-0.017	Category 1 (Grades 1-5)	0.007
	-0.027		-0.029
Category 2 (Grades 6-8)	0.023	Category 2 (Grades 6-8)	0.025
	-0.026		-0.027
Category 3 (Grades 9-12)	0.086	Category 3 (Grades 9-12)	0.061
	(0.029)***		(0.027)**
Category 4 (Above 12)	0.153	Category 4 (Above 12)	0.092
	(0.055)***		(0.035)***
Private Tuition * Category 1	-0.054	**Private Tuition * Category 1**	-0.056
	(0.026)**		(0.029)*
Private Tuition * Category 2	-0.147	**Private Tuition * Category 2**	-0.096
	(0.024)***		(0.027)***
Private Tuition * Category 3	-0.215	**Private Tuition * Category 3**	-0.169
	(0.022)***		(0.024)***
Private Tuition * Category 4	-0.242	**Private Tuition * Category 4**	-0.193
	(0.058)***		(0.034)***
Observations	281970	Observations	281970
R-squared	0.57	R-squared	0.57
Child Controls	**Y**	Child Controls	**Y**
Household Controls	N	Household Controls	N
Village Controls	N	Village Controls	N

State FE	N	State FE	N
District FE	N	District FE	N
Village FE	N	Village FE	N
Household FE	**Y**	Household FE	**Y**