WORKING PAPER NO. 46

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The case of Andhra Pradesh in India based on Young Lives data

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Young Lives
An International Study of Childhood Poverty

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Contents

Abstract

This paper asks whether there is a boy bias in household-level education expenditure for households with children aged 5 to 19 years old in Andhra Pradesh in India, based on Round 2 of the Young Lives survey conducted in 2006. The sample contains 982 households comprising 2578 children. The analysis is based on both demand analysis and a hurdle model. The results show that there is a bias favouring boys in terms of school enrolment as the children get older, captured by age categories 10–14 and 15–19. There is also a bias favouring boys in household education expenditure allocation, given positive expenditure, when children are between 10 and 14 years of age, driven mainly by extra tuition fees. Quite notably, once the households have decided to educate a child beyond the upper primary level (i.e., beyond grade 8), there is no gender-based expenditure bias and an equal proportion of boys and girls are sent to private schools that provide better quality education

The Author

Rozana Himaz is an economist working for the Young Lives project. She has a PhD in Economics from the University of Cambridge (2006) and an MSc from the London School of Economics and Political Science (2001). Her research interests lie in the micro-level theoretical and empirical analysis of issues pertaining to poverty, intra-household resource allocation and child welfare and in developing countries, with a strong policy focus.

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1. Introduction

Developing countries have been a testing ground for the investigation of gender bias in the allocation of educational resources – mainly schooling expenditure – in a household (Burgess and Zhuang 2000; Rudd 1993; Kingdon 2005; Himaz 2008; Koohi-Kamali 2008). The rationale for the exercise is often found in the hypothesis that girls may be less favoured than boys (or even discriminated against) in terms of parental spending on their education. Often, macro data lend support to this contention with female schooling rates being significantly less than those for men. Previous work on differentials in the allocation of education expenditure in India that uses the National Sample Survey (NSS) data, such as Subramanian and Deaton (1991), finds evidence of a favourable boy bias in rural Maharashtra for age group 10–14. Lancaster, Maitra and Ray (2003) use similar data for ten years later and find a significant boy bias for age group 10–16 in rural Bihar and rural Maharashtra. Such biases are not found for urban areas or for primary school children aged 6 to 9. On a slightly different note, Kingdon (2005) argues that the boy-bias in education expenditure for India is driven mainly by the households' decision to enrol more boys than girls, rather than due to positive expenditure once the enrolment decision is made. She concludes that most previous studies based on household data model the enrolment and expenditure-once-enrolled decisions together, leading to failure to pick up a bias, even if national data suggests it may exist.

This paper explores this contention further by using a new rich data set for Andhra Pradesh in India. The paper asks in particular whether gender bias in education expenditure – if it exists – is seen more in particular age groups and why that may be so. It also looks at which component of education expenditure actually drives the bias, if at least a part of the bias is explained by expenditure once households decide to enrol a child.

The paper uses data from a sample of 982 households comprising 2578 children, taken from the second round of data collection in 2006 of the Young Lives survey for Andhra

Pradesh in India. Because individual level data on education expenditure are not available, the paper attempts to infer bias indirectly using the Engle curve method and a hurdle model.

The paper is organised as follows. Section 2 looks at the empirical strategy adopted. Section 3 focuses on the data and descriptive statistics, while Section 4 discusses the results. Section 5 concludes.

2. Empirical strategy

2.1. Engle framework

If individual level data were available, then we could directly compare expenditure on education for males and females. However, the data set does not have individual level data. Given its absence, intrahousehold allocational differences have to be estimated indirectly.[1] Data are available at the level of the household and therefore I try to detect gender-biases in education expenditure by investigating how the presence of individuals of similar ages but opposite sexes affects household expenditure on education. The Working-Lesser Engle form for demand analysis is used, with a linear relationship assumed between the share of the budget on each good and the log of total household expenditure. Deaton and Muellbauer (1980: 75) argue that such a relationship has the theoretical advantage of being consistent with a utility function and conforms to data 'in a wide range of circumstances'. As discussed in Deaton (1997: 231), Working's Engle curve can be extended to include household demographic composition where age groups are denoted by n_j and are broken down by gender. Separate γ_{ij} coefficients can be calculated for males and females:

$$w_i = \alpha_i + \beta_i \ln(x/n) + \eta_i \ln n + \sum_{j=1}^{J-1} \gamma_{ij}(n_j/n)\tau_i.\overset{f}{z} + u_i \qquad (1)$$

where w_i is the share of the household budget devoted to the i^{th} good (education expenditure in this paper) calculated as $p_i\, q_i\,/X$ with p_i and q_i denoting the price and quantity of good i (education) and x is total expenditure per household, n is household size, n_j is the number of people in age-sex class j (there are J such classes in total).[2]

