

Gender and wealth disparities in schooling: Evidence from 44 countries

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Abstract

This paper uses internationally comparable household data sets (Demographic and Health Surveys) to investigate how gender and wealth interact to generate within-country inequalities in educational enrollment and attainment. The paper highlights that girls are at a great educational disadvantage in particular regions: South Asia and North, Western, and Central Africa. There are two main new findings. First, while gender gaps are large in a subset of countries, wealth gaps are large in almost all of the countries studied—and typically larger than corresponding gender gaps. Second, and of special concern, is the finding that in particular countries where there is a large female disadvantage in enrollment, wealth interacts with gender to exacerbate the gap in educational outcomes.

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1. Introduction

Universal primary education was enshrined as a human right in the United Nation's Universal Declaration of Human Rights in 1948. Forty years later the goal was still not in sight and a call on donors and governments to reaffirm their commitment to universal primary enrollment was part of the World Declaration on Education for All issued in Jomtien, Thailand in 1990. The World Education Forum in Dakar, Senegal, reviewed the progress towards Education for All by 2000 and had to face the failure to achieve the ambitious goals. The Dakar conference endorsed what have come to be known as the

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Millennium Development Goals in the education sector: universal primary enrollment by 2015, and the elimination of gender disparities at the primary and secondary levels by 2005.

While these targets are developed in terms of broad national aggregates, there is substantial heterogeneity in how education outcomes are distributed across populations within countries. This analysis uses a collection of internationally comparable household datasets to investigate the correlates of educational enrollment and attainment gaps within countries. Data from the Demographic and Health Surveys (DHS) from over 40 countries are used to carry out cross-country comparable analyses. This paper's goal is to compare within-country interactions between educational outcomes, gender and household wealth across countries.

Using household based surveys allows the investigation of inequalities along the wealth dimension, and therefore enables one to go beyond comparing country aggregates typically reported in large "international databases" (e.g. UNESCO data or derivatives thereof). However, the DHS have the drawback that they lack information on household consumption expenditures, the usual variable used to rank households by their economic standing. This analysis uses an index of housing characteristics and assets owned by the household members, which are collected in the DHS, as a measure of a household's long run wealth.

The paper is organized in five main sections: Section 1 discusses why one would expect to find inequalities in education; Section 2 discusses the data and methodological issues; Section 3 describes the results on gender and wealth inequalities in education.

2. Why would one expect differences in schooling?

Economists typically start from a simple model where education is a pure investment, households are perfectly linked across generations, credit markets are perfect, and investment opportunities in, and returns to, education are equally distributed across individuals.¹ Such a model implies that investments in education will not be related to a family's present financial wealth or a child's gender. Reality does not always match the model, however. This paper focuses on potential departures from the model that manifest themselves in gender and wealth differences in schooling.

2.1. Gender

The first departure from the simple model is that schooling—or learning—is valued as consumption. If parents value the education of sons more than that of daughters one would observe more boys' schooling than girls'. Aspects of school supply might also affect the relative consumption value of schooling. For example the availability of sex-segregated schools, or the presence of female teachers, might increase the demand for girls' schooling more than boys'.

¹There are several recent reviews of the economics of income and gender inequalities in education. For example, [Behrman and Knowles \(1997\)](#) reviews the reasons for, and estimates of the magnitudes of, the responsiveness of several educational indicators to income; [Strauss and Thomas \(1995\)](#) and [Alderman and King \(1998\)](#) review the literature on gender differences in enrollments. This section outlines some of the main points that come out of these reviews and some of the subsequent literature.

There are other ways that the reality may not match the model that start from the perspective of education as an investment good. The ideal amount of any investment depends on costs of, and returns to, that investment, both of which could be related to a child's gender.

