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Picking winners: An empirical analysis of the determinants of educational outcomes in India

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We use data from the Young Lives longitudinal survey to analyse the effect of socioeconomic conditions and gender on the educational performance of young children in India. In particular, we use data for standardised scores on two cognitive tests: the Peabody Picture Vocabulary Test (PPVT) and a maths test. Our results show that there are significant gender differences in the way that household wealth affects the educational performance of children. Specifically, boys born into wealthier households perform significantly better in maths than those from worse-off economic backgrounds. The effect of wealth on the PPVT is stronger for girls than it is for boys. The results are robust across a range of specifications. The effect of household wealth on performance differed between the genders, even when we focused our analysis on the bottom 10% and top 10% of the performance distribution. One possible explanation for these differences is parental aspirations. We tested this hypothesis and found that boys from wealthier households with higher parental educational aspirations are positively and significantly associated with higher maths scores. Further analysis showed that the moderating role of parents' educational aspirations was more pronounced at the top of the test score distribution, an indication that more able children are associated with wealthier and more ambitious parents.

Keywords: educational outcomes; gender; India; longitudinal study; parental expectations

Introduction

This article analyses the effect of gender and socioeconomic conditions on measures of cognitive outcomes of young children in India. Our study follows children at different ages and uses panel estimation to identify how factors that determine the socioeconomic status of these children may affect the educational outcomes that these children experience. Unlike previous studies, our analysis goes beyond the measurement of education as years of schooling. Instead, we consider measures of cognitive performance, which can be seen as proxies of the quality of education.

Educational attainment and outcomes have been at the centre of public debate in India for nearly three decades, as it became evident that the educational framework of the 1990s and early 2000s was unable to support the fast development the country experienced after the post-1990 market liberalisation reform (Lopez *et al.*, 1999).

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This was reflected in very low school enrolment rates (Mehrotra, 2006); gender bias against girls, which resulted in even lower enrolment rates of female pupils (Kingdon, 2010); a lack of investment in educational infrastructure in rural areas that severely limited the schooling opportunities of children living in these areas (Tilak, 2007; Kingdon, 2010); and an overall underperformance of Indian pupils. The result is that 'nearly 50% of children in government-run schools in India have fallen behind' (Bansal and Bhattacharya, 2017). In response to these needs, the Indian government implemented a very substantial and complex set of policy initiatives to reform the education sector and improve access to education for young children. This set of policies is known as the *Revised National Plan of Education*, and it came into effect in 2002. To support this new policy framework, the Indian government increased in a substantial way the budget provision for educational expenditure to nearly 13% of all public expenditure (Crost & Kambhampati, 2010).

The policy measures that were subsequently put into practice managed to boost enrolment rates—a metric that is often used in the literature to measure educational outcomes. As a result, the gross enrolment ratio for all persons in elementary education in India increased from 81.6% in 2001 to 96.4% in 2015 (Government of India, 2016). The reforms, however, have been less effective in improving the quality of education (Sahoo, 2017). *The Annual Status of Education Report* (ASER, 2005–2014) shows that despite the higher enrolment rates, learning outcomes in reading and mathematics among pupils remain precariously low and do not show any signs of improvement over time. Moreover, the policy reforms have been considerably less effective in addressing the issue of gender bias in schools (Desai and Kulkarni, 2008).

The issue of gender bias in India, and the problems that are often associated with it, have been discussed widely in the education and economic development literature. Our study aims to contribute to this debate by providing an update on the current status of the gender gap in the Indian education system following these reforms, focusing on quality-related measures of educational attainment. More specifically, we seek to address three key issues in this article. First, we estimate the effect of various household and individual characteristics on educational outcomes—measured by standardised scores on two cognitive tests (language and mathematics). Second, we provide estimates of gender differences for all measures of performance and scrutinise the robustness of these results across test types and the socioeconomic background of households. Third, we consider whether part of the gender difference we find can be explained by parents' educational aspirations for their child. In doing so, we use data on caregivers' aspirations and expectations for children's future educational attainment.

The rest of the article is structured as follows. First, we explain the background to the research. Then, we summarise the key features of the dataset, provide definitions of the main variables and outline their key properties. Following that, we set out the methodology and then present the results. Finally, we conclude.

Research background

Education is generally regarded as a major determinant of future life outcomes in a multitude of ways. A number of papers have been written on this issue, each describing different paths through which early-life educational outcomes can affect later-life

outcomes for individuals—and, by extension, for societies (Hanushek and Wößmann, 2007). The importance of early-life education as a determinant of later-life success is recognised in the literature for both developing and developed countries. It is also understood that socioeconomic and household characteristics have a powerful effect on the educational attainment and educational performance of young children (Darko and Carmichael, 2020), although the ways these characteristics affect the decision-making processes of households may differ between developing and developed countries in significant ways (Carmichael *et al.*, 2019a).

In the context of developed economies, such as the UK and the USA, recent studies have shown that there are associations between educational outcomes and household characteristics—such as household income, the gender of the pupil, class and ethnicity (Strand, 2011; Hampden-Thompson and Galindo, 2015). Household income is often found to be a strong predictor of children's future educational outcomes, with lower incomes often being associated with higher school dropout rates, lower educational attainment and poorer school performance (see e.g. Dearing, 2008).

Moreover, the significance and magnitude of the household income effect varies significantly throughout childhood. Duncan *et al.*'s (1998) longitudinal study of 5,000 US households shows that household economic conditions experienced before the age of 5 have a stronger effect on children's school outcomes than economic conditions from ages 6–15. Similar results are reported by Votruba-Drzal (2006), who shows the early childhood income of US households to have enduring effects on educational outcomes. Moreover, a number of studies find that adverse economic shocks are likely to have a stronger and more long-lasting effect on schooling outcomes for children in lower-income households compared to their more affluent peers (Lacour and Tissington, 2011).

In most developing countries, family background is often associated with children's success in adult life. Children from wealthier households tend to have a higher probability of being in school, mainly because these children experience few or no constraints during childhood. The direct costs of education (such as books, tuition fees and school uniforms) are less likely to be a concern for wealthier households (Huisman & Smits, 2009). Opportunity costs are also smaller—wealthier households have less or no need for their children to be available to work or help with household chores (Basu, 1999). Furthermore, poorer children can experience economic hardships that affect their ability to achieve better developmental outcomes. It is, therefore, not surprising that the literature often reports household wealth as one of the strongest predictors of educational attainment and performance. The effect of wealth can, however, be complex and non-linear in developing countries. For instance, Woldehanna *et al.* (2008) show that when household wealth rises beyond a certain level, it may increase the probability of a child combining school with work.

Other socioeconomic characteristics that are often reported as important determinants of early-life academic achievement include parental education, where the evidence overwhelmingly suggests that children of more-educated parents are generally more likely to stay in school longer and perform better than children of less-educated parents (UNESCO, 2005). Mother's education is often found to be an important determinant of girls' school enrolment: more educated mothers are more likely to

keep their daughters in school longer, although the effect of mother's education on girls' performance is not always found to be significant—especially when looked at in the context of traditional developing countries, with strong gender stereotypes, such as India (Breen and Goldthorpe, 1997; Emerson and Portela Souza, 2007). Mani *et al.* (2013) find that having a mother (father) with non-zero schooling raises the probability of a child's enrolment by 3–7% (7–10%).

