Do Parents Spread Educational Expenditure Evenly across the Two Genders?

Evidence from Two North Indian States

This paper tries to examine the gender gap in educational expenditure in two states of north India using the data on education from the Living-Standard Measurement Survey (1997). Our results show that parents exhibit a gender bias while educating their children. Using controls for caste, religion and the level of development in the community, the paper finds that the size and extent of this gap differ across the age groups of children. The results, in general, are found to be more robust when information is used at the individual level rather than at the household level.

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According to the human development report published by the National Council of Applied Economic Research in 1999, gender differences in schooling outcomes are very common to India. The ever-enrolment rate (defined as the proportion of children aged 6-14 years that was ever enrolled in school, at any level, at the time of survey) was only 64.8 per cent for female children as compared to 77.2 per cent for male children. The discontinuation rate (defined as the percentage of ever-enrolled children who discontinued studies at any time in the age-group of 6-14 years) stood at 7.6 per cent for female children as compared to 4.8 per cent for male children. The gender gap in literacy, as per the 2001 Census, ranges from 24.6 per cent in rural India to 13.4 per cent in urban India. There are, however, substantial interstate disparities. In the northern part of India, for instance, figures for literacy vary from 27.7 per cent in rural Bihar to 17.5 per cent in urban Bihar whereas the corresponding figures for Uttar Pradesh are 30.3 per cent for the rural areas and 16.1 per cent for the urban areas. For southern states of India like Kerala, the gap between the rural and the urban regions is less stark, standing at 6.7 per cent for the rural areas and 5.2 per cent for the urban areas. The states of Bihar and Uttar Pradesh present an interesting case for exploring the gender dimension in the problem of low levels of educational attainment. As per the National Human Development Report 2002, among the various states of the Indian union, these two states had to cope with not only the lowest levels of enrolment rates in the age group 6-14 but also the highest levels of dropout rates.

Does the bias against the enrolment of the female children, as revealed in the previous paragraph, carry over to the decision of how much to expend on their schooling, if at all any? At the societal level, the expenditure on education comes from two sources: institutional, that can include the expenditure of the state on education and private, which may consist of the household's own expenditure on education [Tilak 2003]. The role of neither of these two components can be overemphasised, as they must complement each other to ensure the adequacy and the equity in education. The government of India, on its part, is trying to establish a primary school in every village in India. But, despite this, many parents are averse to enlisting children and girls, in particular, to any kind of school. On the other hand, the poor quality of the educational services or the absence of the school within the habitat turns away many parents from school even if they nurture the desire to impart schooling to their children. The end outcome is that the poor are left out of the schooling system and only the rich have access to any educational services.

It is a well known fact that parents in rural India are reluctant to split household resources on education equally across male and female children. The question of interest, however, is whether this reluctance is significantly large so as to result in a substantial gap in the resources available for the schooling of the male and female children. The purpose of this paper is threefold: to test for both the existence of a gender bias in the household expenditure on education as well as to determine whether the discrimination is more prominent/likely in certain age groups and less prominent in others. Secondly, we also determine whether this discrimination is more likely at the stage of enrolment and less severe for children that are already enrolled or whether it is a phenomenon that continues to be a significant problem even after conditioning on enrolment. Thirdly, we exploit the rich survey data to estimate an expenditure function at the individual level to test for the existence of any gender bias that may not have been detected at the household level equations.

Our estimates of the individual level expenditure function not only confirm the presence of a gender gap in educational expenditure but also suggest that this gap becomes more important with a rise in the age of the child. The gap is particularly prominent during making the decision to incur no or zero expenditure vs. the decision to incur at least some expenditure. The expenditure wedge is less prominent for those households where parents are already incurring some expenditure on both the girls as well as the boys. There can be no claims contested as to the superiority of the individual regressions in detecting gender bias, but it is interesting to note that even our household-level regressions

although not reported, present a picture that mimics the results of the individual level regressions very closely. The paper is organised as follows: Section I briefly describes the existing literature; the empirical methodology is introduced in Section II; Section III reports the data along with the descriptive statistics; the empirical results are presented in Section IV while Section V concludes.