Direct costs may differ: for example [Khandker, Lavy, and Filmer \(1994\)](#) find that families with both boys and girls enrolled in school in Morocco reported higher average expenditures for girls, conditional on grade. Opportunity costs may differ as well. This will depend on the different roles that children play in household production, for example in looking after siblings, working on the family's land, or working for wages. The opportunity cost of sending daughters to school will be higher than for sons if daughters play a large role in substituting for their mother's time in the home. For example, [Skoufias \(1993\)](#) finds that the time rural Indian girls spend in school is more sensitive than boys' time to adult female wage rates (which would increase the opportunity cost of both their time and that of their daughters if these are substitutes in home production). If boys also contribute to household income—for example by working on a family farm—then the relative values of these opportunity costs will influence observed disparities in education.²

The returns to the investment in schooling may differ as well—both in the way schooling is converted into human capital and in the way human capital is converted into earnings. There is a substantial literature documenting differential wage or earnings increments to schooling by gender (for example see [Behrman & Deolalikar, 1995](#); [Glick & Sahn, 1997](#); [Schultz, 1993](#), or the results compiled in [World Bank, 1995](#)). While one might expect enrollments to be higher for men than women in countries where returns are higher for women than men, this is not always the case (e.g. Guinea in [Glick & Sahn, 1997](#)). In environments where sons provide support to elderly parents (perhaps because daughters move upon marriage), parents may invest more in sons as a way of increasing their resources in old-age.

2.2. *Wealth*

Investment in schooling could differ by household wealth for analogous reasons to gender differentials. If schooling—or learning—is valued as consumption then demand for it will increase with increases in household income or wealth. If there are credit constraints—if households are not able to borrow for investments in human capital—then only those with access to ready-cash will be able to afford the education expenses. If wealthier households are able to borrow at cheaper rates than poorer households, then investments in education will be higher among the rich than the poor ([Becker, 1975](#); [Lazear, 1980](#)). [Jacoby \(1994\)](#) and [Rose \(2000\)](#) find that poorer households are indeed more credit constrained than richer households in Peru and India, respectively, with implications for human capital investments in children.

Returns to education might differ by household wealth as well. For example, there are likely to be income differences in the efficiency with which schooling is converted into human capital. If wealthier households are able to make complementary investments, such as more health and nutrition inputs or additional tutoring, then the efficiency of schooling

²This argument relies on the substitution of school for “work” time. [Ravallion and Wodon \(2000\)](#) show that the reduction in child labor as a result of school subsidy was substantially smaller than the increase in school participation in Bangladesh.

will be higher for wealthier households. Since the return on the investment would be higher, this would lead to higher investment in schooling among wealthier households. In addition, success in the labor market might depend on connections and networks which could be related to family income or wealth. Educated children from wealthier households would therefore have access to job opportunities denied to other similarly educated children. One set of empirical papers has found that the returns to schooling are lower for marginalized—typically poorer—groups such as ethnic minorities (MacIsaac & Patrinos, 1995; van de Walle & Gunewardena, 2000).

2.3. *Gender and wealth*

There is limited theoretical and empirical work on gender-based schooling differences among poorer and richer households within a country. On the one hand one could argue that intra-household equality is a “normal” good and would therefore fall as wealth rises. On the other hand, one could appeal to the investment aspects of education: in the context of investments in health, Garg and Morduch (1998) argue that the degree to which gender differences increase or decrease with income depends on the relative rates at which the returns to human capital decline. An alternative explanation rests on systematic differences in relative opportunity costs among poorer and richer children. For example, boys might be more likely to participate in farm or off-farm wage employment at low levels of income whereas girls are not, and at higher levels of income neither might participate in these out-of-school employment activities. Such a scenario would lead to a male disadvantage in poorer households. Similarly if daughters substituted for their mother’s time in poorer households, but not wealthier ones, one would expect a female disadvantage that diminished as household wealth increased. But it need not be the case that gender gaps necessarily uniformly decline with income: Murthi, Guio, and Dreze (1995) that female disadvantage is less pronounced in poor or tribal populations in India.

3. Data and methodological approach

3.1. *DHS data and measures of education outcomes*

The DHS are large, nationally representative household surveys—the DHS provide a unique set of datasets collected in a consistent way across many countries. The DHS are part of a systematic data collection effort whose main purpose is to obtain nationally representative and cross-nationally comparable household-level data related to family planning, and maternal and child health. While not designed specifically for the collection of education related data, the more recent surveys record data on school participation as reported by a respondent in the context of the household roster.

All public datasets with the requisite education and wealth information that were available are analyzed here.³ This resulted in no dataset dated earlier than 1990. Where multiple datasets for the same country were available, only the most recent has been retained. Sample sizes range from about 2000 households in Comoros to 87,000 households in India, with an average of close to 10,000 (Annex Table A.1). The 44 countries analyzed here correspond to about half of the world’s population living in

³All the data are available from the DHS website at <http://www.measuredhs.com>.

countries with more than one million people and GNP per capita <\$5000 (about three-quarters if China is excluded). Nevertheless, the countries covered by the DHS are not necessarily representative of countries around the world, or even of poor countries around the world.

