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From Nutrition to Aspirations and Self-Efficacy: Gender Bias over Time among Children in Four Countries

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Available from:
Young Lives
Department of International Development
University of Oxford
3 Mansfield Road
Oxford OX1 3TB, UK
Tel: +44 (0)1865 281751
E-mail: younglives@younglives.org.uk
Web: www.younglives.org.uk

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Abstract

We use data on children at ages 8, 12 and 15 from Young Lives, a cohort study of 12,000 children across Ethiopia, India (Andhra Pradesh), Peru and Vietnam, to document the presence of a gender gap across a wide variety of indicators, including nutrition, education, aspirations, subjective well-being and psychosocial competencies. First, we find that there is considerable heterogeneity across countries, ages and indicators in whether there is any gender bias and whether it is in favour of boys or girls. Second, we find strong evidence of an ‘institutionalised’ gender bias against girls in education in India and, to an extent, Ethiopia; the bias appears to emerge in the educational aspirations of parents for their children at age 8, is transmitted to the aspirations of children at 12 and is transformed into gender gaps in test scores related to cognitive achievement at age 15, despite relatively high enrolment levels. This bias is stronger in rural than in urban India; in rural Peru there is some evidence of a pro-male bias in education at age 12 and 15. We also observe lower self-efficacy (as measured by agency) for girls in Ethiopia and India at age 15. Similar patterns exist in Vietnam but in the opposite direction – in favour of girls rather than boys. Evidence in other studies suggests that poorer non-cognitive skills lead to poorer performance in the labour market, as well as lower human capital, which causes continuing bias in outcomes for these groups.

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The Authors

Stefan Dercon is Professor of Development Economics at the University of Oxford; **Abhijeet Singh** is a researcher at Young Lives Oxford. Contact: stefan.dercon@economics.ox.ac.uk and abhijeet.singh@economics.ox.ac.uk.

About Young Lives

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1. Introduction

Gender equality is central to much of the discourse on development. It is enshrined in the third Millennium Development Goal (MDG) and remains an important area of concern in many dimensions, including MDG targets covering employment opportunities and political representation, where women consistently have more negative outcomes. However, in some other dimensions, especially school enrolment, which is one of the most important aspects of the MDGs relevant for children, gender gaps have declined considerably in the past two decades: the ratio of girls to boys enrolled in primary education rose from 87 per cent to 96 per cent, and in secondary education from 78 per cent to 96 per cent, between 1991 and 2008 (United Nations 2011).

This paper focuses on gender-based inequalities as experienced by children through a systematic quantitative analysis of a broad set of indicators.¹ The discussion hitherto on gender inequalities in child well-being has been centred on a very restrictive set of indicators: from infancy until the age of five, child well-being is reduced to some measure of nutrition or the risk of dying, then it becomes a question of enrolment into school, and by about age 15 indicators focus on labour market participation and marriage. Much of this approach is necessitated by data availability since most data on children come from population census data (for indicators such as mortality), the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Survey (MICS) data, as well as large household welfare monitoring surveys such as the Living Standard Measurement Surveys (LSMS). This makes up, however, a very narrow view of what matters for children and in this paper we aim to do better by analysing a much richer range of data. We will document, by comparing data from different settings, the presence and extent of a gender bias across a broader set of indicators, collected from cohorts of children at the age of 8, 12 and 15 years in Ethiopia, Andhra Pradesh (India), Peru and Vietnam. The data were collected using almost exactly the same instruments and are very recent: in this paper, we use data collected in 2006 and 2009. The result is a multidimensional snapshot of the current gender bias across parts of the developing world with different cultural and socio-economic contexts.

The data presented here cover 13 indicators which include indicators on nutrition (height-for-age, weight-for-age and BMI-for-age z-scores),² on education and achievement (enrolment and also test scores in arithmetic and the Peabody Picture Vocabulary Test (PPVT)), on educational aspirations (reported by both children and by parents/caregivers), on subjective well-being (reported by children, using the 'ladder of life', a measure of life satisfaction), and on four psychosocial competencies (agency/self-efficacy, trust, pride/self-esteem, and inclusion). In so doing, we complement the existing analyses on gender bias in childhood by offering a more comprehensive picture of children's skill formation during childhood, which includes not only their cognitive skills as measured by conventional standardised test scores but also their psychosocial development, such as in terms of agency or self-esteem, as well

1 See also Pells (2011), a complementary analysis of the patterns around gender inequality in these data, which discusses findings from qualitative data and basic descriptive statistics collected by Young Lives and situates these findings in the broader policy literature on gender inequality.

2 BMI-for-age z-scores refer to the body mass index (BMI) of children normalised to account for difference in BMIs of boys and girls at different ages.

as valuing children's own perception of their lives through measures of life satisfaction and their perceptions of inclusion.

The data come from the Young Lives cohort study, which aims to study the causes and consequences of child poverty across these four countries. The survey covers two cohorts, the first comprising about 4,000 children (1,000 per country) who were born in 1994–5 and the second comprising 8,000 children (2,000 per country) who were born in 2001–2.³ Starting in 2002, the study has followed these children for three rounds of data collection, in 2002, 2006 and 2009. The data are highly clustered – from 20 rural and urban sites in Ethiopia, Andhra Pradesh, Vietnam, and Peru.⁴ The cluster selection and a relative oversampling of poorer households mean that the data are not nationally representative, but rather miss typically the 10 per cent richest households in each country. Careful comparisons with DHS and other surveys in each country nevertheless suggest that the data are representative of the type of variation typically found in nationally representative surveys (Escobal and Flores 2008; Kumra 2008; Nguyen 2008; Outes-Leon and Sanchez 2008).

Three main results stand out from our analysis. First, contrary to perceived wisdom, we find considerable heterogeneity in gender bias. Gender biases are often specific to age groups, contexts and indicators, and the bias is not always simply against girls. Second, we find strong evidence of an 'institutionalised' gender bias against girls in education in India, and, to an extent, Ethiopia. This bias appears to emerge in the educational aspirations of parents for their children at age 8, and is transmitted to the aspirations of children at 12. It is then transformed into gender gaps in cognitive outcomes at age 15. We also observe lower self-efficacy (as measured by agency) for girls in Ethiopia and India. Similar 'institutionalised' patterns exist in Vietnam, but in the opposite direction – in favour of girls rather than boys. As these non-cognitive skills are correlated with success in labour markets (Cunha and Heckman 2008), they contribute to the perpetuation of bias in later life. Finally, we note that even where gender biases manifest themselves strongly, they are sometimes overshadowed by deprivations in other dimensions, such as caste or being in a rural area.

In the next section, we introduce first the data and the indicators used, as well as the method used to document gaps. In section 3 we offer the core findings. In section 4 we extend the analysis and ask whether the indicators are different when disaggregated by various classifications, such as among poorer families, in rural rather than urban areas and by different levels of education of the mother. Section 5 extends the analysis to look at transmission of biases across dimensions over time for the same children. Section 6 discusses our findings, and the final section concludes.

2. Data and method

The Young Lives data are unique in their breadth and scope among developing country datasets: large cohorts of children and their caregivers are systematically interviewed on a wide variety of indicators. As previously noted, even though the data are relatively highly

3 The only exception in this regard is Peru where there were only 716 children in the Older Cohort (born in 1994–5) because of resource constraints.

4 The number of individual communities within sentinel sites differ across country and is significantly more in Peru and Andhra Pradesh.

clustered, careful analysis of the samples suggests that they are broadly representative of all but the richest children in each of the countries studied. Another unique feature of the Young Lives survey is its low attrition rates with, in all countries, still more than 95 per cent of the original sample represented in the data (Outes-Leon and Dercon 2008); children are tracked wherever they move to and about 1.5 percentage points of this attrition is accounted for by mortality.