The age categories adopted for children are important because each leads up to an important national exam that qualifies a student to enter the next stage and even make the choice of entering an institution that has a reputation for a better performance than the one which he or she leaves. The vector z contains other socioeconomic variables such as the education of the household head, ethnic group, location (district) dummies. Finally, u_i is the error-term for good i (education). The coefficient β determines whether the good is a luxury or a necessity. If $\beta > 0$ then the good is a luxury with the budget share increasing with total outlay making the total expenditure elasticity greater than 1. The good is a necessity if $\beta < 0$ with an expenditure elasticity less than 1. Gender bias in the allocation of good i can be detected through a straightforward F-test checking whether the coefficients $\gamma_{ij} = \gamma_{ik}$ where j and k reflect boys and girls in the same age group.

1 Note that the survey asks each household how much they spend on various categories of education expenditure, such as uniforms and tuition fees, for all boys and all girls in the household separately. This information is useful for generating descriptive statistics, but is not usable directly in the estimation procedures outlined below. Moreover for some categories – such as books – on which the households spend the bulk of the education budget, expenditure information is collected only at the household level. I therefore have to rely on household-level information alone.

2 The potential endogeneity of household expenditure per capita is checked for with the use of the instrumental variable approach. I use unearned income and its square as instruments. Unearned income comprises interest from savings and rents from property or other assets. Roughly 22 per cent of the rural households report some form of positive unearned income. The instruments are relevant with an F-test on the joint significance of the instruments in an equation predicting the potentially endogenous variable being significant at the 5 per cent level. An over-identification test asserts that the instruments are valid. However, the Hausman-Wu test performed fails to reject the endogeneity of the log of expenditure per capita and I have therefore retained this variable in the wage equation.

The model is fitted, as is conventional, on the sample of all households with a child aged 0 to 19 years, regardless of whether the households incur a zero or positive budget share of a particular expenditure.[3]

Kingdon (2005) argues that fitting one model to capture the school enrolment decision, as well as the expenditure given enrolment decision may be one of the reasons as to why the conventional Engle curve analysis may fail to pick up a gender-bias in schooling expenditure in India, as in Subramanian and Deaton (1991). She argues that a gender-bias in schooling can work through both the above channels and that averaging across them may lead to the conclusion of no gender bias if the bias works through just one channel. She therefore proposes a hurdle model that separates the households' decision of whether to incur any expenditure (i.e., enrol the child in school or not) from how much is actually spent, given that they have decided to incur expenditure (i.e., expenditure given enrolment). In her sample, zero purchases equate to the child not being sent to school, while nearly 98 per cent of those sent to school (i.e., enrolled) incur some positive expenditure. She therefore uses the terms positive expenditure and enrolment interchangeably. Kingdon finds that the basic discriminatory mechanism is via differential enrolment rates for boys and girls.

Even in our data set, 96 per cent of the households that have a child between ages 5 and 19 who is schooling, spend some positive amount on education. As such, this paper also uses a hurdle model, as explained below.

2.2. A hurdle model

A hurdle model unpacks the school enrolment decision (or the participation decision) from how much a household spends, once they have decided to enrol a child in school. Reflecting this, in the empirical analysis, I first estimate a probit model to look at gender biases in the enrolment decision and then use ordinary least squares (OLS) estimation to look at biases in education expenditure on the sample of households that incur a positive education expenditure.

The model used is:

$$P(w_i = 0 \mid a) = 1 - \Phi(a\delta) \tag{2}$$

$$\log(w_i) \mid (a, w_i > 0) \sim Normal(a\lambda, \sigma^2) \tag{3}$$

Where w_i is the budget share of education, a is a vector of explanatory variables, δ and λ are parameters to be estimated and σ is the standard deviation of w_i. Equation 2 expresses the probability that the household incurs a positive expenditure or not on schooling. This reflects the school 'participation' decision, the 'hurdle' that has to be crossed. Equation 3 states that conditional on school expenditure being positive $w_i|a$ follows a log normal distribution. This reflects the household expenditure decision given that a household has

3 Another issue to consider is whether the Engle curve is indeed linear, as assumed, or if it is non-linear, with households considering education a luxury at lower levels of income and a necessity at higher levels of income. In the regression analysis, this would be reflected by the coefficient on the log of household expenditure being positive for the lower income groups and negative for the higher income groups when the analysis accounts for household socioeconomic status. This is not the case, as seen in results discussed later: education is a luxury with an elasticity of 0.02. Even simple descriptive statistics of the budget share of education expenditure by expenditure quartile show a positive correlation. The poorest quartile spend 3 per cent of their budget on education expenditure, the second poorest 4 per cent, the near-rich 6 per cent and the richest quartile 11 per cent. This is a sign that education is a luxury with the budget share devoted towards it increasing with income (expenditure). I therefore work with the assumption that the Engle curve is linear.

decided to enrol a child in school (or alternatively, given that the household has decided to spend a positive amount on education).