The education outcomes analyzed are based on the answers to three questions about those aged six and above: whether they had ever been to school; what was the highest level of schooling attended if they had ever been to school; and what was the highest grade attained at that level. Those aged 6–25 were asked, in addition, whether they were still “in school” (if they report ever attending).⁴ This analysis focused on two outcomes derived from these responses: “enrollment”—the percentage of children aged 6–14 years old who are reported to be in school, and “attainment”—the percentage of youths aged 15–19 who have completed grade 5.⁵

3.2. *Measuring wealth using DHS data*

The major advantage of using household level data is that within country inequalities can be explored. However, the DHS do not ask about household income or consumption expenditures, the variables usually used to rank households by standard of living. The surveys carried out since 1990 do however include two sets of questions related to the economic status of the household. First, respondents are asked to report about ownership of various assets, such as whether any household member owns a radio, television, refrigerator, bicycle, motorcycle, or car. Second, questions are asked about housing characteristics, namely whether electricity is used, the source of drinking water, the type of toilet facilities, how many rooms there are for sleeping, and the type of materials used in the construction of the dwelling. There is substantial overlap in the questions asked in different countries, but the precise list varies. The number of variables derived from these questions is usually about 15 or 16 (Annex Table A.1).⁶

In order to use asset and housing characteristic indicator variables to rank households by their economic status, they need to be aggregated into an index, and a major problem in constructing such an index is choosing appropriate weights.⁷ This is done here using the statistical technique of principal components. Principal components is a technique to

⁴The DHS used here were not collected for the specific analysis of education. Consequently, the timing of the survey was not linked to the school year and may have been fielded during a school break. Respondents are typically asked to refer to the previous school year in this case. While this may affect the levels of school participation, it is unlikely to affect the inequality measures analyzed here.

⁵Comparisons with UNESCO based data on gender differences in enrollment (World Bank, 1999) show a fair amount of consistency with the DHS based numbers. The main difference is that the UNESCO numbers tend to find a larger male advantage in enrollments in West Africa.

⁶The variables used in the construction of the index are (in a typical case such as Mali): (1) a set of six dummy variables one of which is equal to one if a member owns each of a radio, refrigerator, television, bicycle, motorcycle, or car, (2) a set of three dummy variables one of which is equal to one if the household's drinking water is from a piped source, a well or surface source, or another source (rainwater, tanker truck...), (3) a set of three dummy variables one of which is equal to one if the household has a flush toilet, a pit toilet latrine, or no/other toilet facilities, (4) a dummy variable equal to one if the house has electricity, (5) the number of rooms for sleeping in the dwelling, and (6) a dummy variable equal to one if the dwelling's floors are made of finished materials (such as cement, parquet, vinyl).

⁷If these assets were only to be used to examine the impact of some other factor (e.g. maternal education) as a “control” for wealth in a multivariate regression we would not need to aggregate the variables (see Montgomery, Gragnolati, Burke, & Paredes 2000).

summarize the information contained in a large number of variables in a smaller number by creating a set of mutually uncorrelated components of the data. Intuitively, the first principal component is that linear index of the underlying variables that captures the most common variation among them. The first principal component can be interpreted as a “wealth index” on the assumption that the underlying variable with the largest explanatory power is a household’s long-run wealth.⁸

The details of the approach are described and defended by Filmer and Pritchett (2001) who show that the wealth index performs as well as a more traditional measure, such as household-size-adjusted consumption expenditures, in predicting educational enrollment and attainment. The methodology was applied by Filmer and Pritchett (1999a) to analyze wealth gaps in educational attainment in 35 countries, and by Filmer and Pritchett (1999b) to investigate the determinants of education gaps in India, and how these vary across states. This study extends these previous analyses by focusing on interactions with gender.⁹

The wealth index is calculated separately for each country and within each country households are ranked in an analogous way to other welfare measures found in the literature. In particular, individuals can be assigned to the “rich” or “poor” group based on the distribution of individuals across the sample. It is important to keep in mind that the principal components procedure normalizes the mean of the index to zero for each country and that the measure is therefore relative. The standard of living of the “poor” in one country may be more like that of the “rich” in another. No attempt is made here to generate an absolute poverty measure based on the wealth index approach.