The questionnaires were developed with inputs from researchers in a variety of disciplines, including experts in education, health, child psychology and anthropology. Instruments were chosen for their suitability to be used in a variety of cultural and social settings and were designed to be appropriate for the age of the children at the time. In this paper, we use 13 indicators. Box 1 (overleaf) documents the indicators used as outcomes in the analysis, and their definition or procedure of computation. Some – nutrition indicators, or enrolment data and test scores⁵ – are rather standard. The nutrition data use the z-score transformations proposed by the WHO 2005 conventions; in principle comparability across settings is possible. Together, these indicators offer a sense of the child's physical and cognitive development.

However, children are more than this. Some of the indicators included aim to capture children's own perceived well-being as well as at least one aspect of their hopes for the future. In particular, child aspiration indicators refer to direct questions asked of children and parents about the desired levels of education if no constraints were to exist; almost all children will have gone to school at some point and thus the question has appeared meaningful to all. Subjective well-being is assessed here using the standard instrument, the ladder of life, familiar from, for example, the World Value Surveys. Its validity and implementation in research on children is discussed in Camfield et al. (2008) and the sources cited therein.

We also aimed to capture a child's perception of itself and its opportunities from a psychosocial point of view. These indicators have intrinsic value; furthermore other work, summarised in Cunha and Heckman (2008), has shown that such indicators can have strong predictive power for future job attainment, earnings, and even crime and antisocial behaviour. These psychosocial indicators are based on existing scales, but had to be adjusted to be relevant for children. They refer to children's trust (similar to more common generalised trust measures), pride and self-esteem (building on Rosenberg 1965), agency or self-efficacy (building on the concept of locus of control, Rotter 1966; and Bandura 1993) and sense of inclusion or discrimination. In Dercon and Krishnan (2009) these measures were broadly validated, although the relatively small number of questions may well result in measurement error affecting precision.

5 For test scores, extensive validation work has been conducted for cross-cultural comparisons for the 2006 round, and the general advice is to be cautious about using it across countries; as a result we only report raw scores and not standardised scores (as this would invite apparent comparisons). See Cueto et al. (2008).

Box 1. *Indicators and definitions used*

Indicator	Question/Definition
Aspirations	
Child's desired education	Q. Imagine you had no constraints and could study for as long as you liked, or go back to school if you have already left. What level of formal education would you like to complete? [CODED AS YEARS OF EDUCATION; UNIVERSITY=15, ADULT LITERACY=5]
Parent's desired education	Q. Ideally what level of education would you like [NAME] to complete? [CODED AS YEARS OF EDUCATION; UNIVERSITY=15, ADULT LITERACY=5] (asked of the main caregiver)
Subjective well-being	
Ladder of life	Q. There are nine steps on this ladder. Suppose we say that the ninth step, at the very top, represents the best possible life for you and the bottom represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time?
Psychosocial competencies	
All psychosocial indices are produced through an identical procedure: (i) all relevant questions are recoded to be positive outcomes, (ii) relevant questions are all normalised to z-scores within each country (subtract mean and divide by SD) and then (iii) an average of the relevant z-scores is taken across the non-missing values of the questions. The questions differed in coverage a little across rounds and cohorts and thus the indices are calculated a little differently. All the questions are on Likert-type scales going from 1 to 4 in Round 2 (R2) and from 1 to 5 in Round 3 (R3). The exact questions used per index are given below. YC=Younger Cohort; OC=Older Cohort.	
Trust index	YC R3 (8 years): Most people in my neighbourhood can be trusted. I feel safe when I go out of the house on my own. I believe the government does what is right for people like me. ----- OC R2 (12 years): Most people in my neighbourhood are basically honest. Most people in my neighbourhood can be trusted. I believe the government does what is right for people like me. I feel safe when I go out of the house on my own. ----- OC R3 (15 years): Most people in my neighbourhood can be trusted. I feel safe when I go out of the house on my own. I believe the government does what is right for people like me.
Agency index (Self-efficacy scale)	YC R3 (8 years): If I try hard, I can improve my situation in life. Other people in my family make all the decisions about how I spend my time [recoded to positive]. I like to make plans for my future studies and work. If I study hard at school, I will be rewarded by a better job in the future. I have no choice about the work I do – I must do this sort of work [recoded to positive]. ----- OC R2 (12 years): If I try hard, I can improve my situation in life Other people in my family make all the decisions about how I spend my time [recoded to positive]. I like to make plans for my future studies and work. If I study hard at school, I will be rewarded by a better job in the future. I have no choice about the work I do – I must do this sort of work [recoded to positive]. ----- OC R3 (15 years): If I try hard, I can improve my situation in life. Other people in my family make all the decisions about how I spend my time [recoded to positive]. I like to make plans for my future studies and work. If I study hard at school, I will be rewarded by a better job in the future. I have choice about the work I do – I must do this sort of work.

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Indicator	Question/Definition
Pride index (self-esteem scale)	<p>YC R3 (8 years):</p> <p>I am proud of my shoes or of having shoes.</p> <p>I am proud of my clothes.</p> <p>I am never embarrassed because I do not have the right books, pencils or other equipment.</p> <p>I am proud that I have the correct uniform.</p> <p>I am proud of the work I have to do.</p>
	<p>OC R2 (12 years):</p> <p>I feel proud to show my friends or other visitors where I live.</p> <p>I am ashamed of my clothes [recoded to positive].</p> <p>I am ashamed of my shoes [88=no shoes] [recoded to positive].</p> <p>I feel proud of the job my [INSERT RELATIONSHIP OF HOUSEHOLD HEAD TO THE CHILD] does.</p> <p>I am often embarrassed because I do not have the right books, pencils and other equipment for school [recoded to positive].</p> <p>I am worried that I don't have the correct uniform [recoded to positive].</p> <p>I am proud of my achievements at school.</p> <p>I am embarrassed by/ashamed of the work I have to do [recoded to positive].</p> <p>The job I do makes me feel proud .</p>
	<p>OC R3 (15 years):</p> <p>I am proud of my shoes or of having shoes.</p> <p>I am proud of my clothes.</p> <p>I am never embarrassed because I do not have the right books, pencils or other equipment.</p> <p>I am proud that I have the correct uniform.</p> <p>I am proud of the work I have to do.</p>
Inclusion (discrimination) index	<p>OC R2 (12 years):</p> <p>When I am at the shops/market I am usually treated by others with fairness and with respect.</p> <p>Adults in my [STREET/VILLAGE] treat me worse than other children my age [recoded to positive].</p> <p>The other children in my class treat me with respect.</p> <p>Other pupils in my class tease me at school [recoded to positive].</p> <p>My teachers treat me worse than other children [recoded to positive].</p>
	<p>OC R3 (15 years)</p> <p>The other children in my class treat me with respect</p> <p>Pupils in my class never tease me at school.</p> <p>Adults in my community treat me as well as they treat other children at my age.</p>
Nutrition	
Height-for-age z-scores	Computed using WHO 2005 standards
Weight-for-age z-scores	Computed using WHO 2005 standards
BMI-for-age z-scores	Computed using WHO 2005 standards
Education and cognitive achievement	
PPVT raw score	Non-standardised raw score on the Peabody Picture Vocabulary Test
Maths score	Score on standard maths computing questions (maximum score is 20)
Enrolment	Dummy variable equal to 1 if enrolled in formal schooling

In this paper, we only use data from the 2006 and 2009 rounds of the study and analyse gender-based inequalities as experienced by the children in our sample at 8, 12 and 15 years of age approximately. We select these three ages, and ignore observations at younger ages, as most of the innovative indicators (subjective well-being, child aspirations and psychosocial competencies) could only be asked once children had reached about 8. Also, in the first round of data collection in 2002, the cohort born in 1994–5 had only been offered a shorter questionnaire. As a result, we use data from this cohort collected in 2006 and 2009 (when they had reached age 12 and 15), and data from the Younger Cohort (born 2001–2) from 2009 (when they were aged 8).