To identify whether significant within-household differentials exist in the allocation of education expenditure, the coefficients on the demographic controls are compared using an F-test, as with the conventional Engle Curve analysis. The most important thing about this analysis is that since the enrolment and expenditure decisions are now estimated separately, we can unpack the effects picked up by the Engle curve analysis and see whether the bias occurs in the enrolment or expenditure decision.

3. Data and descriptive statistics

The data comes from the Young Lives survey based on children and households surveyed in 2002 and 2006 in Andhra Pradesh, India. The survey is panel in nature and this study uses the data for the 'older cohort' who were 11 to 12 years of age in 2006. Even though the focus of the survey was mainly the 'index child' who the survey aims to follow until the year 2016 in several forthcoming rounds, data were also collected for the child's siblings with vital data gathered about their (and other household members') levels of education, gender, age, schooling status, etc. Thus we have a sample of 982 households with 2487 children aged 5 to 19 years old.[4]

Note that even though the data-set itself is a panel, this paper only uses the second round data collected in 2006. This is because the second round survey asked explicitly for information on household expenditure, including education expenditure, which was not available in Round 1. So while the panel information available can be used to control for various household-specific shocks, we leave this analysis for the section on robustness checks and base the central analysis on the 2006 data.

The 982 households come from 100 communities across three regions in Andhra Pradesh: Telangana, Coastal Andhra and Rayalaseema. The sample is largely pro-poor, as the aim of the Young Lives project was to look at the causes and consequences of childhood poverty. However, a careful analysis of the distribution of child characteristics included in the sample suggests that the data covers a wide variety of children in terms of wealth, consumption, health, nutrition, education and access to education, similar to nationally representative data sets. Therefore, while not suited for simple monitoring of child outcome indicators (as the mean characteristics will be different), the Young Lives sample is an appropriate and valuable instrument for analysing correlates and causal relations, and for modelling child welfare and its dynamics in Andhra Pradesh.

The official age for starting formal schooling in India is five. However, schools may enrol children before this or after this as the official starting age is not strictly enforced. Grades 1 to 5 reflect primary school education; 6 to 8 reflect 'upper primary' education (also known as

4 In a strict sense, our results hold only for households that have at least 1 child between ages 11.5 and 12.5. However, given that the number of households in the sample is reasonably large and that the data represent households with children of all ages (particularly the 5 to 19 group that is the focus of the paper), the results are applicable beyond the specific case of households that have at least one child in the 11.5 to 12.5 age group.

junior or middle school); grades 9 to 10 reflect secondary education; and grades 11 to 12 reflect 'upper secondary' education. Key national and state-level examinations are held when a child is at secondary and upper secondary school, roughly around age 15 and above, assuming no grade retention. A child can be sent to either a public community (Non-Governmental Organisation or church aided), government or private school. Private schools are argued to provide better quality education than others.

Table 1 provide some summary statistics on child schooling. It shows that school enrolment is significantly different for age groups 5–9 and 10–14. For the younger group, difference actually favours girls. This is reversed as the children get older, with 85 per cent of girls enrolled in school compared to 89 per cent of boys. For the older age group, comprising mainly children who have by and large completed middle-school (also known as 'upper primary') and have moved on to reading for the high school exam and intermediate examinations, the enrolment rates are not significantly different for boys and girls.

Education expenditure takes up about 6.5 per cent of the monthly household expenses. Roughly 37 per cent of this goes towards school books, 26 per cent towards school fees, 24 per cent towards uniforms, 6 per cent on extra tuition and coaching fees and around 5 per cent on transport. Data are available separately for boys and girls under each of the above categories apart from transport and books. The descriptive statistics show a significant difference between boys and girls for extra tuition costs but not for any of the other categories.

More boys than girls seem to be attending private schools rather than government schools. It is generally believed that private schools provide a better education. Note, however, that this gender difference in terms of private schools attendance is not apparent as the children get older and reach higher grades: roughly 30 per cent of both boys and girls attend private school in the age 15–19 category.