I
Literature Review

Studies like Das Gupta (1987), Bardhan (1974) have documented clear evidence of discrimination against females in India (although the explanations put forward by the two authors are quite different)[1] and yet the empirical evidence on the fact that within the intra-household allocations, a lower level of resources is directed towards the females vis-à-vis the males has been far from satisfactory. The question at hand, however, has important policy implications. If females are indeed allotted fewer resources within the family unit, then such schemes as the mid-day meal programme, etc, assume special significance [Subramaniam 1995]. The problem of detecting discrimination at the household level comes from two kinds of limitations: a lack of data on consumption at the individual level, and the fact that the lower allocations of one good to the girls relative to the boys may be offset by higher allocations of other goods. Deaton (1989) proposes a very useful technique for detecting gender bias at the household level.[2] Deaton applies this technique to test for gender discrimination in Thailand and Cote d' Ivoire. He fails to find any evidence of a significant level of gender bias in Cote d' Ivoire; Thailand, however, evinces some gender discrimination but the levels of significance are "not impressive". Subramaniam and Deaton (1991) test for gender gaps in the intra- household consumption patterns in Maharashtra using the outlay equivalent/adult good approach. They find that basic foodstuffs were either gender neutral or pro-female. A pro-male preference was also detected for educational and medical expenditures in the urban areas. In rural households, discrimination against the girls was confined to the young age groups. The study, however, did not find any evidence of major gaps in the allocation of resources within the household. Haddad and Reardon (1993) use the same methodology, disaggregated by agro-economical zone (rural versus urban) and income stratum, to test for gender discrimination in Burkina Faso. Their study suggests that there are no significant gaps in the intra-household allocations towards male and female children in Burkina Faso. Subramaniam (1995) applies the outlay equivalent technique for adult goods and educational and medical expenditures for rural areas of five Indian states: Andhra Pradesh, Maharashtra, Punjab, Rajasthan and Tamil Nadu. He fails to find any evidence of gender discrimination in the northern states using the adult goods approach; although Andhra Pradesh and Maharashtra document some evidence of gender discrimination in the 5-9 age groups. Andhra Pradesh and Rajasthan also depict evidence of gender discrimination in the 10-14 age groups for educational expenditure whereas Rajasthan (0-4 age group) and Punjab (0-4, 5-9 and 10-14 age group) show evidence of discrimination in medical expenditures. Kingdon (2005) finds significant gaps in the intra-household allocation of educational expenditure for 15 major states of India. The methodology is described in the following section.

II
Empirical Methodology

In order to estimate individual level educational expenditure, we modify the Deaton (1989) specification also followed by Subramaniam and Deaton (1991) and Kingdon (2005). The Engel curve approach based on household level data utilises the fact that the budget share of education is likely to change with the composition of the household. This is particularly useful if the data on individual allocation is missing. Individual level information is not a constraint in the present context as the survey data provided detailed information on the educational expenditure at the household level. Equations based on expenditure at the individual level may also be more effective in detecting any bias that may not have been detected in the household equations. The empirical counterpart to the household educational Engel curve for the individual level is given by

$$s_{ji} = \alpha + \beta(x_i / n_i) + \gamma \ln n_i + \delta Sex_{ji} + \eta z_i + \varepsilon_i$$

where s_{ji} (the dependent variable) is the total schooling expenditures on the individual children j by household i. The variables n_i, Sex_{ji}, and z_i stand for the household size, dummy variables for the gender of the child belonging to a particular age-group in household i, and z_i consists of other household and village level characteristics in the ith household. To estimate the gender-gap in individual regressions, we estimate separate regressions for each of the age categories and then look for the significance of the gender dummy in each of these categories. In our case, we model Sex_{ji}, as a binary variable taking the value of one if the jth child is a female belonging to the ith household. In our set-up, we test for the significance of the coefficient associated with the female dummy variable.