We investigated the gender gap first in the simplest possible way: by comparing the difference in the means between boys and girls at various ages. A second set of results uses a multivariate regression approach and presents the gender gap in various indicators after controlling for a series of other possible covariates for the indicators used. In particular, we ran regressions in which the indicator was regressed on a dummy for gender (1=male) as well as the logarithm of total consumption expenditure, education of the mother, household size, ethnicity/caste and urban/rural location of residence. The advantage of this approach is that we narrow down the effect to general 'preference'-based gender bias effects, at least after accounting for socio-economic factors that may induce certain behaviours. For example, if gender bias is just driven by poverty or the lack of an educated caregiver, then any remaining gender bias would disappear. If not, the effects remain unchanged. The results will allow us to see the impact of relatively simple explanations on the persistence of gender effects, as well as suggesting some mediating factors. For example, if the gender effects are reduced once we control for education of the caregiver, then this is at least suggestive evidence of how these effects are being perpetuated (even though this is at best suggestive, and not a framework for full causal analysis).

To explore the possibility that gender inequality is specifically or differentially linked to particular groups, such as rural or poor or poorly educated households, we offer in section 4 some further analysis, using the same regression approach, but this time using also interaction effects with the gender dummy for these characteristics.⁶

6 Note that the regression-based results will allow us to avoid problems of comparison between the data from 2006 and 2009: in all countries, substantial growth has taken place, so that by controlling for socio-economic factors, we can ensure closer comparability of the results from these different years.

3. Basic results: gender gaps and interpretation

Tables 1A, 1B and 1C present the means of the outcome variables used in our regressions, disaggregated by gender, for children aged 15 years, 12 years and 8 years respectively for the four study countries. Table 2 presents the coefficients on the male dummy variable after controlling for various covariates.⁷

Table 1A. Mean of outcome variables, by gender, Older Cohort (age 15)

	Ethiopia			India			Peru			Vietnam		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
Enrolled in school	0.92	0.88*	0.9	0.74	0.81**	0.77	0.95	0.91*	0.93	0.81	0.73***	0.77
Child aspirations	13.76	14.05*	13.91	13.17	13.63**	13.4	15.59	15.7	15.65	14.14	13.58***	13.86
9-step ladder	4.78	4.77	4.78	4.91	4.62**	4.77	6.32	5.95***	6.12	5.43	5.16***	5.3
Trust index	-0.1	0.09***	0	-0.02	0.02	0	-0.09	0.08***	0	-0.13	0.13	0
Pride index	-0.03	-0.01	-0.02	0.06	-0.08***	-0.01	0	-0.01	0	-0.02	0.02	0
Inclusion index	-0.03	0.02	0	0	-0.02	-0.01	0.03	-0.01	0.01	-0.02	0.01	0
Agency index	-0.03	0.03**	0	-0.05	0.06***	0.01	0.09	-0.08***	0	0	0	0
Height-for-age z-score	-0.99	-1.74***	-1.37	-1.7	-1.63	-1.66	-1.59	-1.38***	-1.48	-1.38	-1.46	-1.42
BMI-for-age z-score	-1.35	-2.07***	-1.72	-0.92	-1.62***	-1.26	0.42	0.12***	0.26	-0.69	-1.02***	-0.85
PPVT raw score	149.45	154.24**	151.9	121.76	138.15***	129.8	95.38	97.99*	96.77	166.48	164.92	165.71
Maths score	3.89	4.87***	4.39	5.77	7.28***	6.51	9.99	9.75	9.86	13.01	11.76***	12.39

*** p<0.01, ** p<0.05, * p<0.1

There is a wealth of data on various indicators in Tables 1A, 1B, 1C and 2, not necessarily very surprising when considered individually but which, taken together, show the striking heterogeneity in the presence of bias and in its direction across countries, stages in a child's life cycle and indicators. Certainly there is no simplistic boy bias, even within particular countries, on all indicators. While some striking patterns emerge, they are frequently more nuanced than is often emphasised in the narrative on gender disparities in development.

Considering the first three variables presented in Table 2, which focus on educational outcomes, a key contrast can be observed between India and Ethiopia on the one hand and Vietnam on the other. In terms of cognitive achievement, a clear pro-boy bias is present in Ethiopia and India, which is not necessarily apparent at an early age, but by the age of 12 and especially 15 years, is most pronounced. In contrast, in Vietnam we find a tendency for a pro-girl bias in achievement, strongly significant for mathematics. At an early age there is a clear bias in test scores in favour of boys in Peru, but this tends to disappear at a later age.

These findings for school achievement tend to mirror child and parental aspirations. We observe a striking association between parental and child aspirations, and between aspirations and outcomes, especially in the three countries where we find significant bias by the age of 15 in achievement. We collected parental aspirations when the children were

⁷ In practice, it is generated by running a regression of the indicator onto the gender dummy (male=1) and a constant, and the coefficient on the gender dummy is the effect.

Table 1B. Mean of outcome variables, by gender, Older Cohort (age 12)

	Ethiopia			India			Peru			Vietnam		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
Child aspirations	13.9	13.93	13.92	13.47	14.03***	13.75	15.41	15.42	15.42	14.22	13.92**	14.07
Parental aspirations	14.08	14.21	14.15	12.14	13.33***	12.72	15.42	15.52	15.48	13.99	13.85	13.92
9-step ladder	4.29	4.23	4.26	3.61	3.68	3.64	6.33	5.68***	5.98	4.82	4.77	4.8
Trust index	-0.01	0.01	0	0	-0.01	0	-0.07	0.06***	0	-0.07	0.08***	0.01
Pride index	0.04	-0.05***	0	-0.02	0.02	0	-0.03	0.02	0	0	-0.01	-0.01
Agency index	0.01	-0.02	0	-0.01	0	-0.01	0.03	-0.03	0	0.02	-0.04	-0.01
Inclusion index	0.04	-0.05**	-0.01	0.06	-0.08***	-0.01	0.05	-0.05**	0	-0.01	0.01	0
Enrolled in school	0.98	0.97	0.97	0.89	0.91	0.9	0.99	0.99	0.99	0.97	0.97	0.97
PPVT raw score	75.39	76.32	75.87	88.93	91.69*	90.27	72.72	72.53	72.62	137.47	137.64	137.56
Maths score	4.77	5.02	4.9	5.64	5.85	5.74	5.75	5.76	5.75	7.49	7.38	7.44
Height-for-age z-score	-1.31	-1.47*	-1.39	-1.77	-1.51**	-1.64	-1.51	-1.55	-1.53	-1.34	-1.48**	-1.41
BMI-for-age z-score	-1.66	-1.61	-1.64	0.57	-0.01	0.29	0.25	0.31	0.28	-0.94	-1.04	-0.99

*** p<0.01, ** p<0.05, * p<0.1

Table 1C. Mean of outcome variables, by gender, Younger Cohort (age 8)

	Ethiopia			India			Peru			Vietnam		
	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total
Parental aspirations	14.21	14.3	14.25	12.29	13.68***	13.03	7.77	7.4*	7.59	14.31	14.16*	14.23
9-step ladder	5.28	5.3	5.29	5.14	5.07	5.1	7.05	6.93	6.99	6.13	6.06	6.09
Trust index	0.01	-0.01	0	-0.01	0.01	0	0.02	0	0.01	-0.02	0.02	0
Pride index	-0.02	-0.03	-0.02	-0.05	0.04***	0	0	-0.01	0	0.03	-0.03**	0
Agency index	-0.03	0.01	-0.01	-0.04	0.03**	0	0.01	-0.01	0	0.02	-0.03**	-0.01
Height-for-age z-score	-1.13	-1.28***	-1.21	-1.36	-1.49**	-1.43	-1.15	-1.18	-1.17	-1.06	-1.13	-1.1
BMI-for-age z-score	-1.3	-1.27	-1.28	-1.35	-1.48***	-1.42	0.39	0.65***	0.52	-0.75	-0.59***	-0.67
Weight-for-age z-score	-1.57	-1.68**	-1.63	-1.77	-1.97***	-1.87	-0.38	-0.29	-0.34	-1.14	-1.12	-1.13
PPVT raw score	79.01	80.19	79.64	55.01	61.6	58.5	58.5	60.08*	59.3	94.18	95.57	94.9
Maths score	2.09	2.32	2.21	5.6	5.64	5.62	7.47	7.91**	7.69	11.81	11.71	11.76
Enrolled in school	0.79	0.75*	0.77	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.98
Urban location	0.4	0.39	0.39	0.26	0.27	0.26	0.71	0.72	0.72	0.2	0.21	0.21
Mother's education	3	3.14	3.08	3.72	3.67	3.69	7.87	7.92	7.9	6.9	6.82	6.86
Per capita expenditure	262.81	269.99	266.6	846.52	895.08**	872.31	216.46	215.19	215.82	509.2	520.8	515.16