Table 2 provides descriptive statistics on the variables that will be used in the Engle curve and hurdle model analysis. As noted previously, the budget share of education is 6.5 per cent. The total per capita monthly expenditure is roughly Rs. 790. In the regression analysis we use the logarithm of this value, as well as the logarithm of household size. The demographic composition of the household is broken down by gender and catagorised into age groups 0–4, 5–9, 10–14, 15–19, 20–29, 30–54 and above 55. Note that the age group 10–14 seems over represented at 30 per cent of the household composition. This is unsurprising as the survey purposively includes households with a child in this age group. The average length of education for the household head is around 4.2 years. The analysis also includes information about the caste, region and sector (rural/urban) a household belongs to.

4. Results

The key results of this paper are presented in Table 3. The Engle curve estimates provided in the first column of results indicate that there is a bias favouring boys in the age group 10–14, but does not show whether it is driven by the participation decision or the expenditure given the participation decision. This is elaborated in the hurdle model results. We notice that part of the bias is driven by households choosing to enrol boys more than girls as well as spend more on boys once they have decided to enrol the children in school. The hurdle model results also show a clear participation bias favouring boys, for age group 19. In other words, as they get older, girls are not enrolled in school as much as boys, and this is what drives lower household expenditure on girls compared to boys. Of course, once the decision to enrol a child has been made, there is no bias in the level of expenditure for boys or girls. Also, once the decision to enrol has been made, there does not seem to be a quality-based differential in enrolment either, as girls are as likely to be sent to private school as boys.

In order to find out what the key driving force for the expenditure bias in middle school is, I re-estimated the Engle curve and hurdle models for various subcategories of education expenditure. The subcategories included school fees, uniform costs, books, transport and extra tuition fees. The dependent variable in all the estimates, therefore, was the budget share of expenditure under each of the above categories, estimated one at a time. The results showed a bias for only participation and expenditure in extra tuition fees. In other words, there was no significant household-level bias for any of the other categories (even though levels were always higher for boys) in any category apart from tuition fees. Part of the reason parents may be deliberately spending more on a boy’s tuition fee may be due to the fact that the schools that boys go to are significantly worse in terms of quality than those attended by girls, and households need to back up the education with extra tuition. Interestingly, however, 98 per cent of the caregivers say the schools their children attend provide an excellent, good or ‘reasonably ok’ quality of education. It seems, then, that parents place more importance on ensuring that a boy has better quality education than they do a girl. They are also more likely to provide extra coaching for a boy than a girl, especially at age 10 to 14. It is also very likely that parents tend to invest in things other than education, such as the dowry, for girls after they have acquired some basic level of formal schooling.

In order to make certain that the results are not due to noise in the data, I leave child age in years from ages 5 to 19 (rather than in groups of 5–9, 10–14 and 15–19) and re-estimate the models. The results (unreported) show that the strongest male bias in school enrolment is indeed at age 15 to 16, while the strongest bias in education expenditure once enrolled is at ages 12 and 13.

5. Discussion

The results from the Engle curve model, which are matched very closely by the hurdle model results show that households tend to spend more on boys than on girls at around age 12 to 13, the upper primary years, driven significantly by extra tuition fees. Our sample shows no gender bias in school enrolment prior to the age of 14. Typically, a child would be in the primary or upper primary levels of education (grades 1 to 8) between ages 5 and 14. A significant bias against girls in terms of school enrolment occurs at age 15 to 18, which corresponds to secondary school education. However, once the decision to enrol a child in school between ages 15 and 18 is made, there are no biases in terms of education expenditure. Indeed, once the enrolment decision is made, the same proportion of girls and boys are sent to private school, quite in contrast to the larger proportion of boys sent to private school at a younger age. This may reflect the fact that the girls who dropped out of school are by and large from public schools. Unfortunately, the data do not allow us to see if this is indeed the case, for the full sample of children used in this paper.

However, if we focus only on the index children focussed in the survey (i.e., the children aged 11 to 12 in the households for which the survey collects detailed information but not their siblings), and estimate a probit regression on which characteristics explain dropping out of school for girls, we notice that attending a public school is statistically significant. This suggests that the fact that there is a higher proportion of girls who are in private school at the secondary school level than at primary level (30 per cent compared to 18 per cent) is at least partly due to public school children dropping out more around age 14.[5]

The analysis in the previous section shows that there are differentials in school enrolment and expenditure that are unfavourable towards girls at some age groups. Are there gender-based differentials in children's cognitive and mathematical test outcomes as well? Can these differences be a reflection of biases in education expenditure? Again, based just on the measures available for children aged 11.5 to 12.5, we notice that there is indeed a gender differential in cognitive score outcomes between boys and girls. Table 6 shows that girls perform significantly lower that boys on the Peabody Picture Vocabulary Test (PPVT) which was conducted by Young Lives to measure children's cognitive performance.[6] The PPVT is a widely-used test of receptive vocabulary. Its main objective is to measure vocabulary acquisition. The test was conducted on all children and was individually administered, untimed, norm-referenced, and orally delivered. The test taker's task was to select the picture that best

5 Children switching from public to private schools may also partly explain the higher proportion of girls attending the latter. Note, however, that in our sample 32 girls moved from public to private school and 38 from private to public school between rounds, which cancels the effect switching schools may have on a rising proportion of girls being enrolled in private school as they get older. Similar switching patterns are observed among boys between rounds, with the corresponding numbers being 48 and 29.