3.3. *Measuring inequalities*

Measuring inequality of one variable across the distribution of another variable can be done in many ways. Measures typically capture a subset of features that analysts desire. For example, measures of absolute inequalities versus relative inequalities; measures that capture the entire distribution of the second variable versus summary measures; summary measures that weigh different points in the distribution differently. The measure used here is selected on the basis of two criteria: first, a measure that can be used to compare differences across wealth and gender dimensions, and second a measure that isolates relative inequalities.

The measures used are the ratio of the average enrollment of males and females, and the ratio of the average enrollment of children from the richest 50% of households and the poorest 50% of households (with corresponding measures for attainment). Using ratios will ensure a relative measure, and the comparison of the richest to poorest 50% will ensure comparability between gender and wealth.¹⁰

The comparison of the richest to poorest 50% is perhaps unusual. Since the wealth index is continuous any number of measures could have been used, for example a concentration

⁸Factor analysis, which is closely related but has slightly different properties could be used as well. This is what is used by Sahn and Stifel (2000). The rank correlation between indexes based on these two methods is typically almost 1.

⁹Other applications of this wealth index approach using the DHS can be found in Bonilla-Chacin and Hammer (1999), Gwatkin, Rutstein, Johnson, Pande, and Wagstaff (2000), Sahn and Stifel (2000), Stecklov, Bommier, and Boerma (1999), and Wagstaff and Watanabe (2003).

¹⁰Note that this definition of education inequalities is different from an “education Gini” that would measure the univariate dispersion of education outcomes (Thomas et al., 2000).

index, or the enrollment ratio between the richest and poorest quintiles. While these are valid alternative measures, the estimates of inequality produced by these three methods are highly correlated. Enrollment inequalities by wealth, as measured by enrollment ratio between the richest and poorest 50% and by a concentration index have correlation coefficient of .99 across the 44 countries. The enrollment ratio between the richest and poorest 50%, and the richest and poorest quintiles have a correlation coefficient of .90. The comparison of the richest and poorest 50% of households ensure comparability between the gender and wealth dimensions since both encompass about 50% of children, and this is therefore the measure that will be retained for the remainder of this analysis.¹¹ The rather crude distinction between richest and poorest 50% may mask subtle non-linearities. For example it is possible that the extreme poor behave differently from those close to being non-poor. Examining such subtleties, while potentially interesting, is beyond the scope of this paper.

4. The magnitude of gender and wealth inequalities in education

4.1. Gender and wealth inequalities in enrollment and attainment

Table 1 reports the level of female enrollment (Column I) and the measure of gender inequality in enrollment (Column II) in the 44 countries. Girls have significantly lower enrollment in all the countries in the Central and Western African, South Asian and North African regions. The average inequality in these regions is 1.31 in the first and about 1.25 in the second and third, corresponding to 31% and 25% differences in male and female enrollment. In several of the countries the inequality measure is over 1.35, indicating that in these countries male enrollments are >35% higher than female enrollments.

In Central and Western Africa it is predominantly the francophone countries where the gender inequality exceeds 1.35: Benin, Burkina Faso, C.A.R., Chad, Mali, and Niger with Cote d'Ivoire, Senegal and Togo close behind. In Cameroon and Nigeria there is a statistically significant difference between male and female enrollment, although the magnitude is relatively small (1.05 and 1.09, respectively). Ghana is the only country in this region where the gender differential is statistically insignificant. Gender inequalities are also large in the South Asia region: 1.13 in India, 1.37 in Nepal, and 1.46 in Pakistan. Bangladesh escapes this regional pattern with a statistically insignificant female advantage in the enrollment of 6–14 year olds. Gender inequality in enrollment is statistically significant in both the North African countries: it is over 1.35 in Morocco and equal to 1.13 in Egypt.

Outside of these three regions there is no systematic tendency towards a female disadvantage in the enrollment of children between 6 and 14 years old. In the Eastern and Southern African countries there is a range from high and statistically significant inequality in the Comoros, Ethiopia, and Mozambique, to moderate statistically significant inequality in Uganda, to insignificant inequality in most countries, and finally to a statistically significant female advantage in Namibia and Tanzania. Gender inequalities are small in the European and Central Asian, Latin American and East

¹¹This will therefore not be subject to Kanbur's (2002) critique that comparing education for the richest and poorest quintiles to education for boys and girls will overstate inequalities by wealth relative to those by gender because the former is based on five categories whereas the latter is based on two.