aged 8 and 12 years. Parental aspirations at an early age are biased towards boys in India, while in Peru and in Vietnam they are in favour of girls; by the age of 12 they are biased towards boys in Ethiopia and India. This pattern mirrors child aspirations: by the age of 12 and 15, they are significantly biased in the same direction as parents' aspirations at the age of 8 and 12, with clearly higher aspirations for boys in India and Ethiopia, and for girls in Vietnam. It is, however, also worth noting that the gap between the educational aspirations of boys and girls in Andhra Pradesh, where this gap is widest in our data, is only half as wide as the gap in parental aspirations for their education at the age of 12 years; clearly, even though there may be inter-generational transfer of low or biased aspirations to girls in this context, the bias is not reproduced perfectly and girls' own aspirations exceed those of their parents for them. The correlation with actual achievement in these countries is striking, and consistent with a narrative of institutionalised gender bias which is nested in the norms

Table 2. *Coefficient on male dummy variable*

	Education and cognitive achievement			Educational aspirations		Subj. well-being	Psychosocial competencies				Nutrition		
	PPVT score	Maths score	Enrolment	Child	Care-giver	Ladder of life	Trust	Pride	Inclusion	Agency	Height-for-age	BMI-for-age	Weight-for-age
Ethiopia													
YC (2009) age 8	-0.256	0.146	-0.05***	–	0.0627	-0.0304	-0.0259	-0.0206	–	0.0278	-0.17***	0.0216	-0.12***
OC (2006) age 12	1.369	0.295**	-0.0127	0.0590	0.140	-0.0746	0.0147	-0.079**	-0.0704*	-0.0180	-0.143*	0.0654	–
OC (2009) age 15	5.084***	1.051***	-0.0354*	0.338**	–	-0.0351	0.175***	0.0194	0.0430	0.0629*	-0.77***	-0.70***	–
India													
YC (2009) age 8	6.202***	0.0192	0.00394	–	1.398***	-0.0913	0.0153	0.086***	–	0.065***	-0.136**	-0.129**	-0.20***
OC (2006) age 12	3.319**	0.251*	0.0215	0.632***	1.190***	0.0818	0.0135	0.0442	-0.13***	0.0267	0.258**	-0.620	–
OC (2009) age 15	15.96***	1.529***	0.0668**	0.509***	–	-0.242**	0.0323	-0.13***	-0.0182	0.104***	0.0752	-0.70***	–
Peru													
YC (2009) age 8	1.508**	0.390**	0.00221	–	-0.341*	-0.129	-0.0130	-0.0116	–	-0.0186	-0.0437	0.260***	0.0781
OC (2006) age 12	-0.681	-0.0546	-0.00504	-0.0628	0.0466	-0.65***	0.145***	0.0357	-0.10***	-0.0811*	-0.0580	0.0639	–
OC (2009) age 15	1.728	-0.362	-0.0332*	0.0652	–	-0.329**	0.174***	-0.0231	-0.0428	-0.19***	0.190***	-0.29***	–
Vietnam													
YC (2009) age 8	1.436	-0.0872	-0.0072	–	-0.159**	-0.106	0.0312	-0.0598**	–	-0.054**	-0.0683	0.146***	0.0194
OC (2006) age 12	0.718	-0.0966	0.00356	-0.275**	-0.104	-0.0029	0.161***	-0.00508	0.0152	-0.0659*	-0.143**	-0.113*	–
OC (2009) age 15	-1.265	-1.36***	-0.08***	-0.53***	–	-0.27***	0.265***	0.0479	0.0305	-0.0113	-0.0840	-0.35***	–

Note:

1) Robust (Huber-White) standard errors are used. *** p<0.01, ** p<0.05, * p<0.1

2) Coefficients on mother's education, log of monthly per capita expenditure, household size and dummy variables for ethnic/caste groups and urban areas are not reported owing to space constraints.

and values of parents, and then transmitted to children (at least in part), contributing to lower achievement. The causality from aspirations to achievement is still a debated issue in educational psychology and sociology (Saha 1997), but these patterns are very suggestive.

It is important also to note here that even though the direction of bias in both achievement and aspirations seems to be very similar for children at 15 years of age in Ethiopia and India, the implied magnitudes are very different. Consistent with our other findings, the magnitude of bias in favour of boys is much larger in India than in Ethiopia. These differential findings across the four countries highlight not just the heterogeneity within developing countries in the existence and direction of gender-based inequalities, but also their size, across different contexts. Although we do not present coefficients of other variables here, it is also germane to note that gender is not always the key axis of disadvantage: for example, at the age of 15 years, the disadvantageous effect of living in a rural area in Ethiopia is twice as much on child educational aspirations, one-and-a-half times as much on maths scores, and five times as much on PPVT scores as the disadvantage from being a girl.

Turning to nutritional status – including in terms of height or body mass index, the patterns are similarly striking and typically point to a pro-female bias in all four countries by the age of 15, not least in BMI, likely to reflect both more intensive manual labour for boys and lack of social opportunities for girls. Obesity figures (using BMI, above 2 standard deviations in z-score) are not necessarily higher for girls, so the former explanation may be more likely. More work would be required to explore this further.

In terms of subjective well-being, the data suggest a move from no bias (or if anything, a pro-boy bias) in answers to the ladder of life question at the age of 8 to a pronounced and significant pro-girl bias equivalent to about a quarter of a step at the age of 15. In general, girls in this sample suggest a higher subjective well-being than boys.⁸

Finally, in terms of psychosocial competencies, the patterns may at first seem very heterogeneous, but on closer inspection, a few distinct patterns appear. Two strong effects are worth highlighting here. A first finding is that across three of the four countries, (Ethiopia, Peru and Vietnam) girls at the age of 15 have significantly lower trust in members of their immediate society than boys, possibly reflecting personal, parental and community values and fears related to girls reaching marriageable age.

A second finding, possibly more importantly, is that agency or self-efficacy (measuring the extent to which a person feels in charge of his/her life and destiny, and therefore sometimes referred to as a measure of empowerment), has a striking pro-male bias in India and Ethiopia by the age of 15. As this psychosocial competence is essentially a forward-looking indicator (Bandura 1993) and has been shown to correlate with investment in the future (Bernard et al. 2011), the similarity with the aspirations and findings on education, both in terms of aspirations and achievement is striking. In social psychology, social cognitive theory posits that goals and aspirations come about from self-efficacy (Miller and Dollard 1941, themselves building on social learning theories): for example, self-efficacy regulates students' aspirations, motivation and, in the end, achievements (Bandura 1993). While our indicator of self-efficacy goes beyond education, it confirms a chain of evidence consistent with this view. As self-efficacy is shaped during earlier childhood, not least via norms and value transmission, and encouragement or discouragement by parents,⁹ referring to the presence of an institutionalised bias would not be inappropriate in both settings. Such a chain of transmission of gendered bias against girls is not present in the data from Peru and Vietnam; on the contrary, to some extent it is present in the Vietnamese data in the opposite direction, i.e. in favour of girls, going from parental aspirations for girls to higher aspirations on the part of girls for themselves in comparison to boys and finally into higher educational achievement for girls.¹⁰

8 This effect is present in all countries, albeit with varying degrees of significance. This result, however, needs to be interpreted with caution. As Sen (1992) argues eloquently, in the case of entrenched inequalities, the extent of a person's deprivations may not show up at all in a metric of desire fulfilment, owing to a downward adaptation of the best possible life that the individual visualises for himself/herself.