Further, on the issue of gender inequality, there is extensive empirical evidence to suggest that education in India is gender discriminatory, with boys having a higher chance of staying longer in school (Vecchio and Roy, 1998) and achieving higher literacy rates—82.14% for boys and 62.46% for girls according to 2011 Census of India data (Batra and Reio, 2016). Strong patriarchal norms and labour market discrimination against female workers have been reported to still have an influence on Indian households' decision-making processes, resulting in a biased allocation of household resources for education towards boys (Chada & Sinha, 2013). This is an important issue, with strong societal, developmental and economic connotations. For instance, a number of papers have found that gender inequality in education leads to slower economic growth (Klasen, 2002); lower quality of life (Nussbaum, 2000); and higher mortality and lower fertility rates (Drèze and Murthi, 2001).

Data

Our data was drawn from the Young Lives longitudinal cohort survey of childhood poverty (Young Lives, 2018). Young Lives followed the lives of around 12,000 younger and older children across four low-to-middle-income countries (Ethiopia, India, Peru and Vietnam). Data were collected during five rounds spread over 15 years: 2002, 2006, 2009, 2013 and 2016. The first round of the survey took place when the younger cohort were 1 year old and the older cohort were 8 years old. For both cohorts, the survey collected a rich set of information on household and parental characteristics, as well as detailed information on children's characteristics including educational attainment and measures of cognitive ability. As the survey collects information on children and household characteristics, it is possible to examine how children's development changes over time. The results that we present in this article are based on data for the older cohort for India, as the younger cohort has limited information on the educational outcomes that are the focus of this study. This included a sample of 951 children from three Indian regions: coastal Andhra Pradesh, Rayalaseema and Telangana.[1]

We use two measures of cognitive ability for this study, both of which are based on assessments of literacy and mathematical ability. At ages 12 and 15, children's cognitive development was assessed using the Peabody Picture Vocabulary Test (PPVT), a test of receptive vocabulary that has been widely used to measure verbal ability and general cognitive development[2] (Rosenzweig and Wolpin, 1994). The second measure of cognitive ability was the maths test, which required children to solve some maths-based questions. Maths tests were conducted at ages 12, 15 and 19. Both the PPVT and the maths test were collected for all children, regardless of whether they were attending school or not. This unique feature potentially avoids the issues of selection bias, which are often associated with school-based data.

The estimated equations control for a range of household socioeconomic characteristics, including household wealth, parental education and location of the household. Household wealth is measured with a composite variable that combines a set of wealth-related metrics, including proxies for housing quality, access to services and consumption of durable goods.[3] We also control separately for parental education, measured as the highest grade completed by the household head (in years). Since education is positively linked to earnings, the educational attainment of the household head is also likely to have a strong impact on the ability of the household to stock up wealth, which is usually found to be an important determinant of educational attainment (Hannum *et al.*, 2009).

Investment in education may also change with the age of the child. As children grow older, the opportunity cost of education increases. Traditionally, this has resulted in lower enrolment rates at higher grades, as poorer households opt to take their children out of school and bring them into income-generating activities. The Education for All policy reforms of 2002 managed to reduce this trend to an extent by boosting enrolment rates in upper primary, primary and elementary education (Mehrotra, 2006).

Table 1 shows summary statistics for the main variables used in our analysis. Boys and girls are represented in nearly equal shares throughout all cohorts. Most children (nearly 70% of our total sample) reside in rural areas and in households with an average size of five family members. As expected, the share of female-headed households is relatively smaller (just over 13%) when compared to male-headed households. Boys perform better, particularly in maths, with an average score of 10.5 compared to girls (8.5). For both tests, the differences between boys and girls were statistically significant.

Figure 1 illustrates the distribution of educational outcomes for boys and girls. As shown, girls tend to underperform their male counterparts, especially at the top end of the distribution. The gap is, however, narrower (particularly for PPVT) at both ends of the distribution.

Figure 2 presents further evidence of the differences in educational outcomes between boys and girls, this time by taking into consideration the distributional properties of household wealth. In particular, the figure shows the distribution of test scores by wealth quartile, Q. For both measures of cognitive ability, the distribution for boys and girls is similar at lower ends of the household wealth distribution. A test of differences in means for maths, for boys and girls at the bottom end of the distribution, fails to identify any statistically significant differences between genders. At relatively higher levels of household wealth, the figure shows that boys perform better compared to girls. This is confirmed by tests of differences in means between boys and girls at higher quartiles. Similar evidence is found for PPVT scores.

Table 2 shows a summary of average test scores at different ages and by gender. There is clear evidence of improved performance for both tests as the child gets older. Boys are shown to achieve systematically higher scores at all ages for both the PPVT and the maths test. As all the biological, socioeconomic and developmental variables in our dataset follow similar distributions for both genders (as one would expect from a representative sample), such differences in performance are likely to be driven by

Table 1. Summary statistics of key variables

	Full sample			Boys			Girls		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Female	2,841	(0.510)							
Maths score	2,784	9.459	6.672	1,361	10.456	7.070	1415	8.510	6.107
PPVT score	1,849	110.531	38.847	906	115.831	39.947	943	105.438	37.073
Household wealth index	2,840	0.532	0.185	1,853	0.499	0.198	1930	0.501	0.198
Age of child (in months)	2,840	185.259	32.931	1,857	162.938	48.084	1934	162.925	47.957
BMI (standardised)	2,829	0.024	1.155	1,854	-0.016	0.942	1926	0.015	1.053
School type: public	2,267	(0.531)		1,610	(0.575)		1588	(0.623)	
School type: private	2,267	(0.331)		1,610	(0.345)		1588	(0.260)	
School type: other	2,267	(0.138)		1,610	(0.080)		1588	(0.116)	
Highest grade completed by household head	2,501	5.098	4.995	1,727	4.337	4.943	1715	4.767	4.899
Female head of household	2,847	(0.133)		1,856	(0.126)		1934	(0.114)	
Age of household head	2,847	44.187	9.434	1,856	43.440	9.490	1934	42.906	10.292
Household size	2,849	4.995	1.895	1,858	5.160	2.111	1934	5.113	1.775
Religion: other	2,838	(0.127)		1,858	(0.131)		1930	(0.122)	
Religion: Hindu	2,838	(0.873)		1,858	(0.869)		1930	(0.878)	
Ethnicity: SC	2,849	(0.215)		1,858	(0.222)		1934	(0.207)	
Ethnicity: ST	2,849	(0.111)		1,858	(0.097)		1934	(0.124)	
Ethnicity: BC	2,849	(0.461)		1,858	(0.480)		1934	(0.445)	
Ethnicity: OC	2,849	(0.213)		1,858	(0.202)		1934	(0.224)	
Region: coastal Andhra Pradesh	2,847	(0.347)		1,858	(0.351)		1932	(0.344)	
Region: Rayalaseema	2,847	(0.298)		1,858	(0.293)		1932	(0.300)	
Region: Telangana	2,847	(0.351)		1,858	(0.353)		1932	(0.351)	
Locality: rural	2,844	(0.737)		1,856	(0.745)		1931	(0.743)	
Survey round 2	2,849	(0.334)		1,858	(0.250)		1934	(0.251)	
Survey round 3	2,849	(0.332)		1,858	(0.250)		1934	(0.250)	
Survey round 4	2,849	(0.334)		1,858	(0.250)		1934	(0.248)	

Note: Proportions in parentheses.