Kingdon (2005) points out to two potential problems with the OLS approach. The budget share of education may be following a lognormal instead of a normal distribution. The second potential problem is that the aggregation of bias that operates at the stage of decision of whether or not to enrol with the stage of decision of how much to expend conditional on enrolment, may wipe out the true picture. If, for instance, most of the bias exists at the stage of enrolment but conditional on enrolment, parents do not discriminate much or in fact direct a higher expenditures towards the girls in the form of their special needs like travel and clothing etc, then an aggregation of the two decisions may lead to non-detection of the gender bias even if significant biases exist. To overcome this problem, she proposes estimation of separate equations for the two decisions, a probit or logit model for the decision of whether or not to invest in education and a conditional OLS for positive educational expenditure. Alternatively, one could also estimate models that allow for the effect of these decisions to vary, for instance, Heckman's sample selection model.

III
Data, Variable Description and Descriptive Statistics

We use the 1997-98 Uttar Pradesh-Bihar, Survey of Living Conditions (LSMS) for our empirical investigation.[3] The dataset

covers a total of 2,250 households (120 villages) in rural Uttar Pradesh and Bihar. Respondents provide information on their household demographics, farming and livestock, and durable assets. It also contains information on the enrolment status of their children and the type of school attended if enrolled, and the current grade at which he/she is enrolled. The data on the cost of schooling (school fees, books, uniform, private tuition, and other schooling expenditures) is also available. The village questionnaire elicits information on anti-poverty programmes in the village, and access to facilities like health, education, road, and telecommunication.

We select all children in the age group of 5 to 19. Individual information on schooling and gender were subsequently merged with household information like wealth status, religion, caste, parental education and village level characteristics like access to facilities, and caste composition. The final dataset had 4,104 observations out of which 2,276 were from Uttar Pradesh and the rest were from Bihar.

Description of the Variables Used

Dependent variable: The dependent variable is the natural logarithm of expenditure incurred on education on individual children. Table 1 describes the summary statistics of education expenditure. We also decompose this based on religion and caste. The educational expenditure in an all-female child household in Uttar Pradesh, i e, where all the children are females, is lower in all the age groups as compared to a household where there is at least one boy, although for the age group of 5-9, individual expenditures on education in all female households exceed those in the case of households with at least one boy for Bihar. This does not get altered even if we consider only Hindu households. We also observe that this difference gets larger for higher age groups. Considering only the household belonging to the scheduled caste/tribe, we infer that they spend less on education expenditure of their children; however, the spending pattern across the gender remains the same.

Independent variables: The independent variables included in the set of household-level regressions are the log of per capita total expenditure and its square (total expenditure of household consists of both food as well as non-food consumption, expenditure on education, and expenditure on health), the log of household size, and the child demographic variables captured by a gender dummy. Parental preferences need not always be aligned; for example, mothers may be more compassionate towards daughters as fathers towards sons. Lillard and Willis (1994) show that in Malaysia, the mother's education has a far larger effect on the daughters' education than on the sons' whereas the reverse holds true for the father's education. Kambhampati and Pal (2001) and Pal (2004) argue that each parent's education may be taken as an indicator of his/her individual preference, and suggest that it is the higher level of literacy amongst women that encourages female education in rural Bengal. Keeping this in mind we introduce a variable that is an index of the level of education attained by the mother and the father. These indices, therefore, serve as a proxy for the parental motivation of educating the children.[4] In the context of intra-household allocation of resources, the existence of a complex inter-relation between the household resource constraints and the parental preferences cannot also be ruled out. Quisumbing (1993) documents that families that differ with respect to their land constraints also have significantly different patterns of schooling investments and this results in an inequality among the siblings. In order to capture this aspect, we also include the occupational dummies: we consider three dichotomous variables to control for the occupational structure of the household: casual labour, salaried employment, and the business class. The base category is "own farm activities" (sample size 1987) that comprises 48.57 per cent and "others" (sample size 130) that comprise 4 per cent of the total sample. Given the nature of the job, each of these categories can have different implications for the indirect costs of schooling. The casual labour class as opposed to the salaried group, for instance, may be less willing to send their children to school when the demand for the labour of their children is high.