9 Bandura (1993) summarises that self-efficacy stems from at least four sources: mastery experiences (learning from success and failure), vicarious experiences (learning from social models), social persuasion (responding to encouragement), and emotional strength (stamina or raising ability to respond to stress). Krishnan and Krutikova (2010) report on how efficacy among adolescents in slums of Bombay is both shaped by parents' views and possibly affected by positive encouragement by NGO intervention.

10 The gender differences in the self-efficacy indicator are mainly driven by the question: 'Other people in my family make all the decisions about how I spend my time'. It appears that in this question boys generally reflect greater agency than girls. Furthermore, the answers are not positively correlated as expected with other questions in the index. Interpreting this is not self-evident. On the one hand, being able to make one's own decisions about one's life is clearly an important dimension of agency; on the other hand, if girls allow this to happen consciously in order to open up opportunities in response to cultural or other local factors, then perhaps interpreting this as reflecting low agency is not straightforward.

4. Extension: is bias conditioned by poverty, maternal education or location?

In this section, we explore whether the overall effects are heterogeneous within each country. In particular, are gaps larger or smaller when focusing on poorer, less educated, or rural settings. Our approach here is simple: we augment the basic regression specification from section 3 (including a gender dummy and various covariates as controls) by adding an interaction term between the gender dummy variable and the dimension regarding which we want to study any variation in gender bias, such as urban/rural location of residence or mother's education. We report the coefficients on the gender dummy variable and the interaction term for all regressions of this form to enable an examination of any heterogeneity within a country in the nature of gender bias in a dimension.

4.1 Urban versus rural location

Table 3 (overleaf) reports the results from considering whether living in an urban setting changes some of the biases reported in the previous section. A few results are striking. First, the evidence suggests that the bias in favour of boys, from the educational aspirations of parents and children and test score results, is considerably stronger in rural areas in Andhra Pradesh, with a lower incidence or (statistically significant) absence of a bias in urban areas. In Peru, the pro-girl bias in parental aspirations at an early age, present in both rural and urban areas, appears to translate into pro-girl bias at the age of 12 for girls in urban areas only, but by this age, a pro-male parental educational bias exists in rural areas. These patterns persist in child educational aspirations at the age of 15. In short, there appear to be elements of divergence in attitudes towards gender and education between rural and urban Peru. Finally, in Vietnam, the parental pro-girl bias at age 8 is strikingly only present in rural areas. Looking at nutrition outcomes, the most striking pattern is that the pro-male biases in BMI and weight in both Peru and Vietnam are considerably higher in urban than in rural areas, again consistent with higher energy use of boys in rural areas.

Table 3. Coefficient on male dummy and interaction term with urban location

	Education and cognitive achievement			Educational aspirations		Subj. well-being	Psychosocial competencies				Nutrition		
	PPVT score	Maths score	Enrolment	Child	Care-giver	Ladder of life	Trust	Pride	Inclusion	Agency	Height-for-age	BMI-for-age	Weight-for-age
Ethiopia													
YC (2009) age 8													
Male	-2.066	0.0768	-0.0519**	–	0.0961	-0.118	-0.0062	-0.0440	–	0.0117	-0.145**	0.0362	-0.1000*
Male* Urban	4.608	0.177	0.00298	–	-0.0851	0.224	-0.0502	0.0594	–	0.0409	-0.0610	-0.0371	-0.0609
OC (2006) age 12													
Male	1.946	0.263	-0.0158	0.0503	0.181	-0.0844	0.0194	-0.0665	-0.0148	-0.0466	-0.210**	0.101	–
Male*Urban	-1.452	0.0786	0.00765	0.0214	-0.102	0.0249	-0.0119	-0.0334	-0.141*	0.0721	0.169	-0.0889	–
OC (2009) age 15													
Male	6.596**	0.970***	-0.0404	0.482**	–	-0.0729	0.121**	0.0724	0.0504	0.0506	-0.994***	-0.726***	–
Male*Urban	-3.704	0.199	0.0124	-0.351	–	0.0927	0.132	-0.130	-0.0182	0.0300	0.553***	0.0536	–
India													
YC (2009) age 8													
Male	5.867***	0.107	0.00389	–	1.557***	-0.0407	0.00848	0.0588*	–	0.0596**	-0.176***	-0.139***	-0.236***
Male*Urban	1.344	-0.353	0.000191	–	-0.641**	-0.202	0.0274	0.110	–	0.0222	0.162	0.0363	0.144
OC (2006) age 12													
Male	3.803**	0.333**	0.0294	0.782***	1.440***	0.114	0.0270	0.0519	-0.142***	0.0541	0.328**	-0.598	–
Male*Urban	-1.905	-0.316	-0.0305	-0.545*	-0.975**	-0.124	-0.0524	-0.0301	0.0663	-0.107	-0.275	-0.0886	–
OC (2009) age 15													
Male	17.06***	1.833***	0.0821***	0.543**	–	-0.136	0.0497	-0.143***	-0.0276	0.0598	0.0220	-0.727***	–
Male*Urban	-4.254	-1.181*	-0.0594	-0.135	–	-0.409	-0.0674	0.0488	0.0366	0.173**	0.207	0.113	–
Peru													
YC (2009) age 8													
Male	1.446	0.219	0.000148	–	-0.563	-0.363	-0.0621	-0.0097	–	0.0157	-0.0728	0.145**	-0.0541
Male* Urban	0.0855	0.238	0.00286	–	0.307	0.325	0.0682	-0.0027	–	-0.0475	0.0404	0.161*	0.184*
OC (2006) age 12													
Male	-2.574	0.0128	-0.00721	0.207	0.318*	-0.537**	0.122*	0.103*	-0.100	-0.0014	-0.0360	0.0689	–
Male* Urban	3.119	-0.110	0.00356	-0.444*	-0.447*	-0.185	0.0366	-0.111	-0.0011	-0.131	-0.0361	-0.00817	–
OC (2009) age 15													
Male	1.912	-0.537	-0.0444	0.789	–	-0.471**	0.193**	0.0877	0.00376	-0.17***	-0.00103	-0.315***	–
Male* Urban	-0.301	0.288	0.0184	-1.190*	–	0.233	-0.0315	-0.182*	-0.0764	-0.0362	0.316**	0.0420	–
Vietnam													
YC (2009) age 8													
Male	1.477	-0.0626	-0.00675	–	-0.217**	-0.104	0.0295	-0.066**	–	-0.065**	-0.0830*	0.0400	-0.0697
Male* Urban	-0.195	-0.120	-0.00228	–	0.282**	-0.0092	0.0082	0.0301	–	0.0538	0.0716	0.517***	0.434***
OC (2006) age 12													
Male	0.918	-0.122	0.00536	-0.299**	-0.0888	-0.0516	0.16***	0.0213	0.0395	-0.0810*	-0.164**	-0.0361	–
Male* Urban	-0.944	0.120	-0.00866	0.112	-0.0723	0.235	0.0279	-0.127	-0.117	0.0724	0.101	-0.372**	–
OC (2009) age 15													
Male	0.0514	-1.240***	-0.085***	-0.548***	–	-0.34***	0.26***	0.0335	0.0143	-0.0160	-0.147**	-0.335***	–
Male* Urban	-6.514*	-0.575	0.0318	0.0940	–	0.317	0.0515	0.0703	0.0793	0.0230	0.310**	-0.0609	–

Note:
1) Robust (Huber-White) standard errors are used. *** p<0.01, ** p<0.05, * p<0.1
2) Coefficients on mother's education, log of monthly per capita expenditure, household size and dummy variables for ethnic/caste groups and urban areas are not reported owing to space constraints.

Turning to the psychosocial indicators, there are some differences in the extent of gender bias across rural and urban areas but not necessarily presenting a systematic pattern. The pro-male gender bias in agency in India at 15 years of age, for example, seems to be concentrated only in urban areas. On the other hand, in Peru it seems that there is a significant pro-girl bias in pride and self-esteem at the age of 15 years in urban but not in rural areas. Again, consistent with the educational aspirations data, rural and urban Peru are characterised by rather different gender differences in indicators relevant for forward-looking behaviour.