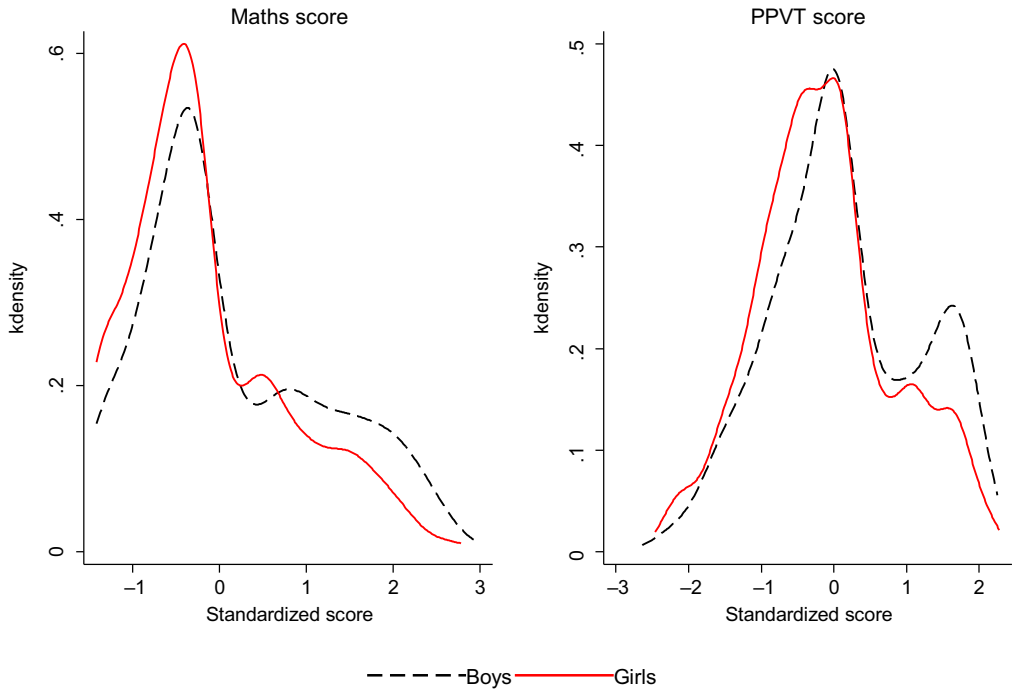

Figure 1. Test scores by gender. [Colour figure can be viewed at wileyonlinelibrary.com]

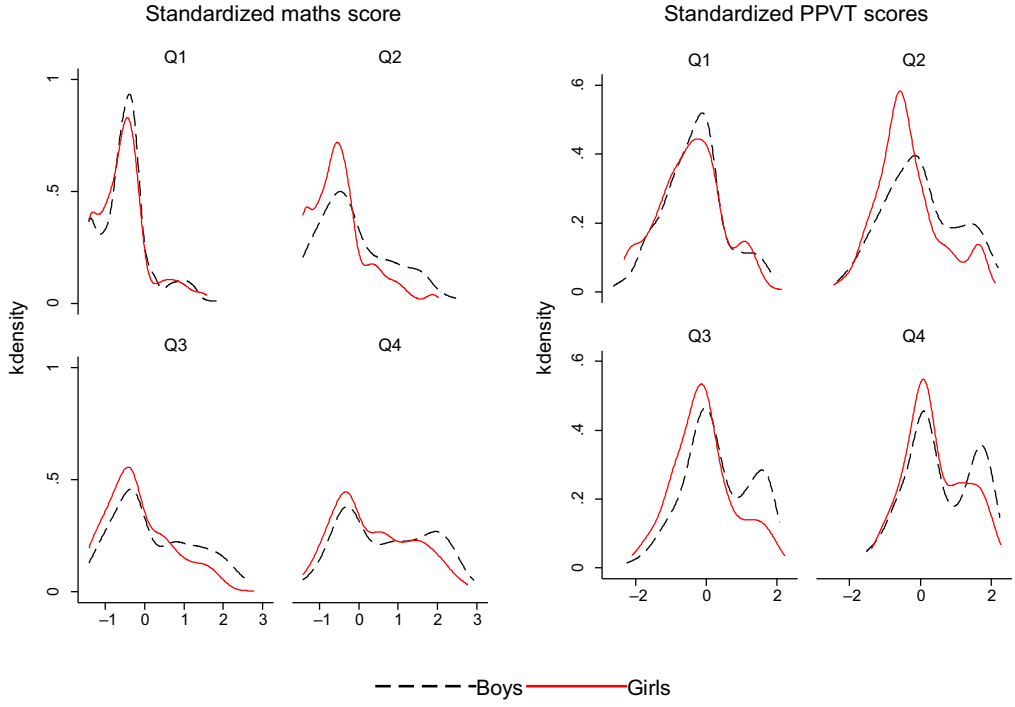

Figure 2. Test scores and household wealth. [Colour figure can be viewed at wileyonlinelibrary.com]

Table 2. Gender and test scores

	Age 12		Age 15		Age 19	
	Mean	SD	Mean	SD	Mean	SD
Boys						
Maths score	5.87	2.21	10.14	6.98	14.30	7.14
PPVT	91.85	24.12	139.81	38.22		
Girls						
Maths score	5.65	2.24	7.50	5.73	11.94	7.24
PPVT	88.65	24.51	122.69	39.80		

societal and cultural norms (Baker & Milligan, 2013), which we explore in further detail later.

Methodology

This section outlines the methodological approach that we are going to follow in the rest of the article, while also summarising some of the key properties of the main variables used in our analysis. The estimation results are then presented and explained in the next section.

We base our estimations on a multivariate panel least-squares model. The general form of the basic estimated model is as follows:

$$\left\{ \begin{matrix} Maths_{it} \\ PPVT_{it} \end{matrix} \right\} = \alpha_0 + \alpha_1 wealth_{it} + \alpha_2 X_{it} + \alpha_3 Z_{it} + j_t + v_i + \varepsilon_{it} \quad (1)$$

Subscripts it are used to denote the value of a variable for child i at time period t, whereas α_1, α_2 and α_3 are the corresponding coefficient vectors; j and v are time and region dummies, respectively. The dependent variables, $Maths_{it}$ and $PPVT_{it}$, record performance on each of the two cognitive tests.

To ensure that our dependent variables also capture some element of educational quality, we adjust the test scores to take into account the individual's completed years of schooling. Doing this gives a more accurate measure of the child's ability for their level of completed schooling. We derive this measure by firstly calculating the average test score by the child's year of completed schooling. This is then subtracted from the actual test score. Values greater than the average indicate better performance for the child's level of completed schooling, whereas values below average indicate that the child underperformed. In effect, this variable is taking into account educational quality. The final values are then standardised to have mean 0 and standard deviation 1. A key limitation of the dependent variable is that test scores are not available for all survey rounds. The maths test was administered in rounds 2, 3 and 4, whereas the PPVT was administered in rounds 2 and 3 only.

The main independent variable is *wealth*, a composite index that combines a set of wealth-related metrics, including proxies for housing quality, access to services and consumption of durable goods. $\boldsymbol{X}$ is a vector of individual characteristics, including

age of the child (in months) and health as measured by body mass index (BMI). Finally, $\boldsymbol{Z}$ is a vector of household characteristics, including the gender and age of the household head, highest grade completed by the household head, household size, caste and religion. All specifications allow for time-fixed effects (j) to capture the effect of time-variant economic trends on educational outcomes. The regional and urban–rural location dummies would account for the effect of unobserved regional policies and location-specific characteristics.