6 Verbal and mathematic skills and achievement were measured using tests we developed or adapted from standardised international tests, such as the Peabody Picture Vocabulary Test (PPVT). We acknowledge that bias may arise when testing children with different languages and cultures using the same instruments, although measures were taken to adapt them to local contexts and languages and in no case were original standard scores used. Bias is an especially important consideration in testing children who speak minority languages. Reliability and validity results for our test administrations and concerns are presented and discussed in Young Lives Technical Note 15. In particular, the authors of this document recommend that results should not be compared across countries, or across groups with different maternal languages within countries.

represented the meaning of a stimulus word presented orally by the examiner.[7] A Mathematics Achievement Test was also administered to assess the children's quantitative abilities.

Table 6 below presents the results. The corrected raw score measure as well as the RASCH score measure on the PPVT both show that girls performed lower than boys.[8] The differences are not so apparent in the mathematics scores.

A simple regression on the determinants of these scores with each of the scores above as the dependent variable shows that the most significant positive influences on the score are being male, budget share of expenditure, household head's education and coming from Rayalaseema or Coastal Andhra rather than Telangana. A significantly negative influence is exerted by rural residence. Caste was included but was not significant. The high significance of the budget share of education expenditure on cognitive score outcomes, together with the previous findings that there was a bias against girls particularly at age 12 to 13, hint that intrahousehold allocational differences may have an impact on cognitive outcomes.

It is likely that the differential expenditure is driven by different expectations for boys and girls, especially in terms of their education. When the children themselves are asked about what the highest grade they would like to complete is, the grade is significantly lower for girls, with only 53 per cent wanting to complete university compared to nearly 70 per cent of boys. In terms of future career ambitions, 30 per cent of the boys want to be teachers, 19 per cent doctors and 14 per cent engineers, while 48 per cent of the girls want to be teachers, 17 per cent doctors and 13 per cent full-time parents or homemakers. This closely matches the caregiver's ambitions for the child. Most caregivers of boys said they would like their children to be teachers or engineers (33 and 15 per cent respectively), while most caregivers of girls wanted them to be teachers (39 per cent) or full-time home makers (26 per cent).

Even at the young age of 11.5 to 12.5, there are obvious differences in time allocation in a typical day. While boys and girls spend roughly the same number of hours a day at school and on studying outside school hours, girls spend significantly more time on household chores and caring for younger siblings and less time on play than boys (Table 7). This bias in time allocation is somewhat indicative of differences in gender roles apparent in pre-teenage years which may influence differentials in expectations from schooling that also influence the school expenditure differentials which we noted were significantly biased towards boys around age 10 to 14.

It is likely, therefore, that what both caregivers and children expect from their education reflects household resource allocation in terms of education expenditure. It is also likely that parents invest more in education for boys and other assets for girls, especially in preparation for marriage in terms of dowry. When caregivers were asked about what they expected from

7 The PPVT was originally developed in 1959 by Dunn and Dunn. Since then, it has been updated and improved several times (PPVT-R, 1981; PPVT-III, 1997; and PPVT-IV, 2007) and checked for validity in various settings. See Cueto (2009) for more details and for how validity is checked for the Young Lives sample. Cueto (2009: 11-12) explains the test as follows: 'The items in the test are arranged in order of increasing difficulty and not all the items in the test are administered to a given child but only those within his or her *critical range*. The examiner must select the appropriate Start Item according to the child's chronological age and continue administering the test until the child reaches a ceiling, i.e., those items extremely easy or extremely hard for the child are not administered but only those within his or her *critical range*. This requires that the examiner establish correctly the Basal Item Set and Ceiling Item Set for the individual.'

8 In the Rasch model, the probability of a specified response (e.g. right/wrong answer) is modeled as a function of person and item parameters. In the simple Rasch model, the probability of a correct response is modeled as a logistic function of the difference between the person and item parameter. Person parameters refer to ability and attainment level, while the item parameter refers to the difficulty of the item.

the child, the expectations were significantly different for boys and girls. As Table 8 shows, caregivers expected girls to be financially independent sooner than boys and earn (if there were expectations about the girl earning) sooner than boys. They were also expected to leave the household, marry and have children earlier than boys. Significantly more girls' caregivers than boys' reported that they had no expectations about a girl earning or being financially independent.