We also include dummy variables to control for the religion of the household (1 if Hindu, 0 otherwise) and the caste of the household; either scheduled castes and scheduled tribes (SCST) or other backward castes (OBC) is included to investigate whether certain schools are preferred or avoided based on extra-quality considerations.[5] The level of village development is captured via dichotomous variables for the presence of electricity (1 if present, otherwise 0) and all weather roads in the village (1 if present, otherwise 0). Dreze and Kingdon (2001) have also considered the presence of electricity and all weather roads in the construction of their index for village development.

Finally, we would like to focus on our last variable: the index of caste homogeneity. It is an important indicator of the presence of diversity in interests or of cultural heterogeneity. Cultural heterogeneity is an important factor that gives rise to demand

Table 1: Average Expenditure on Individual Children by Household Type

	Child Age		
	5-9	10-14	15-19
All households			
Uttar Pradesh			
Household only with female child	160.521	332.726	121.390
Household only with male child	185.777	493.428	493.71
Households with both male and female children	167.783	442.905	468.534
Bihar			
Household only with female child	232.819	293.595	97.272
Household only with male child	246.610	412.190	619.816
Households with both male and female children	197.439	347.521	345.505
Hindu households			
Uttar Pradesh			
Household only with female child	160.429	333.779	121.390
Household only with male child	190.892	508.290	493.710
Households with both male and female children	192.740	448.315	475.451
Bihar			
Household only with female child	224.508	315.127	104.902
Household only with male child	247.918	446.482	674.050
Households with both male and female children	171.886	369.753	365.651
Scheduled caste/tribe households			
Uttar Pradesh			
Household only with female child	87.793	154.370	43.714
Household only with male child	116.977	314.000	267.829
Households with both male and female children	120.069	288.821	250.803
Bihar			
Household only with female child	43.742	62.188	96.833
Household only with male child	120.784	198.132	385.750
Households with both male and female children	66.752	129.324	118.615

for private schools [James 1993]. Caste homogeneity also has implications for coordination among the people to press for the provision of public goods and, in particular, to a public school [Dostie and Jayaraman 2003]. However, too much homogeneity may not be good because neighbourhood effects tend to be reinforced. Thus, if households that belong to a particular caste/tribe have a history of ignoring the education of the females, then such practices are likely to be reinforced in the presence of very low levels of caste heterogeneity, i e, the presence of a large number of households who think identically makes it more likely that such regressive practices will be continued in future. The index of caste homogeneity has been constructed in line with the ethno-linguistic fractionalisation index proposed in Paulo (1991). However, since it is a measure of caste homogeneity rather than heterogeneity, it is given by 1-(Ethno-linguistic Fractionalisation Index) = $\sum_i \frac{n_i^2}{N^2}$, where N is the total population and n_i is the population of the ith ethnic group. We have also introduced a district dummy in order to control for district-specific unobserved heterogeneity. We estimate separate equations for Uttar Pradesh and Bihar: the choice being reflected by a likelihood-ratio statistics comprising of a pooling versus a separate regression.[6]

Table 2: Determinants of Household Expenditure on Education (Age 5-9)

	Sample Selection Model			
	Uttar Pradesh		Bihar	
	Coefficient	p-Value	Coefficient	p-Value
Log of per capita total expenditure	-2.191	0.291	-5.262	0.074
Square of log of per capita total expenditure	0.145	0.238	0.327	0.062
Log of household size	0.178	0.056	-0.228	0.189
Casual labour	-0.027	0.780	0.003	0.983
Salaried class	0.546	0.000	-0.053	0.782
Business class	0.302	0.009	0.189	0.200
Father's education	-0.441	0.021	-0.431	0.250
Mother's education	1.333	0.000	-0.197	0.640
Hindu household	-0.408	0.016	0.121	0.581
Scheduled caste/tribe household	-0.262	0.029	-0.122	0.529
Other backward caste household	-0.018	0.857	-0.069	0.632
Female child dummy	0.045	0.508	0.170	0.114
Electricity in village	0.017	0.862	0.245	0.033
All weather roads	-0.121	0.493	-0.280	0.166
Index of caste Homogeneity in the village	0.091	0.715	-0.101	0.782
District dummy	Yes	Yes	Yes	Yes
N	763		658	
Censored N	259		332	
p-Value for Wald Test of Independent Equations (H_0: $\rho = 0$)	0.006		0.000	

Note: The dependent variable is the natural logarithm of share of spending on education. Robust p values are reported in parentheses (after adjusting for clustering at the household level).