4.2 Maternal education

Results from a similar analysis regarding mother's education are reported in Table 4 (see page 14). Maternal education emerges as a significant ameliorating factor in reducing gender inequalities across all our study countries in a range of outcomes. For example, for Ethiopian children aged 15, having an educated mother reduced inequalities substantially in test scores, in children's own educational aspirations, and in their height-for-age. A similar pattern is observed in India for test scores at 15 years of age and educational aspirations (both by parents and children) at the age of 12 years, where many of the gaps essentially disappear for girls who have mothers educated for 12 years or more. In Vietnam as well, having an educated mother helps reduce disadvantages faced by boys in BMI-for-age and weight-for-age (at 8 years of age), and BMI-for-age and height-for-age (at 15 years of age).

4.3 Poor versus non-poor households

The impact of interaction terms distinguishing the gender gap for the poorest tercile in the (consumption per capita) distribution and the other two terciles is relatively limited (see Table 5, page 15). First, in terms of the education variables, there is no *differential* gender gap between richer and poorer households in aspirations on the part of caregivers and children in India and Ethiopia – in other words, the male bias is present among richer and poorer households alike. However, unlike boys from richer households, poorer boys in India are no more likely than poorer girls in both these countries to be enrolled in school at 15 years of age; this may reflect a pattern where both boys and girls in poorer households are often expected or necessitated to contribute economically to the household by their teenage years, which requires them to leave school. Perhaps even more surprisingly, in Ethiopia poorer boys are significantly less likely to be enrolled than poorer girls. Perhaps as a reflection of this lower rate of enrolment for older boys in poorer households, in India, the male bias in the PPVT and the maths test appears to be less for boys from poor households at least at age 8 for the PPVT and age 12 for the maths test.

In terms of nutrition, more striking is that the pattern of pro-girl nutritional bias in height-for-age is, if anything, most pronounced among the poorest households, with significant evidence in Vietnam at the age of 8 years and again at 15 years, and in Peru at the age of 15 years as well. Whether this reflects relatively heavier activity by boys or, at least by age 15, less activity by girls is hard to assess from these data.

Finally, relatively few new patterns emerge in terms of the psychosocial competencies.

Table 4. Coefficient on male dummy and interaction term with years of mother's education

	Education and cognitive achievement			Educational aspirations		Subj. well-being	Psychosocial competencies				Nutrition		
	PPVT score	Maths score	Enrolment	Child	Care-giver	Ladder of life	Trust	Pride	Inclusion	Agency	Height-for-age	BMI-for-age	Weight-for-age
Ethiopia													
YC (2009) age 8													
Male	-2.132	0.0838	-0.06**	–	0.0755	-0.090	-0.0281	-0.0271	–	0.0408	-0.22***	0.0330	-0.15***
Male* <i>Mother's education</i>	0.607	0.0202	0.0028	–	-0.004	0.019	0.0007	0.0021	–	-0.0042	0.0168	-0.00368	0.00991
OC (2006) age 12													
Male	1.563	0.500***	-0.0226*	0.0163	0.0634	-0.105	0.0127	-0.09**	-0.053	-0.0463	-0.233**	0.127	–
Male* <i>Mother's education</i>	-0.0684	-0.0715*	0.00347	0.0148	0.0270	0.0109	0.0007	0.004	-0.006	0.0100	0.0323	-0.0221	–
OC (2009) age 15													
Male	7.966***	1.315***	-0.0380	0.529**	–	-0.135	0.18***	0.0157	0.0706	0.0781*	-0.89***	-0.67***	–
Male* <i>Mother's education</i>	-1.022**	-0.0936	0.00096	-0.0673*	–	0.0356	-0.0011	0.0013	-0.01	-0.00542	0.0419**	-0.0134	–
India													
YC (2009) age 8													
Male	5.952***	0.345	0.0066	–	1.654***	-0.070	0.0400	0.0599	–	0.068**	-0.140*	-0.125*	-0.20***
Male* <i>Mother's education</i>	0.0689	-0.09*	-0.001	–	-0.070**	-0.006	-0.0068	0.0073	–	-0.0008	0.00112	-0.00128	0.00083
OC (2006) age 12													
Male	4.294**	0.293*	0.0386	0.819***	1.614***	0.0909	0.0440	0.091**	-0.10**	0.0872*	0.366***	-1.995	–
Male* <i>Mother's education</i>	-0.344	-0.0148	-0.006	-0.0608*	-0.15***	-0.003	-0.0108	-0.016*	-0.008	-0.022**	-0.0383	0.488	–
OC (2009) age 15													
Male	19.52***	1.942***	0.09***	0.507**	–	-0.173	-0.0039	-0.0779	-0.0650	0.0325	0.0797	-0.71***	–
Male* <i>Mother's education</i>	-1.256**	-0.146**	-0.0084	0.00062	–	-0.024	0.0128	-0.019*	0.0165	0.025***	-0.00158	0.00456	–
Peru													
YC (2009) age 8													
Male	2.995**	0.842**	0.0120	–	0.211	-0.318	-0.103	0.0152	–	-0.0010	-0.0226	0.105	-0.0614
Male* <i>Mother's education</i>	-0.186	-0.0571	-0.00123	–	-0.0696	0.0238	0.0114	-0.0033	–	-0.0022	-0.00266	0.0196**	0.0176*
OC (2006) age 12													
Male	-4.663**	-0.0605	-0.0044	0.176	0.328	-0.539*	0.183**	0.0578	-0.068	-0.0374	-0.0873	-0.0101	–
Male* <i>Mother's education</i>	0.532**	0.00078	-8.4e-05	-0.0318	-0.0375	-0.015	-0.0051	-0.003	-0.005	-0.0058	0.00392	0.00988	–
OC (2009) age 15													
Male	4.226*	-0.255	-0.0177	0.904	–	-0.55**	0.107	0.118	0.0093	-0.195**	-0.106	-0.42***	–
Male* <i>Mother's education</i>	-0.330	-0.0143	-0.002	-0.111	–	0.0291	0.0088	-0.019*	-0.007	0.00046	0.039***	0.0171	–
Vietnam													
YC (2009) age 8													
Male	1.013	-0.287	-0.0179	–	-0.341*	-0.228	-0.0140	-0.15***	–	-0.12**	-0.152*	-0.158	-0.27***
Male* <i>Mother's education</i>	0.0615	0.0292	0.00156	–	0.0266	0.0177	0.0066	0.0134*	–	0.0102	0.0123	0.044***	0.042***
OC (2006) age 12													
Male	0.490	-0.226	0.00831	-0.320	-0.128	0.102	0.128	-0.0243	-0.092	-0.0524	-0.261**	-0.303**	–
Male* <i>Mother's education</i>	0.0329	0.0190	-0.0007	0.00644	0.00352	-0.015	0.0049	0.0028	0.0158	-0.00198	0.0174	0.0278	–
OC (2009) age 15													
Male	-3.056	-2.14***	-0.119**	-0.558	–	-0.173	0.265**	0.163*	0.0946	0.0650	-0.37***	-0.57***	–
Male* <i>Mother's education</i>	0.265	0.116	0.00593	0.00426	–	-0.014	0.00	-0.0170	-0.009	-0.0113	0.042***	0.0327*	–

Note:
1) Robust (Huber-White) standard errors are used. *** p<0.01, ** p<0.05, * p<0.1
2) Coefficients on mother's education, log of monthly per capita expenditure, household size and dummy variables for ethnic/caste groups and urban areas are not reported for space constraints.