Thus there is a significant gender difference in caregivers' and children's attitudes, perceptions and expectations about the future. This is no doubt reflected in differential allocation of education expenditure within the household.

6. Conclusions

This paper looked at whether there were significant gender-based differentials in the allocation of education expenditure within households in Andhra Pradesh in India. The paper used data from the Young Lives Round 2 survey for index children aged 11.5 to 12.5 years of age in 2006 and their siblings.

The paper found that there were indeed biases in expenditure towards education favouring boys at age 10 to 14 (mainly age 12 to 13) and 15 to 19. This was seen using demand analysis assuming a linear Engle curve, as well as a hurdle model that unpacks the enrolment and expenditure given enrolment decisions. The differential expenditure observed around age 10 to 14 was driven by both the enrolment decision and the expenditure after the enrolment decision. To elaborate, when girls reached the age of 10 to 14, households tend to enrol significantly fewer girls than boys in formal school and this is reflected in the outcome that less is spent on girl's schooling than boys. Exacerbating this expenditure bias is the fact that even when households decide to enrol girls in school, less is spent on them than boys. The difference is driven mainly by expenditure on extra tuition. The bias observed in age group 15–19 is driven by the participation decision and not the expenditure after the enrolment decision. In other words, adding a girl in the age group 15–19 rather than a boy reduces the household budget share of education. This is mainly because households are less likely to enrol girls of this age group in school compared to boys. However, once the child is enrolled, there is no bias in terms of how much the household decides to spend on boys versus girls. It was also noted that the proportion of girls and boys sent to private school at this age was roughly the same, whereas it was observed that more boys were sent to private schools at younger ages. Private schools are believed to provide better quality education. The rise in the proportion of girls who attend private schools at age 15 to 19 is a reflection partly of the fact that most girls who drop out are from public schools.

A brief look at the attitudes and expectations of 11- to-12-year-old children and their caregivers reveal significant differences between boys and girls. It is likely that these differences are reflected in household resource allocation in terms of education and other investments towards a child's future, such as the dowry in preparation for marriage. An in-depth modelling or discussion of how social norms and differing expectations for boys and girls are incorporated into the household resource allocation decisions is not attempted in this paper. However, it serves to establish empirically that significant resource allocation decisions in education expenditure among our pro-poor sample for Andhra Pradesh at least partly reflect social norms and differences in expectations about boys and girls.

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Appendix

Table 1: *Summary statistics on schooling*

	Boys	Girls
School enrolment (proportion of the relevant age group)		
Age 5–9	0.89	0.94*
Age 10–14	0.89	0.85*
Age 15–19	0.64	0.59
Expenditure on schooling (average rupees per month)		
Uniforms	21.70	18.58
School fees	106.28	86.14
Extra tuition costs	11.57	7.90**
Books and stationary	64.58	
transport	17.16	
Type of school		
Private	31.08	22.26**
Public community (NGO/church)	5.21	6.19
Government school	62.93	71.06
Private school attendance by age-group (proportion of the relevant age group)		
Ages 5–9	0.29	0.17*
Age 10–14	0.31	0.22*
Age 15–19	0.30	0.30

Note: This table is based on individual-level data for 5 to 19 year olds. Sample contains 2578 children across 982 households.

Table 2: *Descriptive statistics*

Variable name	Description of variable	
Educ_share	Budget share of education: household education expenditure/Total expenditure on food and non-food items X 100	6.48 (0.08)
percapEXP	Total monthly expenditure (in rupees) on food and non-food items per member of the household	790.92 (612.58)
Hsize	Household size	5.72 (2.26)
M0_4	Males aged 0 to 4 as a proportion of all household members	0.01
f0_4	Females aged 0 to 4 as a proportion of all household members	0.01
M5_9	Males aged 5 to 9 as a proportion of all household members	0.04
f5_9	Females aged 5 to 9 as a proportion of all household members	0.03
M10_14	Males aged 10 to 14 as a proportion of all household members	0.15
f10_14	Females aged 10 to 14 as a proportion of all household members	0.15
M15_19	Males aged 14 to 16 as a proportion of all household members	0.05
f15_19	Females aged 14 to 16 as a proportion of all household members	0.05
M20_29	Males aged 20 to 29 as a proportion of all household members	0.02
f20_29	Females aged 20 to 29 as a proportion of all household members	0.06
M30_54	Males aged 30 to 54 as a proportion of all household members	0.17
f30_54**	Females aged 30 to 54 as a proportion of all household members	0.17
M55	Males above age 55 as a proportion of all (excluding boarders and lodgers)	0.02
f55	Females above age 55 as a proportion of all household members (excluding boarders and lodgers)	0.03
hhead_educ	Education level (in years) of the household head	4.29
SC	Household head is from the Scheduled Caste	0.20
ST	Household head is from a Scheduled Tribe	0.09
BC	Household head is from a Backward Caste	0.49
OC*	Household head is from 'other' caste	0.22
Rural	Household is from a rural area	0.65
Telengana*	Household is in the Telangana region	0.36
Coastal Andhra	Household is in the Coastal Andhra region	0.34
Rayalaseema	Household is in the Rayalaseema region	0.30
Number of households		982