Table 3: Determinants of Household Expenditure on Education (Age 10-14)

	Sample Selection Model			
	Uttar Pradesh		Bihar	
	Coefficient	p-Value	Coefficient	p-Value
Log of per capita total expenditure	-3.173	0.235	6.835	0.010
Square of log of per capita total expenditure	0.224	0.161	-0.370	0.017
Log of household size	-0.085	0.462	-0.132	0.353
Casual labor	-0.144	0.189	-0.098	0.524
Salaried class	0.207	0.083	0.108	0.452
Business class	0.108	0.505	0.048	0.714
Father's education	0.651	0.001	0.095	0.806
Mother's education	1.121	0.000	0.078	0.855
Hindu household	-0.243	0.074	0.401	0.094
Scheduled caste/tribe household	-0.133	0.304	-0.416	0.010
Other backward caste household	-0.098	0.357	-0.015	0.901
Female child dummy	-0.472	0.000	0.071	0.680
Electricity in village	0.059	0.540	0.058	0.620
All weather roads	0.206	0.275	-0.132	0.499
Index of caste Homogeneity in the village	-0.559	0.008	0.493	0.211
District dummy	Yes	Yes	Yes	Yes
N	787		594	
Censored N	209		240	
p-Value for Wald Test of Independent Equations (H_0: $\rho = 0$)	0.051		0.052	

Note: The dependent variable is the natural logarithm of share of spending on education. Robust p values are reported in parentheses (after adjusting for clustering at the household level).

IV
Empirical Results

At the individual child level, we estimated 24 separate equations (2 states × 3 age groups × 4 equations). We do not report estimation from all 24 equations. We report in details the result from the sample selection model in Tables 2, 3 and 4. In Table 5, we summarise our findings in terms of significance of the gender dummy variable. For an expository purpose, we show in Figures 1 and 2 that educational expenditures are better captured using a log normal distribution rather than a normal distribution. We split our discussion into parts. In first part, we discuss the results on the existence of gender discrimination in educational expenditure and in the second, we look at how some other regressors, the village development indicators and the caste variables, in particular, influence the decisions relating to educational expenditure.

Gender-Bias in Educational Expenditure

Table 2 corresponds to the individual-level regressions in Uttar Pradesh and Bihar respectively for the age-group 5-9 for the sample selection model[7] whereas in Table 3 and in Table 4 for the age-group 10-14 and 15-19 respectively. Table 2 suggests that the coefficient associated with the female dummy is not significant for both states. Hence there exists no gender-bias for the 5-9 years of age-group. For the 10-14 and the 15-19 age-groups, however, the bias seems to be effective for Uttar Pradesh and for the 15-19 age-group in case of Bihar. But, does the significance of the gender variable remain the same across different estimation? The answer to this question lies in Table 5 where we look at the significance of the coefficient for each of the female dummy across different models.

Let us first look at unconditional OLS.[8] Interestingly, in Uttar Pradesh the effect is significant but not in case of Bihar in the 5-9 age-group. However, the effect is present for the other two age-groups. Since unconditional OLS may give misleading results due to the inter-mingling of the bias at the two levels, it is also important to look at other methodologies. The probit estimations[9] reveal that the first level discrimination is important for all the three age-categories in both Uttar Pradesh and Bihar – a result quite different from that of unconditional OLS. The conditional OLS[10] reflects the presence of significant negative coefficient associated with female dummy