Table 5. Coefficient on male dummy and interaction term with poorest tercile of consumption expenditure

	Education and cognitive achievement			Educational aspirations		Subj. well-being	Psychosocial competencies				Nutrition		
	PPVT score	Maths score	Enrolment	Child	Care-giver	Ladder of life	Trust	Pride	Inclusion	Agency	Height-for-age	BMI-for-age	Weight-for-age
Ethiopia													
YC (2009) age 8													
Male	-1.280	0.178	-0.063***	–	0.0135	-0.061	-0.0353	-0.0178	–	0.0168	-0.181***	0.0875*	-0.0801
Male*Poor	2.579	-0.102	0.0318	–	0.132	0.0992	0.0306	-0.0086	–	0.0392	0.0272	-0.196**	-0.135
OC (2006) age 12													
Male	0.231	0.288	-0.0189	0.128	0.104	0.0064	0.0479	-0.099**	-0.0527	0.0376	-0.117	0.0332	–
Male*Poor	3.231	0.00374	0.0191	-0.214	0.113	-0.233	-0.0893	0.0604	-0.0428	-0.164**	-0.0847	0.0945	–
OC (2009) age 15													
Male	5.448**	1.053***	0.00232	0.233	–	-0.081	0.19***	-0.0111	0.0430	0.0802**	-0.695***	-0.765***	–
Male*Poor	-2.095	-0.0847	-0.118***	0.276	–	0.0740	-0.0315	0.0715	-0.00361	-0.0528	-0.218	0.158	–
India													
YC (2009) age 8													
Male	8.026***	0.189	0.00760	–	1.381***	-0.060	0.0388	0.135***	–	0.0657**	-0.128**	-0.136**	-0.193***
Male*Poor	-5.422**	-0.490	-0.0107	–	0.0549	-0.092	-0.0697	-0.146**	–	0.0003	-0.0230	0.0175	-0.0203
OC (2006) age 12													
Male	3.327*	0.505***	0.0591**	0.636***	1.362***	0.156	0.009	0.110**	-0.113**	0.0445	0.335**	-2.115	–
Male*Poor	-0.160	-0.785***	-0.117***	-0.0567	-0.611	-0.264	0.0194	-0.20***	-0.0351	-0.0539	-0.231	4.244	–
OC (2009) age 15													
Male	16.84***	1.576***	0.109***	0.567**	–	-0.211	0.0471	-0.0815	-0.0230	0.110**	0.0951	-0.730***	–
Male*Poor	-2.518	-0.213	-0.125**	-0.177	–	-0.144	-0.0353	-0.158*	0.0209	-0.0200	-0.0983	0.0962	–
Peru													
YC (2009) age 8													
Male	1.100	0.161	-0.00076	–	-0.335	-0.153	0.0465	-0.016	–	-0.0289	-0.0778	0.295***	0.0865
Male*Poor	1.408	0.769**	0.00896	–	-0.0503	0.0670	-0.184*	0.0199	–	0.0353	0.119	-0.0787	0.00718
OC (2006) age 12													
Male	-1.286	-0.0386	0.00852	0.0363	0.112	-0.69***	0.15***	0.0454	-0.071*	-0.101**	-0.109	0.0327	–
Male*Poor	1.827	-0.0355	-0.0406**	-0.298	-0.181	0.156	-0.0270	-0.026	-0.0906	0.0610	0.167	0.105	–
OC (2009) age 15													
Male	2.277*	-0.294	-0.0451**	-0.132	–	-0.230	0.18***	-0.067	-0.0528	-0.19***	0.337***	-0.220**	–
Male*Poor	-0.965	-0.195	0.0365	0.420	–	-0.298	-0.0204	0.126	0.0192	0.0202	-0.450***	-0.227	–
Vietnam													
YC (2009) age 8													
Male	1.584	-0.223	-0.0047*	–	-0.133**	-0.108	0.0276	-0.049	–	-0.07**	-0.00133	0.213***	0.119*
Male*Poor	-0.259	0.412	-0.00681	–	-0.0465	0.0797	0.0112	-0.016	–	0.0544	-0.182**	-0.167	-0.263***
OC (2006) age 12													
Male	-0.282	-0.132	-0.00568	-0.189*	-0.0684	0.00456	0.23***	-0.047	0.0360	-0.0742*	-0.0898	-0.0975	–
Male*Poor	2.378	0.0610	0.0250	-0.347	-0.214	-0.101	-0.21**	0.0985	-0.0657	0.00312	-0.191	-0.0650	–
OC (2009) age 15													
Male	-0.236	-1.445***	-0.111***	-0.644***	–	-0.40***	0.22***	0.0214	0.0192	-0.0243	0.0176	-0.282***	–
Male*Poor	-3.006	0.288	0.103*	0.360	–	0.406**	0.147	0.0835	0.0261	0.0409	-0.293**	-0.200	–

Note:

1) Robust (Huber-White) standard errors are used. *** p<0.01, ** p<0.05, * p<0.1

2) Coefficients on mother's education, household size and dummy variables for ethnic/caste groups, being in the poorest tercile and urban areas are not reported owing to space constraints.

5. Exploring the transmissions of gender gaps in aspirations to outcomes

The data in sections 3 and 4 are suggestive of a link between parental aspirations, children's aspirations, educational achievement, and possibly even empowerment. The key contrast was in Andhra Pradesh (especially the rural areas), Ethiopia and to some extent rural Peru on the one hand, and Vietnam on the other. In terms of cognitive achievement and aspirations, a clear pro-boy bias is present in Ethiopia and India, which is not necessarily apparent at early age, but which, by the age of 12 and especially 15 years, is pronounced.¹¹ In contrast, in Vietnam, we find a tendency for a pro-girl bias in aspirations and achievement, strongly significant for mathematics. In rural Peru, there appears to be a pro-boy bias in the aspirations of parents for children at age 12 and in the aspirations of children at age 15 in rural areas. In Ethiopia and India finally, there also seems to be some pro-male bias effect on agency as well, in line with these aspirations and achievements.

The method used is not complete, not only in terms of causality (which is impossible to prove convincingly using these data), but also in terms of basic associations. It could be that while on average there are pro-male biases in a particular set of indicators, individuals experiencing the bias are different for different indicators, so that a link is hardly plausible. To explore this further, we looked in each country at the link between parental aspirations and child aspirations, and aspirations and educational outcomes, using a regression analysis using otherwise the same specification as above. We also investigate whether these aspirations are associated with agency at the age of 15 as well. In practice, this means that earlier regressions exploring child aspirations and educational outcomes are augmented by parental and child aspirations respectively. Two issues are explored. First, is there a positive and significant association? Second, does augmenting this regression reduce the size of the gender gap? Both should be expected if there is a genuine transmission – as some of the gender bias would then be included in the parental, respectively, child aspiration variable (i.e. biased aspirations).

The results are consistent with the idea of a transmission from parents to children's aspirations. In all four countries (Table 6), we find a positive and strongly significant link between parental aspirations at age 12 and child aspirations at age 15, controlling for other family characteristics. Furthermore, child aspirations at age 15 show a positive and strongly significant contemporaneous correlation in explaining enrolment at that age, controlling for the other child and family characteristics. They also reduce the size of the bias in line with the hypothesis, at least in India and in Vietnam (reducing the bias by about half). Similarly, children's own aspirations at the age of 12 are a strongly significant predictor of PPVT and maths test scores in all countries as well, and once they are controlled for, the gender bias observed tends to become smaller.

¹¹ Note that the bias in Andhra Pradesh is striking also as it is a southern Indian state, while most discussion on pronounced gender bias tends to focus on the north of India.