Note: ** Reference group for education Engle-curve estimations. Note also that age group 10 to 14 seems overrepresented in our sample because the Young Lives survey focussed only on households that have a child aged 11 to 12 at the time of the survey.

Table 3: *Engle curve and hurdle model estimates for education expenditure*

	Engle curve method	**Hurdle model**	
		Participation equation	***Expenditure equation***
Log per capita expenditure	0.022	0.368	0.021
	(3.97)***	(1.66)*	(3.46)***
Log household size	0.030	1.464	0.024
	(2.97)***	(4.83)***	(2.20)**
m0_4	-0.126	-1.199	-0.135
	(1.68)*	(0.56)	(1.70)*
f0_4	-0.085	-3.458	-0.054
	(0.95)	(1.89)*	(0.53)
m5_9	-0.010	2.902	-0.016
	(0.22)	(1.97)**	(0.33)
f5_9	-0.017	4.217	-0.023
	(0.36)	(3.41)***	(0.46)
m10_14	0.019	2.903	0.009
	(0.45)	(2.29)**	(0.19)
f10_14	-0.025	1.788	-0.033
	(0.59)	(1.61)	(0.73)
m15_19	0.001	-1.110	0.015
	(0.01)	(0.91)	(0.29)
f15_19	-0.004	0.393	-0.003
	(0.08)	(0.35)	(0.06)
m20_29	-0.064	-1.845	-0.052
	(1.20)	(1.56)	(0.88)
f20_29	-0.031	1.833	-0.039
	(0.99)	(2.46)**	(1.20)
m30_54	0.026	2.223	0.015
	(0.50)	(1.57)	(0.26)
m55	0.019	1.280	0.019
	(0.30)	(0.78)	(0.28)
f55	0.032	0.163	0.030
	(0.64)	(0.10)	(0.55)
HHEAD_EDUC	0.006	0.052	0.006
	(9.56)***	(2.63)***	(9.27)***
SC	-0.029	-0.260	-0.030
	(3.29)***	(0.79)	(3.30)***
ST	-0.015	-0.293	-0.015
	(1.33)	(0.76)	(1.27)
BC	-0.013	-0.572	-0.012
	(1.76)*	(2.08)**	(1.63)
Rural	0.012	-0.109	0.013
	(1.87)*	(0.53)	(2.05)**
coastal	-0.001	0.093	-0.001
	(0.22)	(0.43)	(0.19)
rayalaseema	-0.015	0.193	-0.016
	(2.27)**	(0.95)	(2.37)**
Constant	-0.139	-4.042	-0.111
	(2.62)***	(2.47)**	(1.93)*
Observations	982	982	924
F-Tests: 5-9	0.03(0.87)	0.59(0.40)	0.02(0.89)
10-14	4.48(0.03)**	2.67(0.10)*	3.54(0.06)*
15-19	0.01(0.90)	3.14(0.07)*	0.19(0.66)

Absolute value of t statistics in parentheses. * significant at 5%; ** significant at 1%.