Figure 1: Proportion of Educational Expenditure in Uttar Pradesh

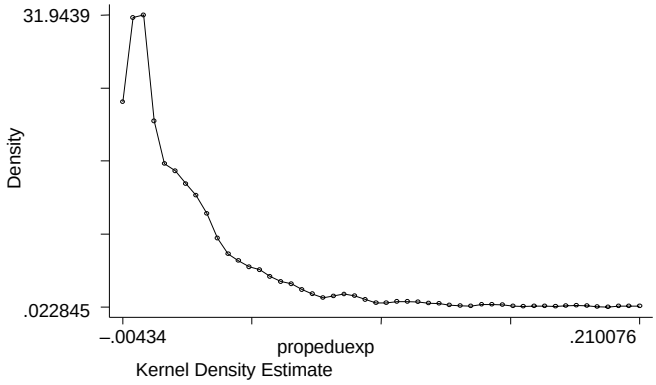
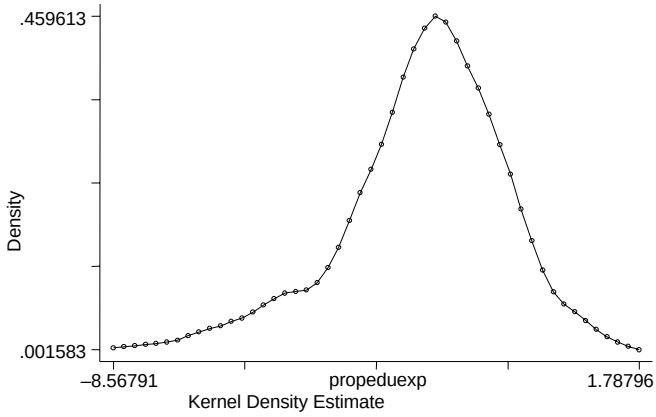


Figure 2: Log of Proportion of Educational Expenditure in Uttar Pradesh



only in 15-19 age-group for Uttar Pradesh and in the 10-14 age-group for Bihar.

How do these results compare with those at the household level? The result is reported in Table 6. Here we replace the female dummy variable by the size of the jth age-gender class, namely, the proportion of female and male children in the age groups 5-9, 10-14 and 15-19.[11] The basic idea behind detecting a gender bias through the estimation of this equation is the following: the budget share of a child good like education is likely to rise with the addition of an additional child in the household. If this increase is higher for the boys as compared to the girls then it implies that parents allocate the scare resources more favourably towards the boys than the girls do. The test for the gender bias in the intra-household allocation of educational expenditure in an OLS framework thus boils down to the test for the equality of male and female coefficients for the corresponding age group. For the other specifications, a difference in the coefficients is a sufficient (not necessary) condition for a difference in the marginal effects. We, therefore, report this as a proxy for a difference in marginal effects.

Interestingly, in both Uttar Pradesh and Bihar, the discrimination in any form seems to be absent in the 5-9 age-group for three models: unconditional OLS, conditional OLS and the Heckman. The probit estimations reveal that the first level discrimination is important for all the three age-categories in Uttar Pradesh and for the 5-9 and 10-14 age groups in Bihar. Conditional on positive spending, the bias is important in the 10-14 age group in Uttar Pradesh (the Heckman regression says that the bias is operational even in the 5-9 age group) but there is no evidence of gender bias in Bihar . Our results also validate the usefulness of using data at the individual level for the 15-19 age group, where household regressions fail to detect bias in either of the two states but the individual regressions are able to capture it.

Background of the Household and Village Development

The variables relating to the ethnic group with which the household identifies itself, the caste composition of the village and the indices of village development have their own importance in determining the size and the composition (the distribution of

Table 4: Determinants of Household Expenditure on Education (Age 15-19)

	Sample Selection Model			
	Uttar Pradesh		Bihar	
	Coefficient	p-Value	Coefficient	p-Value
Log of per capita total expenditure	-6.441	0.065	5.893	0.000
Square of log of per capita total expenditure	0.402	0.044	-0.301	0.000
Log of household size	0.120	0.243	0.640	0.103
Casual labour	-0.357	0.043	-0.930	0.011
Salaried class	0.170	0.204	-0.027	0.921
Business class	0.319	0.014	0.047	0.863
Father's education	0.637	0.018	0.289	0.614
Mother's education	0.532	0.070	2.097	0.015
Hindu household	-0.015	0.931	0.268	0.677
Scheduled caste/tribe household	-0.078	0.644	0.153	0.701
Other backward caste household	0.028	0.809	-0.045	0.889
Female child dummy	-0.318	0.063	-0.753	0.006
Electricity in village	-0.042	0.743	0.168	0.458
All weather roads	0.546	0.032	-0.873	0.157
Index of caste Homogeneity in the village	-0.435	0.221	-0.520	0.558
District dummy	Yes	Yes	Yes	Yes
N	459		350	
Censored N	270		235	
p-Value for Wald Test of Independent Equations (H_0: $\rho = 0$)	0.346		0.000	