Selectivity bias

There is a possibility that the sample of children who completed the test is a non-random subset of the population. This could result in selection bias (and, therefore, sample-induced endogeneity). For instance, more able children can often afford to stay longer in school (by being enrolled and completing more years of schooling) and consequently achieve more. Similarly, children who are currently enrolled in school would be more likely to complete the exercise and consequently may perform better than children who were not enrolled in school. The data actually supports this, and indicates significant differences in both PPVT and maths scores between children who were enrolled and those who were not enrolled. As such, estimating test scores without empirically accounting for selection into enrolment could bias the estimates. We address this issue of sample selection using the Heckman two-stage formulation. The first-stage enrolment equation is estimated with a probit model and takes the following form:

$$\Pr(Enrolled_{it}=1)=\alpha_0+\alpha_1 wealth_{it}+\alpha_2 X_{it}+\alpha_3 Z_{it}+\alpha_4 g_{it}+j_t+v_i+\varepsilon_{it} \qquad (2)$$

The dependent variable, *Enrolled*, takes the value of 1 if the child is currently enrolled in school. g_i is a variable that is not included in the educational outcomes regressions but satisfies the exclusion restrictions. The restriction requires that this variable should directly affect enrolment but should not have a direct effect on educational outcomes. All other variables are as previously defined. We use the number of children (0–5 years) and the number of children of school-going age (6–18 years) as exclusion restrictions.

The identification strategy is that having more young children and children of school-going age in the household may impact on the education enrolment of other children. For instance, as the number of children of school-going age increases in the household, children will have to compete for resources and therefore parents will be unable to enrol all children in school. Investment in education will fall as a result. Similarly, as the number of young children (0–5 years) increases, the need for older children to help with caring for their younger siblings will also increase, thereby reducing children's likelihood to enrol in school.

To account for the potential bias that may result from non-randomness, we use a second-stage equation which yields a selection parameter, the inverse Mills ratio (IMR). The IMR parameter that is derived from the enrolment Equation (2) is then included as an additional explanatory variable in the second-stage test scores equation, which is as follows:

Table 3. Effect of household wealth on children's cognitive outcomes

	(1)	(2)	(3)	(4)
	Maths		PPVT	
	Boys	Girls	Boys	Girls
Household wealth	0.459*	0.116	0.463*	0.617**
	(0.237)	(0.200)	(0.261)	(0.257)
Highest grade completed by household head	0.008	0.022***	0.024***	0.009
	(0.008)	(0.007)	(0.009)	(0.009)
Female head of household	0.025	0.149	0.135	0.208
	(0.104)	(0.099)	(0.121)	(0.129)
Household size	−0.029*	0.005	0.005	0.023
	(0.016)	(0.018)	(0.018)	(0.023)
Constant	1.030	0.414	2.858*	1.955
	(1.848)	(1.701)	(1.636)	(1.724)
Number of children	451	456	446	453
Ethnicity	Yes	Yes	Yes	Yes
Religion	Yes	Yes	Yes	Yes
Survey round	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes
Locality	Yes	Yes	Yes	Yes

All regressions include age of child (in months), school type, health of the child, age of the child and age of the household head.
Standard errors in parentheses.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

$$\left\{ \begin{matrix} Maths_{it} \\ PPVT_{it} \end{matrix} \right\} = \alpha_0 + \alpha_1 wealth_{it} + \alpha_2 X_{it} + \alpha_3 Z_{it} + \alpha_4 IMR_{it} + j_t + v_i + \varepsilon_{it}. \quad (3)$$

All other variables are as previously explained.

To reduce further the effect of individual-level heterogeneities, we implemented a propensity score-matching technique (Deheija and Wahba, 2002) to construct a sample of those not enrolled that is comparable to the sample of children who were enrolled. Due to the reduced sample size, we estimated joint regressions and included a female gender dummy and its interaction with household wealth.[4]

Results

OLS estimations

Table 3 shows the panel ordinary least squares (OLS) estimates for measures of educational outcomes (adjusted test scores) separately for boys and girls. The signs of the reported coefficients are largely as expected, with household wealth having a positive effect on both PPVT and maths scores for boys and girls. Higher household wealth

significantly increases both PPVT and maths scores for boys by 46 percentage points, respectively. The effect of wealth on girls' performance is also positive and significant for PPVT (62 percentage points), but not significant for maths. This finding could relate to possible suggestions that family background may encourage girls and boys to value different aspects and subjects of education differently (Mensah and Kiernan, 2010), so that girls rather than boys view themselves more as readers and writers.

Moreover, the results show a positive association between the level of schooling of the household head and children's educational outcomes—although the level of significance of this effect differs depending on the gender of the child. The education of the household head has similar effects on cognitive outcomes and increases test scores by 2% on the maths test and PPVT, for girls and boys, respectively. This positive effect suggests that educated households can invest more in their children's education and provide further academic support which enables children to perform better. This result agrees with a number of other papers that report a link between parental education and children's educational development (Davis-Kean, 2005).

Our measure of household wealth could be susceptible to endogeneity-induced bias if there are differences in the size of households. For instance, larger households may have more income recipients than smaller households because they are more likely to have working adults (we find evidence of this in the data); therefore, these households may be able to afford more assets. We therefore attempt to eliminate any form of bias that can affect the estimate of wealth on children's educational outcomes by adjusting the household wealth variable. We do this by first estimating the average wealth by total household size, and then subtracting actual household wealth from this average value by household size. Households with wealth values that are higher than the size-adjusted wealth average value are better off compared to their peers. Results that use this variable are presented in Table A1 in the Appendix.[5] As seen, adjusting household wealth by total household size does not substantially alter our findings.

It should also be noted that none of the four specifications showed any significant differences in performance for female-headed households and household size (except in column one, where the coefficient on household size was found to be negative and significant at the 10% level).

Selectivity bias

Table 4 presents selectivity-corrected estimates of the effect of household wealth on children's educational outcomes. Starting with the first-stage estimations in columns 1 and 2, the exclusion restriction variables (number of children) are found to have a negative effect on the likelihood of enrolment for both boys and girls, with the effect larger for girls. This is an intuitive result that has been reported in a number of previous studies (see e.g. Ahiakpor *et al.*, 2014), depicting the positive relationship between household expenditure and number of children in developing countries: larger households generally have less money to spend on children's education, leading to lower enrolment rates and school performance. The size of the effect is higher and more strongly significant for younger children (0–5 years). Household wealth has a positive effect on likelihood of enrolment for boys, but not for girls—for whom the

Table 4. OLS selectivity-corrected effects of household wealth on children's cognitive outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
	Enrolled		Maths		PPVT	
	Boys	Girls	Boys	Girls	Boys	Girls
Number of children in household: 0-5 years	−0.043***	−0.072***				
	(0.017)	(0.017)				
Number of children in household: 6-18 years	−0.017*	−0.020*				
	(0.009)	(0.010)				
Household wealth	0.230***	0.039	0.749***	0.231	0.282	0.861***
	(0.064)	(0.066)	(0.259)	(0.215)	(0.284)	(0.278)
Highest grade completed by household head	0.012***	0.013***	0.011	0.013	0.026***	0.010
	(0.002)	(0.003)	(0.008)	(0.008)	(0.009)	(0.011)
Female head of household	−0.033	0.123	0.007	0.204*	0.174	0.146
	(0.026)	(0.061)	(0.113)	(0.108)	(0.131)	(0.145)
Household size	0.012*	0.018**	−0.025	0.004	−0.002	−0.001
	(0.006)	(0.007)	(0.016)	(0.021)	(0.018)	(0.027)
IMR (Heckman's lambda)			0.117	−0.338**	−0.274	0.071
			(0.179)	(0.145)	(0.406)	(0.303)
Constant			1.034	−2.156	1.267	2.369
			(1.922)	(1.880)	(1.708)	(2.047)
Number of children	465	485	411	396	406	391
Log likelihood	−498.098	−556.755				
Ethnicity	Yes	Yes	Yes	Yes	Yes	Yes
Religion	Yes	Yes	Yes	Yes	Yes	Yes
Survey round	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes
Locality	Yes	Yes	Yes	Yes	Yes	Yes

Columns 3 to 6 include school type, age of child (in months), health of the child, age of the child and age of the household head.
Standard errors in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

estimated coefficient is positive, albeit much smaller in magnitude and not statistically significant.