Table 6. *Transmission of gender bias over time: Persistence coefficients from regression of outcomes at 15 years on variables at 12 years of age*

	Coefficients			
	Ethiopia	India	Peru	Vietnam
Child aspirations (R3) on Caregiver aspirations (R2)	0.0838* (1.670)	0.355*** (7.274)	0.396*** (4.198)	0.367*** (6.297)
Subjective well-being (Ladder of life) (R3) on Subjective well-being (R2)	0.141*** (4.200)	0.133*** (3.372)	0.0587* (1.776)	0.109*** (3.360)
Trust Index (R3) on Trust Index (R2)	0.107*** (3.261)	0.0824** (2.244)	0.175*** (4.227)	0.0470 (1.106)
Pride Index (R3) on Pride Index (R2)	0.0929** (2.167)	0.0242 (0.611)	0.138*** (2.631)	0.0470 (1.385)
Inclusion (R3) on Inclusion (R2)	0.0317 (0.870)	0.0607 (1.434)	-0.0987** (-1.980)	0.0476* (1.920)
Agency (R3) on Agency (R2)	-0.0237 (-0.745)	0.0130 (0.386)	0.0519 (1.485)	0.0175 (0.663)
PPVT scores (R3) on Child aspirations (R2)	1.947*** (3.806)	2.785*** (4.167)	1.807*** (4.722)	3.839*** (6.754)
Maths scores (R3) on Child aspirations (R2)	0.284*** (4.947)	0.381*** (5.497)	0.379*** (3.665)	0.841*** (8.871)
Agency (R3) on Child aspirations (R2)	0.0382*** (3.541)	0.0624*** (5.578)	0.0485** (2.360)	0.0688*** (4.277)
Agency (R3) on Caregiver aspirations (R2)	-0.000619 (-0.0683)	0.0352*** (5.183)	0.0286* (1.801)	0.0141* (1.728)
Enrolment (R3) on Child aspirations (R3)	0.0399*** (6.659)	0.0741*** (19.77)	0.0713*** (6.04)	0.0771*** (14.65)

Note:

1) Robust (Huber-White) standard errors are used. *** p<0.01, ** p<0.05, * p<0.1

2) Coefficients on mother's education, household size and dummy variables for ethnic/caste groups, being in the poorest tercile and urban areas are not reported owing to space constraints.

3) Data examined on Older Cohort aged 12 in Round 2 (R2) and 15 in Round 3 (R3). The results are consistent with the idea of a transmission from parents to children's aspirations. In all four countries (Table 6), we find a positive and strongly significant link between parental aspirations at age 12 and child aspirations at age 15, controlling for other family characteristics. Furthermore, child aspirations at age 15 show a positive and strongly significant contemporaneous correlation in explaining enrolment at that age, controlling for the other child and family characteristics. They also reduce the size of the bias in line with the hypothesis, at least in India and in Vietnam (reducing the bias by about half). Similarly, children's own aspirations at the age of 12 are a strongly significant predictor of PPVT and maths test scores in all countries as well, and once they are controlled for, the gender bias observed tends to become smaller.

These children's aspirations at age 12 also feed through into the child's sense of self-efficacy (agency) in India and Ethiopia by age 15; parental aspirations matter also for agency in India, as well as in Vietnam and Peru, again underlying how parents' hopes for children tend to translate into children's self-efficacy, their sense of being able to achieve what they hope for. Even if the causal role of aspirations in achievement is still debated, these results confirm the institutional basis of bias in attitudes to boys or girls in education, whereby biased parental aspirations translate into similarly biased child aspirations, consistent with observed educational achievement bias as well as the child's sense of agency. Existing gaps in aspirations by parents appear to be transmitted in important child outcomes.

Of course, this does not answer where these biased aspirations come from. They could come from norms or values, or the transmission of information on the economic returns to boys versus girls in local labour markets, or other factors. Full understanding of them is well beyond the scope of these data.

6. Discussion

Our analysis in this paper, while only suggestive, has highlighted several possibly important patterns in gender-based inequalities in the four study countries. The most important of these is, obviously, that there is no common thread that can be used to characterise gender inequalities across these different countries or indeed even across different dimensions of child well-being in the same country or across different ages. That such a narrow characterisation of gender gaps across the developing world has sometimes been made is conceivably a product of a narrow approach to the different dimensions of child well-being, prompted perhaps by data limitations. Our results highlight the importance of considering context and the age of the children being spoken about while discussing gender bias.

While the analysis presented in this paper is relatively simple and has not engaged in the detailed exploration of the mechanisms of gender bias, understanding these mechanisms is central to being able to identify possible policy levers to ameliorate these inequalities. This is important especially in view of the fact that all of these four countries have seen relatively rapid economic growth and changes in social conditions which may well have led to changes in the mechanisms by which gender bias presents itself. Complementary work from the Young Lives study and elsewhere could help in identifying these dimensions of change.

In the case of India, for example, the rapid increases in enrolment across most states has reduced substantially the gender inequality in enrolment; however, as recent analysis from Young Lives shows (see for example, Pells 2011; Streuli et al. 2011), this has been accompanied by a sharp increase in unequal access between boys and girls to English-language-medium and private schools, which are widely perceived to deliver better education and lead to better employment opportunities. Whereas Kingdon (2005) found, using data from 1994, that the important dimension of gender bias in parental investment in education was through parents deciding not to enrol girls, and not through differences between the educational expenditure on boys and girls once they were enrolled, that pattern seems to have since reversed itself almost entirely.

Furthermore, while our analysis above documents the gender-based differences that are detected in the data, it has not engaged in depth with the implications of these differences. Yet, apart from their intrinsic value, we care about emerging inequalities in these dimensions of child well-being also because they may be strongly predictive of future outcomes. Cunha and Heckman (2008) and Cunha et al. (2010) for example document the importance of non-cognitive skills (similar to what we call psychosocial skills in this paper) even in the production of cognitive skills. This pattern is confirmed using Young Lives data from Peru from Rounds 1 and 2 of the survey by Outes-Leon et al. (2010) who found that a child's feeling of being respected at the age of 8 years was strongly predictive of higher test scores at the age of 12. Similarly, early differences in nutrition could further affect later outcomes in other dimensions. For example, again using Young Lives data on Peru from 2002 and 2006, Sanchez (2009) reports a strongly significant impact of early childhood nutrition on later cognitive outcomes; this is, of course, a well-established result in the academic literature from a variety of contexts (see, for example, Glewwe et al. 2001; Glewwe and King 2001; Alderman et al. 2001). Thus, perhaps the critical point to realise about these inequalities is that not only do they present us with important equity concerns at one point in time, but they could also have important effects in perpetuating inequality, not only in the same dimension but also across other dimensions of well-being that we may care about.

7. Policy implications and conclusions

In this paper, we have attempted only to characterise the patterns of gender-based inequalities as experienced by children across a range of dimensions, at different ages within childhood and adolescence, across our four study countries. We have not, as emphasised in the previous section and elsewhere in the paper, attempted a full-fledged causal analysis of the mechanisms that perpetuate these inequalities.

That being said, there are some distinct common threads that arise from our analysis that may, we hope, have useful implications for policy. The first of these threads, emphasised throughout this paper, is that we find no evidence of a common narrative of gender bias that is valid across all four countries and all dimensions; recognition of this heterogeneity in the patterns of inequality is, in our opinion, of central importance to effective policy-making, i.e. policy-making that is targeted towards reducing the biases that do exist in different contexts.

The second thread, which is implicit in our analytical approach, is that, in order to comment on gender inequalities in child well-being, there is a need to consider dimensions of child welfare beyond those commonly documented in large-scale data collection efforts, especially in developing countries. Ignoring these dimensions risks painting a very incomplete picture and may, as discussed in the previous section, have detrimental impacts also on the other indicators that we do measure. This empirical pattern, of inequalities in one dimension perpetuating themselves in other dimensions of well-being, is in our view perhaps one of the most salient features around gender inequality. Finally, as we hope the discussion in the previous section has highlighted, it is an important exercise to monitor the mechanisms by which gender inequalities may be presenting themselves. This is important both for understanding how inequalities in different dimensions interact and in formulating interventions targeted at breaking the cycle of perpetuation of these inequalities across dimensions. Child-focused longitudinal data such as those collected by Young Lives can be an important source of information both on commonly neglected dimensions of well-being and for being able to convincingly draw out causal chains of the perpetuation of gender-based inequalities.

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

The project seeks to:

- 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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London, UK

Child and Youth Studies Group (CREET),
The Open University, UK

Department of International Development,
University of Oxford, UK

Save the Children UK
(staff in the Policy Department in London
and programme staff in Ethiopia).



Young Lives 
An International Study of Childhood Poverty

Department of International Development
University of Oxford
3 Mansfield Road, Oxford OX1 3TB, UK
Tel: +44 (0)1865 281751
Fax: +44 (0)1865 281801
Email: younglives@younglives.org.uk

www.younglives.org.uk