Note: The dependent variable is the natural logarithm of share of spending on education. Robust p values are reported in parentheses (after adjusting for clustering at the household level).

Table 5: Coefficients of the Female Dummy at Individual Level Regressions

Variable	Unconditional OLS Model	Conditional OLS Model	Probit Model	Heckman Model
Uttar Pradesh				
Coefficient on female child of age between 5 and 9 years	-42.751	-0.033	-0.128	0.045
	(0.020)	(0.583)	(0.000)	(0.473)
Coefficient on female child of age between 10 and 14 years	-266.104	-0.168	-0.271	-0.472
	(0.000)	(0.173)	(0.000)	(0.000)
Coefficient on female child of age between 15 and 19 years	-368.798	-0.333	-0.310	-0.318
	(0.000)	(0.000)	(0.000)	(0.063)
Bihar				
Coefficient on female child of age between 5 and 9 years	-17.388	-0.059	-0.198	0.170
	(0.642)	(0.4814)	(0.000)	(0.114)
Coefficient on female child of age between 10 and 14 years	-209.504	-0.207	-0.390	0.070
	(0.000)	(0.026)	(0.000)	(0.680)
Coefficient on female child of age between 15 and 19 years	-329.421	-0.248	-0.158	-0.753
	(0.004)	(0.105)	(0.009)	(0.006)

Note: The figures reported in the parenthesis are the p-values (corrected for clustering at the household level) using a Chi-Square test.

the expenditure among the sexes) of the household's choice of educational expenditure. The occupational pattern of the household and the schooling level of the parents are also likely to be important in this context. We, therefore, explore the impact of these variables on the proportion of educational expenditure of the household (i e, the household level regressions). Since these may vary widely across states, we compare the results for the two states.

Religion and caste: In Uttar Pradesh, the budget share of education is higher amongst the Hindus vis-à-vis the Muslims. But conditional on enrolment, there is a clear evidence of allotting a lower importance to education in the household budget among the Hindus. In Bihar, the scenario is quite different. Conditional on enrolment, the Hindus seem to allocate more vis-à-vis the Muslims. The coefficients associated with SC/ST and OBC households are negative in general. This may be ascribed primarily to the socio-economic disadvantages that these households are subjected to.

Occupational dummies: Given everything else, we expect that the casual labour and the business class households have a higher likelihood of not enrolling children due to the potential child labour earnings. In both Uttar Pradesh as well as in Bihar, we get the expected results in most cases. However, the effect is insignificant in most cases.

Education of the parents: The education of the parents especially that of mothers has a favourable impact on the educational expenditure in each of the states in most cases. Parental education captures the taste for education, and hence we can say that the taste for education is higher among the better-educated households.

Development of the village: In Uttar Pradesh as opposed to Bihar, a higher level of caste homogeneity at the village level, results in a lower level of expenditure being directed to education in the age-group 10-14. This seems to be driven by the strengthening of the anti-female bias in education in a society that already has a taste for promoting the education of the male children vis-à-vis the female children. However, the other infrastructure variable is in general insignificant.