Columns 3 to 6 show the selectivity-corrected estimates. The direction of the effects of household wealth is consistent with the results presented in Table 3, and shows positive effects of wealth on educational outcomes, although both the size and significance of the estimated coefficient varies depending on gender: boys (girls) in wealthier households tend to perform significantly better in the maths test (PPVT), respectively. The IMR is largely insignificant, especially for boys. However, in terms of maths score, the effect is negative (for girls) and indicates that the joint effect of unobservables is negatively correlated with educational outcomes. The negative sign

suggests that girls who are more likely to enrol in school perform worse relative to other girls of similar characteristics (after controlling for observed attributes). The negative effect of the selectivity term can be interpreted to suggest that school enrolment is simply not enough to secure better maths scores, perhaps more so for the less advantaged.

Individual-level heterogeneities: matched subsample

Moreover, we examined how observable individual characteristics might differ based on the child's enrolment status, thereby biasing the results, using a propensity score-matching technique. Figure A1 in the Appendix illustrates results from the matching process and shows the kernel distributions of propensity scores before and after the matching procedure. The figure provides sufficient support for good matching. Table A3 in the Appendix presents results using the matched subsample. Similar to earlier results, the interaction term indicates a negative effect on both PPVT and the maths test. This provides further support that the wealth effect we identified in previous estimations does not appear to be biased by the characteristics of individuals.

Effect of household wealth at bottom and top of test scores distribution

In an effort to better understand the effect of household wealth and gender attitudes, we now look at the distributional properties of children's educational outcomes (and how these are or are not affected by wealth) using the unconditional quantile regression (UQR) technique as proposed by Firpo *et al.* (2009). The underlying principle of this method is to estimate a re-centred influence function (RIF) for the variable of interest (in our case test scores) on a set of regressors, by estimating the partial effects of these covariates on the unconditional quantiles. This influence function can then be used to measure the effect of a particular observation on the distributional statistics of the main variable.[6] Table 5 summarises the main results for the bottom and top 10% of the test scores distribution.

It was expected that gender differences should disappear at the bottom and top end of the test scores distribution, as wealth should have no differentiating effect between boys and girls. In other words, if children in the top 10 percentile of the test score distribution are likely to be from wealthier backgrounds, then we should not be able to identify any significant gender differences on the effect of wealth in performance on this part of the distribution (especially so as boys and girls are represented in roughly equal shares in our distribution). The results in columns 3, 4 and 8, 9 indeed show that the effect of wealth on the top quartile of performers was positive for all children. However, the differences in magnitude of the estimated coefficients between the two genders that we identified in previous estimations remain—the effect of wealth on top-performing boys was almost eight (six) times bigger than for top-performing girls in maths (PPVT). In terms of the statistical significance of the effect, we observe again the same pattern as in previous estimations, with wealth being a significant determinant of educational outcomes for boys for maths (but not PPVT). These results tentatively suggest that, even among the best-performing children in the maths test, top-performing boys are more advantaged

Table 5. Effects of wealth along test score distribution

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Maths Q10		Maths Q90		PPVT Q10		PPVT Q90	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Household wealth	−0.852**	−0.379	1.282**	0.161	0.593	0.918**	0.270	0.045
	(0.371)	(0.424)	(0.628)	(0.458)	(0.501)	(0.383)	(0.345)	(0.294)
Highest grade completed by household head	0.009	0.015	−0.006	0.028	0.021	0.009	0.013	0.015
	(0.013)	(0.016)	(0.021)	(0.018)	(0.017)	(0.015)	(0.011)	(0.011)
Female head of household	0.051	0.281	0.222	0.228	0.066	0.124	0.052	0.213
	(0.159)	(0.201)	(0.262)	(0.217)	(0.217)	(0.185)	(0.144)	(0.139)
Household size	0.002	0.041	−0.053	−0.007	0.010	−0.010	−0.036*	0.029
	(0.024)	(0.037)	(0.038)	(0.040)	(0.032)	(0.034)	(0.021)	(0.026)
IMR (Heckman's lambda)	0.091	−0.640**	−0.587	−0.634**	0.734**	0.406	−0.027	−0.065
	(0.260)	(0.292)	(0.485)	(0.316)	(0.344)	(0.250)	(0.261)	(0.202)
Constant	4.369	0.069	−0.126	−5.882	9.099**	2.111	6.186**	4.945**
	(2.837)	(3.547)	(4.482)	(3.833)	(3.892)	(3.306)	(2.492)	(2.458)
Number of children	451	457	451	457	451	457	451	457
Ethnicity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Religion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Survey round	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locality	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

All regressions include school type, age of child (in months), health of the child, age of the child and age of the household head.
Standard errors in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

compared to top-performing girls. The results for the PPVT are generally inconclusive and show a significant effect only for poor-performing girls at the bottom end of the PPVT distribution.

Education aspirations and educational outcomes

Finally, we examine whether parental aspirations can moderate part of the wealth effect on children's educational outcomes. It is possible that part of the effect of household wealth on cognitive development could be shaped by parental expectations and aspirations for the child. The link between aspirations and educational outcomes has been identified before, although the majority of papers we are aware of have focused on pupils' (rather than caregivers') aspirations (Croll and Attwood, 2013; Khattab, 2015; Berrington *et al.*, 2016).

Table 6. Effect of wealth and parental education aspiration on children's cognitive outcomes

	(1)	(2)	(3)	(4)
	Maths		PPVT	
	Boys	Girls	Boys	Girls
Household wealth	−2.777***	−0.394	1.155	−0.100
	(1.023)	(0.690)	(1.079)	(0.853)
Parental education aspiration	−0.071**	−0.008	0.031	−0.002
	(0.035)	(0.028)	(0.037)	(0.033)
Household wealth × Parental education aspiration	0.252***	0.043	−0.055	0.054
	(0.077)	(0.056)	(0.082)	(0.069)
Highest grade completed by household head	0.003	0.011	0.026***	0.011
	(0.009)	(0.008)	(0.010)	(0.010)
Female head of household	0.049	0.144	0.096	0.191
	(0.106)	(0.101)	(0.125)	(0.130)
Household size	−0.027*	0.006	0.007	0.023
	(0.016)	(0.019)	(0.018)	(0.024)
IMR (Heckman's lambda)	0.008	−0.363***	0.157	0.189
	(0.167)	(0.128)	(0.360)	(0.222)
Constant	2.910	−0.929	2.674	2.706
	(2.015)	(1.831)	(1.837)	(1.902)
Number of children	430	445	425	442
Ethnicity	Yes	Yes	Yes	Yes
Religion	Yes	Yes	Yes	Yes
Survey round	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes
Locality	Yes	Yes	Yes	Yes

All regressions include school type, age of child (in months), health of the child, age of the child and age of the household head.
Standard errors in parentheses.
*$p < 0.1$.
**$p < 0.05$.
***$p < 0.01$.