Table 4: *Engle curve and Hurdle model estimates for extra tuition expenditure*

	Engle curve method	**Hurdle model**	
		Participation equation	***Expenditure equation***
percapEXP	-0.001	0.113	-0.019
	(0.85)	(3.96)**	(6.44)**
HHSIZE2	0.002	0.014	0.005
	(1.23)	(0.27)	(1.02)
m0_4	-0.003	0.406	-0.022
	(0.25)	(1.06)	(0.62)
f0_4	-0.022	-1.083	-0.148
	(1.57)	(1.67)	(1.70)
m5_9	-0.005	0.028	-0.005
	(0.75)	(0.12)	(0.20)
f5_9	-0.005	0.134	-0.027
	(0.62)	(0.55)	(1.17)
m10_14	0.004	0.063	0.018
	(0.60)	(0.29)	(0.86)
f10_14	-0.004	-0.154	-0.005
	(0.62)	(0.71)	(0.26)
m15_19	0.002	0.115	0.001
	(0.21)	(0.48)	(0.07)
f15_19	-0.005	-0.052	-0.012
	(0.68)	(0.23)	(0.52)
m20_29	0.005	0.218	0.012
	(0.55)	(0.76)	(0.43)
f20_29	-0.004	0.081	-0.013
	(0.88)	(0.53)	(0.89)
m30_54	0.009	0.468	0.012
	(1.13)	(1.70)	(0.42)
m55	-0.007	-0.233	-0.021
	(0.65)	(0.69)	(0.63)
f55	0.002	0.387	-0.017
	(0.30)	(1.55)	(0.71)
HHEAD_EDUC	0.000	0.012	0.001
	(4.13)**	(3.98)**	(2.74)**
SC	-0.003	-0.060	-0.008
	(1.84)	(1.41)	(1.69)
ST	-0.004	-0.131	0.009
	(2.02)*	(2.72)**	(1.36)
BC	-0.001	0.023	-0.006
	(0.89)	(0.67)	(1.85)
Rural	-0.002	-0.025	-0.009
	(2.21)*	(0.80)	(2.90)**
coastal	0.002	0.180	-0.010
	(2.08)*	(4.75)**	(2.66)**
rayalaseema	0.001	0.188	-0.011
	(1.19)	(5.00)**	(3.08)**
Observations	982	982	228
F-test: 5-9	0.02(0.90)	0.22(0.63)	1.02(0.31)
10-14	**6.15(0.01)****	**4.16(0.04)****	**5.01(0.02)****
15-19	1.16(0.28)	0.78(0.37)	0.48(0.49)

* significant at 5%; ** significant at 1%; Absolute value of z statistics in parentheses.

Table 5: *Factors influencing girls dropping out of school between ages 7.5 and 11.5*

Dependent variable =1 if girl has dropped out of school between rounds, 0 otherwise	
Attends public school	-0.067
	(1.72)*
percapEXP	-0.006
	(0.21)
HHSIZE2	0.174
	(2.91)***
m0_4	-0.557
	(1.39)
f0_4	-0.364
	(0.74)
m5_9	-0.337
	(1.34)
f5_9	-0.050
	(0.20)
m10_14	-0.310
	(1.27)
f10_14	0.001
	(0.00)
m15_19	-0.491
	(1.88)*
f15_19	-0.404
	(1.64)*
m20_29	-0.396
	(1.33)
f20_29	0.080
	(0.49)
m30_54	-0.059
	(0.20)
m55	-0.244
	(0.72)
f55	-0.104
	(0.37)
Constant	0.791
	(2.52)**
Observations	493
R-squared	0.09

Note: Education of household head, caste and region of residence included in estimation but not reported.

Table 6: *Performance in cognitive and mathematical tests*

	Boys	Girls
PPVT score	91.68	88.93*
RASCH PPVT score	302.81	297.38*
Mathematics score	5.84	5.64
RASCH Mathematics score	302.08	298.01

Table 7: *Allocation of time on a typical day between boys and girls*

	Boys	Girls
Hours spent at school on a typical day	6.68	6.73
Study	2.06	2.03
Household chores	0.42	0.88**
Play	4.43	3.95**
Caring for younger siblings	0.08	0.16**

Table 8: *Caregiver expectations of boys versus girls.*

	Caregivers of boys	Caregivers of girls
At what age do you expect the child to earn[1]	21.34	19.87**
No expectations about earning	7	21**
At what age should child leave full-time education[1]	19.26	17.96**
Age at which the child should be financially independent[1]	22.96	21.45**
No expectation	4	15**
At what age do you expect the child to leave this household[1]	24.82	21.02**
No expectation about age at leaving	38	22**
What is the highest grade you would like the child to complete in school	12.67	11.70**
At what age do you expect the child to be married	25	21**
At what age do you expect the child to have a child	26	22*

Note 1. Percentages are based on caregivers who reported only a positive expectation (i.e., did not say they had no expectations).

Young Lives is an innovative long-term international research project investigating the changing nature of childhood poverty.

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- improve understanding of the causes and consequences of childhood poverty and to examine how policies affect children's well-being
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Young Lives is coordinated by a small team based at the University of Oxford, led by Jo Boyden.

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Department of International Development University of Oxford, UK

Statistical Services Centre, University of Reading, UK

Save the Children UK (staff from the Rights and Economic Justice team in London as well as staff in India, Ethiopia and Vietnam).

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