Table 6: Differences in the Female-Male Coefficients at Household Level Regressions

Variable	Unconditional OLS Model	Conditional OLS Model	Probit Model	Heckman Model
Uttar Pradesh				
Difference in coefficients of female and male child of age between 5 and 9 years	0.005 (0.717)	0.366 (0.303)	-2.287 (0.019)	0.694 (0.080)
Difference in coefficients of female and male child of age between 10 and 14 years	-0.070 (0.000)	-1.295 (0.000)	-2.539 (0.010)	-0.832 (0.029)
Difference in coefficients of female and male child of age between 15 and 19 years	-0.046 (0.057)	-0.811 (0.160)	-3.712 (0.001)	-0.306 (0.604)
Bihar				
Difference in coefficients of female and male child of age between 5 and 9 years	-0.016 (0.170)	-0.433 (0.414)	-2.077 (0.018)	-0.470 (0.476)
Difference in coefficients of female and male child of age between 10 and 14 years	-0.061 (0.000)	-0.259 (0.583)	-1.506 (0.098)	-0.311 (0.642)
Difference in coefficients of female and male child of age between 15 and 19 years	-0.049 (0.041)	-0.976 (0.166)	-1.310 (0.246)	-1.026 (0.235)

Note: The figures reported in the parenthesis are the p-values (corrected for clustering at the household level) using a Chi-Square test.

V
Conclusion

Intra-household allocation of educational expenditure constitutes an important channel through which parental discrimination between the boy and the girl child manifests itself within the family unit. Inappropriate econometric tools may lead to a rejection of gender bias even when it exists and hence give rise to faulty policy recommendations. We use Heckman's sample selection model. We also argue that the Heckman's sample selection is also an appropriate framework in this case. Our results confirm that there are significant gaps in the educational expenditure directed at girls vis-à-vis the boys within the family unit. This discrimination may be either through choice of non-enrolment of girls or through lower expenditures on her schooling conditional on enrolment.

In view of the evidence presented in this paper and Kingdon (2005), the programmes like the Integrated Child Development Scheme (ICDS) and Mid-day Meal Programme, etc, assume special significance. These programmes can enable the government to compensate for the relatively lower allocations directed towards the females within the family unit. Special schemes like those that Female Secondary School Scholarships introduced by the government of Bangladesh, can also go a long way in ensuring equal opportunities for boys and girls. At the same time, one must acknowledge that the lower allocation of household resources towards the females has its roots in the pro-son attitude that is entrenched in our culture. Governmental interventions can play a complementary role in eradicating this norm. The result with respect to caste homogeneity in Uttar Pradesh indicates that the local governments need to play a more active role in eradicating age-old practices within some dominant communities of ignoring education of the females. Improving the access to schools through the construction of all weather roads could also go a long way in bringing children to school. A permanent and effective solution, however, can only come through a greater acceptance and acknowledgement of the important and equal role (vis-à-vis the men) of women in the society. Joint efforts by the mass media, the government and the non-governmental organisations can, however, help turn this distant dream into a reality [Das Gupta et al 2003]. EPW

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Notes

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1 While Bardhan offers an economic rationale, that of the lower valuation of female labour in wheat growing areas of north India vis-à-vis the rice cultivated areas where female labour is highly valued, that gives rise to parental discrimination between girls and boys, Das Gupta argues that such discriminatory tendencies are entrenched in the culture and economic hardships merely aggravate them rather than giving rise to them.

2 See Deaton (1989) for details.
3 The data can be downloaded from the site: http://www.worldbank.org/lsms/country/india/upbhhome.html
4 The indices for parental education are summative indices scaled down to one and capture the fact whether the parent is illiterate, literate, less than primary, primary, middle school, matriculate, or intermediate level educated, or a holder of BA, MA, professional degree, and a diploma. Thus a literate person would have a score of 1/11 and a professional degree holder 10/11 and so on.
5 The two dichotomous variables are constructed as follows: 1 if SC/ST household, 0 otherwise and 1 if OBC household, 0 otherwise respectively.
6 We did not report these set of results; however, it is available on request.
7 We report the results for the amount of expenditure conditional on spending. Hence, we allow for the decision of whether to incur any education expenditure to be modelled separately from the decision of how much to spend on education, conditional on spending.
8 In the unconditional OLS, the dependent variable is educational expenditure fitted with all children including those with zero expenditure.
9 The probit refers to the case where the dependent variable is modelled as a binary variable taking the value of one when the educational expenditure is positive.
10 In the conditional OLS, the dependent variable is natural logarithm of educational expenditure fitted only with positive expenditure.
11 The base group is children in the age groups, 0-4 and >20.

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