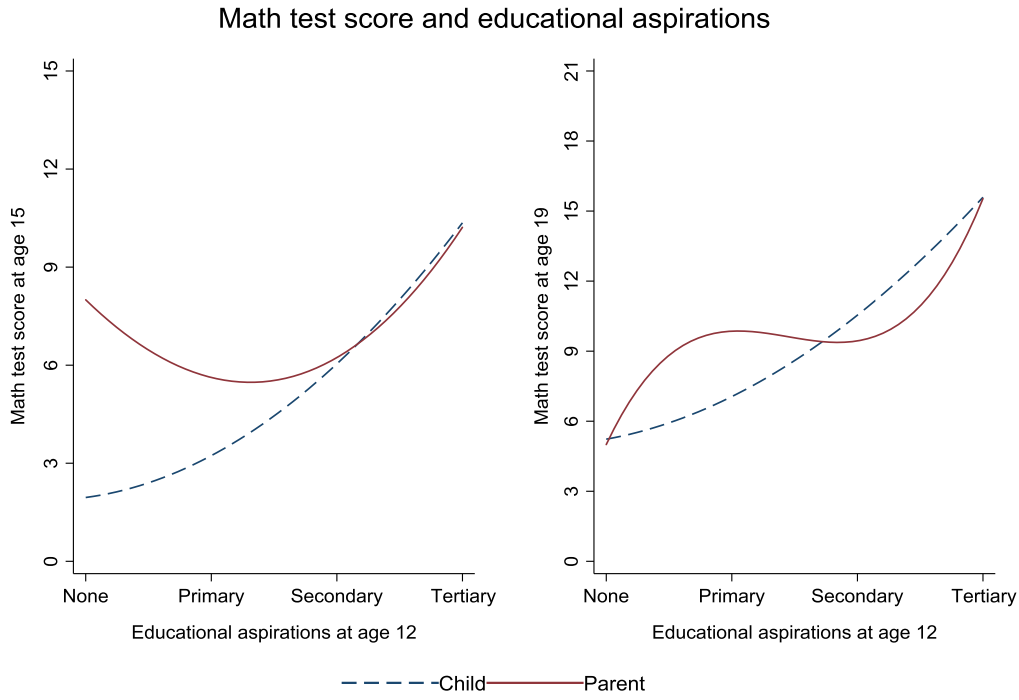

Figure 3. Aspirations and educational outcomes. [Colour figure can be viewed at wileyonlinelibrary.com]

The Young Lives survey provides interesting data on caregivers' aspirations and expectations of children's educational attainment. The question on educational aspiration that we use asks the caregiver (usually the mother): 'What level of education would you like your child to complete?' This question was asked in the second round when the child was 12 years old. The responses provided by caregivers were found to be positively correlated with family wealth and also parental education, with a coefficient of 0.18 and 21.2, respectively. There is also some evidence of gender bias in caregivers' response. For instance, 67% of caregivers aspire for boys to complete university, compared with only 43% for girls. This response is similar when the same question was asked to the child in relation to 'the education grade you would like to complete'. In this case, 61% of girls desired to complete university compared to 76% of boys. Even when this was conditioned on household wealth, boys still had higher aspirations than girls. While these findings are not causal, they can be seen as evidence of parents' preference for boys compared to girls. Figure A2 in the Appendix shows the distribution of parents' aspirations by gender of child. Results from these estimations are presented in Table 6.

As with previous results, we find persistent evidence of gender bias. The interaction effect (shown in columns 1 and 2) indicates a significant and positive effect on the maths test for boys—the effect was found to be not significant for girls, although positive. It is possible that the significant effect for boys may be largely driven by parental preference, due to boys being seen as more likely to be the main source of financial support for parents in old age (Kingdon, 1998). There are no significant effects on

PPVT scores. Focusing on maths scores, Figure 3 plots the results from a local polynomial regression and shows the estimated conditional mean of the test scores at age 15 and 19, conditional on parents' aspirations and children's aspirations. The figure shows a largely positive relationship between parental aspirations and children's later educational outcomes.

The extent to which parental aspirations can affect children's educational outcomes provides further evidence that the existence of a gender bias in our sample (and, in particular, in India) may be beyond parental preference. It is possible that some of these effects are associated with other socio-cultural norms. Two main explanations are often cited for the gender gap. The first associates this gap with labour market discrimination, where employers value women's education less than that of men. This reduces the incentives to invest in girls' education (Kingdon, 1998). The second associates the gender gap with kinship norm, and the notion that because girls leave the house after marriage, any returns to education are enjoyed by their in-laws. This perception reduces investment in children's, especially girls', education—see Chakraborty and Kim (2010) for a more detailed discussion of kinship structure in India. These results provide evidence that girls, rather than boys, remain disadvantaged—even after accounting for a number of family background characteristics.

In further analysis, we examine the interaction effect along the distribution of children's test scores (see Table A2 in the Appendix). The results show that at the top of the distribution, the effect of household wealth and parental educational aspiration is significant for both boys and girls, although the effect is marginally larger for boys than for girls. This finding is a possible indication that while boys are more advantaged than girls, parental aspirations can play a role in moderating this effect, albeit this is more relevant for wealthier children.

Discussion of key findings

The results that we presented earlier in this section (as well as in the accompanying Technical Appendix) leave no doubt that socioeconomic household characteristics (and, in particular, household wealth) are important determinants of educational advancement in India. Indeed, children from poorer households are consistently found to experience educational disadvantages compared to their wealthier peers. This result remains prevalent, even after controlling for factors such as location, school type and other covariates. Although caregiver aspirations are found to compensate this effect, the compensation is only partial, gendered and still strongly influenced by household wealth. This powerful and persistent effect of wealth on educational progression is particularly concerning from a policy perspective—not only because of the existence of gender bias (which, as we show here, remains a pertinent issue), but also because it highlights the limitations of the current education policy to support the development of children from poorer households, who are in turn found to be substantially disadvantaged by the current education system.

There are many reasons why differences in household wealth may matter for educational performance (and for the successful implementation of educational policy reforms). Children from less wealthy backgrounds have access to fewer educational resources (such as textbooks and other reference material), and we do know from

previous research that such resources can have a significantly positive effect on educational performance (Spaull, 2013). Poorer and often less-educated parents may spend less time with their children (Guryan *et al.*, 2008), and they may also be more constrained in their ability to provide support with schoolwork (Cooper, 2010).

In addition, poorer households are likely to be more susceptible to adverse economic shocks (Guarcello *et al.*, 2010; Azam and Imai, 2012), more credit constrained (Menon, 2009) and more vulnerable to the effects of economic uncertainty (Morduch, 1994)—all of which could impact household attitudes towards educational expenditure, and could well explain part of the wealth and gender bias that we find in this article. For instance, liquidity constraints mean that poorer households are less likely to be able to finance educational expenses, which may in turn force them to make choices about which child to send to school (Calero *et al.*, 2009). Poorer households are also more likely to be reliant on their children's income for survival (Jacoby and Skoufias, 1997; Aggarwal, 2018). Such effects can be exacerbated further by social norms and gender-based stereotypes, resulting in further imbalances in educational expenditure allocation between boys and girls for poorer households (Desai et al., 2010).

Finally, another area that is likely to be relevant for some of the results that we report in this study is school quality heterogeneity: children from less wealthy households are more likely to enrol in schools that offer more limited educational resources than their wealthier peers. There are numerous references in the literature to results that link household wealth and quality of schooling (Checchi, 2006; Glewwe and Kremer, 2006; Figlio *et al.*, 2016). Studies such as those of Desai and Kulkarni (2008) and Asadullah *et al.* (2009) show that despite significant growth in school enrolment in India (Dougherty and Herd, 2008), the widening of wealth inequality that has been observed over the course of the last two decades may have had an effect on the academic performance of poorer children along the lines that we describe in this article. Aspects of school quality such as teacher–pupil ratio (Case and Deaton, 1999) and teacher quality (Rothstein, 2010; Rivkin and Schiman, 2015) could also be contributing to the performance gap between children from poorer and wealthier households—partly because allocation into high-quality schools is influenced by family socioeconomic background.

From a policy perspective, this means that educational policy reforms may not be able to fully achieve their objectives, unless they are accompanied by economic policies that address issues of inequity and inequality. Such policies should aim to economically empower poorer households to reap the benefits of educational reforms by making them less reliant on their children's income for survival (Chamarbagwala, 2008), whilst improving schooling quality, especially in areas where children from poorer households are likely to be over-represented.

Conclusion

India has undergone a long period of fast economic reforms which have changed the development prospects the country faces for the better. As part of these reforms, the country embarked on a long series of policy interventions that aimed to improve the quantity (years of schooling) as well as the quality of education offered, mainly by

public schools. Our article has considered educational outcomes in the period following the start of these reforms, by using data drawn for India from the Young Lives dataset, a rich longitudinal cohort study of childhood poverty for low-to-middle-income countries. We observed and analysed how socioeconomic factors such as household wealth have affected the educational outcomes experienced by children. We focused our attention on performance, as measured by standardised scores on two cognitive tests: the PPVT and maths test.

Our results show that household wealth is an important predictor of a child's performance in both types of cognitive tests: children from wealthier households tend to achieve higher grades in both types of these tests. We also, however, find that there are significant gender differences in the way that household wealth affects the educational performance of children. In nearly all of the estimations, household wealth was found to have a consistently stronger effect for boys, particularly in maths test. The effect of wealth differed between the two genders, even when we focused our analysis on the bottom and top 10% of the performance distribution. In particular, we found clear and persistent gender differences in test performance, with boys tending to systematically perform better in maths than girls. This finding is consistent with suggestions that family background may encourage girls and boys to value different aspect and subjects of education differently (Sullivan and Brown, 2015).

One possible explanation for the difference in performance found between girls and boys may be that it is driven by parental expectations and aspirations for children's future. We put this hypothesis to the test by estimating the effect of caregivers' aspirations on children's performance using information provided directly by the head caregiver (usually the biological mother). We found that high caregiver aspirations are positively and significantly associated with better performance in maths tests for boys but not for girls.

We therefore conclude that, despite the success of recent policy reforms in boosting enrolment rates and improving access to education for boys and girls in Indian households, there are still significant gender- and wealth-driven disparities affecting the educational progression of young children in India. These disparities become more visible when using measures of performance, like the ones we presented in this study. It is possible that some of these differences can be attributed to cultural factors and stereotypes that may be historically entrenched in the way of thinking among local societies (labour market discrimination being a case in point). Policy reforms that aim to support the developmental and economic outcomes of young adults in India need to consider gender differences in access to employment opportunities as well as earlier access to education and children's material living conditions.[7] We did find evidence, after all, that parents' expectations have a significant effect on future cognitive outcomes.

Changes in culture are certainly harder (and slower) to achieve, and possibly require interventions that extend beyond the boundaries of education policy. Policy interventions should, however, aim to foster and monitor such changes by providing information, training and support to caregivers and schoolteachers, and encourage children (irrespective of their gender) to achieve their real potential. Until that

happens, the country will be limiting its economic and developmental potential by picking winners based on the wrong criteria.

NOTES

[1] The survey takes into account regional variations to ensure balanced representation of the three regions in the sample.
[2] To elicit a response from the child, a set of four pictures that correspond to a word read out by the examiner (interviewer) is presented to the child. The starting set of items is dependent on the child's age, and the progress (up or down) through the test is determined by performance. This then determines the Basel and Ceiling Item sets. The final scores are computed by subtracting the number of errors from the individual's Ceiling Item score.
[3] The housing quality index is computed as the average of the type of flooring, roofing and walls used, as well as the number of bedrooms. Assets are measured as the scaled sum of ownership of consumer durables. The access to services index is defined as the average of access to drinking water, toilet, fuel and electricity.
4 The estimation controlled for gender, years of completed schooling, education of household head, gender of the household head, religion and region.
5 In results not reported here, we further adjust household wealth using the number of adults (rather than total household size). The results were similar to those reported in this study.
6 See Firpo *et al*. (2009) for a detailed discussion.
7 A discussion of the links between gender discrimination in education and labour market outcomes in developing countries can be found in Carmichael *et al*. (2019b).

References

Ahiakpor, F., Nunoo, J. & Alnaa, S. E. (2014) A new look at school enrolment in Ghana: A statistical analysis. *Journal of Studies in Education*, 4(2), 42–56.

Aggarwal, S. (2018) Do rural roads create pathways out of poverty? Evidence from India, *Journal of Development Economics*, 133, 375–395.

Asadullah, M. N., Kambhampati, U. & Lopez-Boo, F. (2009) *Social divisions in school participation and attainment in India: 1983–2004*. IDB Working Paper No. 692.

Azam, M. S. & Imai, K. S. (2012) *Measuring households' vulnerability to idiosyncratic and covariate shocks – the case of Bangladesh*. Discussion Paper Series (Japan, Research Institute for Economics and Business Administration, Kobe University).

Baker, M. & Milligan, K. (2013) Boy-girl differences in parental time investments: Evidence from three countries (No. w18893).

Bansal, S. & Bhattacharya, A. (2017) *A breakthrough in education reform in India* (Boston, MA, The Boston Consulting Group).

Basu, K. (1999) Child labor: Cause, consequence, and cure, with remarks on international labor standards, *Journal of Economic Literature*, 37(3), 1083–1119.

Batra, R. & Reio, T. G. Jr (2016) Gender inequality issues in India, *Advances in Developing Human Resources*, 18(1), 88–101.

Berrington, A., Roberts, S. & Tammes, P. (2016) Educational aspirations among UK young teenagers: Exploring the role of gender, class and ethnicity, *British Educational Research Journal*, 42 (5), 729–755.

Breen, R. & Goldthorpe, J. H. (1997) Explaining educational differentials: Towards a formal rational action theory, *Rationality and Society*, 9(3), 275–305.

Calero, C., Bedi, A. S. & Sparrow, R. (2009) Remittances, liquidity constraints and human capital investments in Ecuador. *World Development*, 37(6), 1143–1154.

Carmichael, F., Darko, C. K. & Vasilakos, N. (2019a) Health and well-being of young people in Ethiopia, India, Peru and Vietnam: Life course impacts, *The Journal of Development Studies*, 56 (5), 964–983.

Carmichael, F., Darko, C. K. & Vasilakos, N. (2019b) *Unequal from the start? Children's lives and their employment outcomes in Ethiopia, India, Peru and Vietnam*. Working Paper, Centre for Competition Policy (available from the authors upon request).

Case, A. & Deaton, A. (1999) School inputs and educational outcomes in South Africa, *The Quarterly Journal of Economics*, 114(3), 1047–1084.
Chada, R. & Sinha, K. D. (2013) Indian family systems, collectivistic society and psychotherapy. *Indian Journal of Psychiatry*, 55, 299–309.
Chakraborty, T. & Kim, S. (2010) Kinship institutions and sex ratios in India, *Demography*, 47(4), 989–1012.
Chamarbagwala, R. (2008) Regional returns to education, child labour and schooling in India, *The Journal of Development Studies*, 44(2), 233–257.
Checchi, D. (2006) *The economics of education: Human capital, family background and inequality* (Cambridge, Cambridge University Press).
Cooper, C. E. (2010) Family poverty, school-based parental involvement, and policy-focused protective factors in kindergarten, *Early Childhood Research Quarterly*, 25(4), 480–492.
Croll, P. & Attwood, G. (2013) Participation in higher education: Aspirations, attainment and social background, *British Journal of Educational Studies*, 61(2), 187–202.
Crost, B. & Kambhampati, U. S. (2010) Political market characteristics and the provision of educational infrastructure in North India. *World Development*, 38(2), 195–204.
Darko, C. K. & Carmichael, F. (2020) Education of biological and fostered children in Ghana: The influence of relationships with the household head and household structure, *Journal of International Development*, 32(4), 487–504.
Davis-Kean, P. E. (2005) The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment, *Journal of Family Psychology*, 19(2), 294–304.
Dearing, E. (2008) Psychological costs of growing up poor, *Annals of the New York Academy of Sciences*, 1136, 324–332.
Deheija, R. & Wahba, S. (2002) Propensity score matching methods for nonexperimental causal studies, *Review of Economics and Statistics*, 84, 151–161.
Desai, S. B., Dubey, A., Joshi, B. L., Sen, M., Shariff, A. & Vanneman, R. (2010) *Human development in India* (New York, NY, Oxford University).
Desai, S. & Kulkarni, V. (2008) Changing educational inequalities in India in the context of affirmative action, *Demography*, 45(2), 245–270.
Dougherty, S. & Herd, R. (2008) *Improving human capital formation in India*. OECD Working Paper No. 625.
Drèze, J. & Murthi, M. (2001) Fertility, education, and development: Evidence from India, *Population and Development Review*, 27(1), 33–63.
Duncan, G. J., Yeung, W. J., Brooks-Gunn, J. & Smith, J. R. (1998) How much does childhood poverty affect the life chances of children?, *American Sociological Review*, 63, 406–423.
Emerson, P. M. & Souza, A. P. (2007) Child labor, school attendance, and intrahousehold gender bias in Brazil, *The World Bank Economic Review*, 21(2), 301–316.
Figlio, D., Karbownik, K., Roth, J. & Wasserman, M. (2016) School quality and the gender gap in educational achievement, *American Economic Review*, 106(5), 289–295.
Firpo, S., Fortin, N. M. & Lemieux, T. (2009) Unconditional quantile regressions, *Econometrica*, 77(3), 953–973.
Glewwe, P. & Kremer, M. (2006) Schools, teachers, and education outcomes in developing countries, *Handbook of the Economics of Education*, 2, 945–1017.
Guarcello, L., Mealli, F. & Rosati, F. C. (2010) Household vulnerability and child labor: The effect of shocks, credit rationing, and insurance. *Journal of Population Economics*, 23(1), 169–198.
Guryan, J., Hurst, E. & Kearney, M. (2008) Parental education and parental time with children, *Journal of Economic Perspectives*, 22(3), 23–46.
Hampden-Thompson, G. & Galindo, C. (2015) Family structure instability and the educational persistence of young people in England, *British Educational Research Journal*, 41(5), 749–766.
Hannum, E., Kong, P. & Zhang, Y. (2009) Family sources of educational gender inequality in rural China: A critical assessment, *International Journal of Educational Development*, 29, 474–486.
Hanushek, E. A. & Wößmann, L. (2007) *The role of education quality for economic growth* (Washington, D.C., The World Bank).

Huisman, J. & Smits, J. (2009) Effects of household-and district-level factors on primary school enrollment in 30 developing countries. *World Development*, 37(1), 179–193.
Jacoby, H. G. & Skoufias, E. (1997) Risk, financial markets, and human capital in a developing country, *The Review of Economic Studies*, 64(3), 311–335.
Khattab, N. (2015) Students' aspirations, expectations and school achievement: What really matters?, *British Educational Research Journal*, 41(5), 731–748.
Kingdon, G. G. (1998) Does the labour market explain lower female schooling in India?. *The Journal of Development Studies*, 35(1), 39–65.
Kingdon, G. (2010) The gender gap in educational attainment in India: How much can be explained?, *Journal of Development Studies*, 39(2), 25–53.
Klasen, S. (2002) Low schooling for girls, slower growth for all? Cross-country evidence on the effect of gender inequality in education on economic development, *The World Bank Economic Review*, 16(3), 345–373.
Lacour, M. & Tissington, L. D. (2011) The effects of poverty on academic achievement, *Educational Research and Reviews*, 6(7), 522–527.
Lopez, R., Thomas, V. & Wang, Y. (1999) *Addressing the education puzzle: The distribution of education and economic reform* (Washington, D.C., The World Bank).
Mani, A., Mullainathan, S., Shafir, E. & Zhao, J. (2013) Poverty impedes cognitive function, *Science*, 341(6149), 976–980.
Mehrotra, S. (2006) Reforming elementary education in India: A menu of options, *International Journal of Educational Development*, 26(3), 261–277.
Menon, N. (2009) Rainfall uncertainty and occupational choice in agricultural households of rural Nepal, *The Journal of Development Studies*, 45(6), 864–888.
Mensah, F. K. & Kiernan, K. E. (2010) Gender differences in educational attainment: Influences of the family environment, *British Educational Research Journal*, 36(2), 239–260.
Government of India (2016) *Educational statistics at a glance* (New Delhi, Government of India).
Morduch, J. (1994) Poverty and vulnerability, *The American Economic Review*, 84(2), 221–225.
Nussbaum, M. (2000) Women's capabilities and social justice, *Journal of Human Development*, 1 (2), 219–247.
Rivkin, S. G. & Schiman, J. C. (2015) Instruction time, classroom quality, and academic achievement, *The Economic Journal*, 125(588), F425–F448.
Rosenzweig, M. & Wolpin, K. (1994) Are there increasing returns to the intergenerational production of human capital? Maternal schooling and child intellectual achievement, *Journal of Human Resources*, 29(2), 670–693.
Rothstein, J. (2010) Teacher quality in educational production: Tracking, decay, and student achievement, *The Quarterly Journal of Economics*, 125(1), 175–214.
Sahoo, S. (2017) Intra-household gender disparity in school choice: Evidence from private schooling in India, *The Journal of Development Studies*, 53(10), 1714–1730.
Spaull, N. (2013) Poverty & privilege: Primary school inequality in South Africa, *International Journal of Educational Development*, 33(5), 436–447.
Strand, S. (2011) The limits of social class in explaining ethnic gaps in educational attainment, *British Educational Research Journal*, 37(2), 197–229.
Sullivan, A. & Brown, M. (2015) Reading for pleasure and progress in vocabulary and mathematics, *British Educational Research Journal*, 41(6), 971–991.
Tilak, J. B. (2007) Post-elementary education, poverty and development in India, *International Journal of Educational Development*, 27(4), 435–445.
UNESCO (2005) *Decade of education for sustainable development: 2005–2014*. Draft International Implementation Scheme.
Vecchio, N. & Roy, K. C. (1998) *Poverty, female-headed households, and sustainable economic development* (Westport, CT, Greenwood Press).
Votruba-Drzal, E. (2006) Economic disparities in middle childhood development: Does income matter?, *Developmental Psychology*, 42(6), 1154–1167.

Woldehanna, T., Jones, N. & Tefera, B. (2008) The invisibility of children's paid and unpaid work: Implications for Ethiopia's national poverty reduction policy, *Childhood*, 15 (2), 177–201.

Young Lives (2018) *Survey design and sampling fact sheets*. Available online at: www.younglives.org.uk (accessed 4 June 2018).

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Figure A1. Matched and unsampled samples.

Figure A2. Parents' educational aspirations for children.

Table A1. Effect of (adjusted) wealth on children's cognitive outcomes.

Table A2. Effects of wealth and parental aspirations along test score distribution.

Table A3. Gender and wealth effect on children's cognitive outcomes: matched subsample.