Table 1
School enrollment and attainment: gender and wealth levels and inequalities

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
	School enrollment of 6–14 year olds	Gender inequality	Grade 5 completion of 15–19 year olds	Gender inequality	School enrollment of 6–14 year olds	Wealth inequality	Grade 5 completion of 15–19 year olds	Wealth inequality
	Female level (%)		Female level (%)		Poorest 50% level (%)		Poorest 50% level (%)	
Benin 1996	32.6	1.63**	20.1	1.88**	26.9	2.17**	11.0	3.97**
Burkina Faso 1999	20.8	1.38**	16.1	1.64**	15.0	2.31**	8.5	3.74**
C.A.R. 1994–95	48.9	1.35	27.8	1.60**	42.7	1.66**	17.4	2.93**
Cameroon 1998	72.6	1.05**	66.7	1.06	60.5	1.47**	46.3	1.81**
Chad 1998	24.9	1.62**	9.5	2.93**	22.6	1.89**	6.4	4.54**
Cote d'Ivoire 1994	41.7	1.34**	35.6	1.55**	35.0	1.78**	30.0	1.86**
Ghana 1998	76.9	1.01	75.8	1.07**	70.9	1.18**	70.4	1.21**
Mali 1995–96	22.3	1.37**	14.8	1.67**	12.9	3.09**	5.4	5.74**
Niger 1998	18.9	1.41**	17.1	1.90**	11.6	2.93**	10.8	3.29**
Nigeria 1999	61.8	1.09**	70.3	1.15**	44.6	1.90**	57.3	1.58**
Senegal 1992–93	27.4	1.31**	31.3	1.31**	16.2	2.94**	16.2	3.32**
Togo 1998	64.4	1.20**	35.1	1.61**	62.5	1.29**	31.6	1.82**
Bangladesh 1996–97	73.8	0.98	50.7	1.12**	67.2	1.19**	36.4	1.87**
India 1998–99	73.8	1.13**	61.3	1.27	68.7	1.33**	50.7	1.71**
Nepal 1996	55.5	1.37**	35.0	1.82**	58.4	1.27**	38.1	1.52**
Pakistan 1990–91	44.3	1.46**	37.5	1.64**	38.8	1.88**	29.3	2.31**
Egypt 1995–96	75.7	1.13**	71.8	1.17**	70.3	1.32**	66.0	1.36**
Morocco 1992	45.8	1.39**	39.9	1.56**	32.4	2.54**	26.6	2.72**
Comoros 1996	48.3	1.18**	40.1	1.32**	42.2	1.53**	30.9	1.89**
Ethiopia 2000	26.5	1.23**	18.0	1.37**	18.1	2.31**	6.6	4.89**
Kenya 1998	87.0	1.01	85.1	0.98	86.7	1.02	81.5	1.07**
Madagascar 1997	58.6	0.99	26.6	1.01	48.1	1.42**	8.5	5.09**
Malawi 1996	89.7	0.99	34.6	1.35**	86.8	1.05	20.7	2.71**
Mozambique 1997	51.7	1.18**	25.4	1.66**	46.7	1.40**	14.9	3.16**
Namibia 1992	87.1	0.96**	73.2	0.79**	84.8	1.02	54.8	1.41**
Rwanda 1992	51.0	1.02	56.6	0.93	46.7	1.20**	48.8	1.22**
Tanzania 1999	52.7	0.91*	62.8	0.98	38.9	1.60**	55.5	1.25**
Uganda 1995	66.6	1.07**	49.2	1.14**	60.3	1.28**	41.3	1.56**
Zambia 1996–97	60.4	0.99	69.6	1.03	49.5	1.45**	55.4	1.50**
Zimbabwe 1999	83.5	1.00	93.5	0.98	82.2	1.04**	91.7	1.02
Kazakhstan 1999	85.3	0.99	99.5	0.99	83.5	1.04**	99.4	1.00
Kyrgyz Rep. 1997	85.8	1.01	99.4	1.00	85.7	1.02	98.8	1.01
Turkey 1998	63.4	1.21**	89.0	1.07**	62.3	1.27**	90.2	1.04**
Uzbekistan 1996	82.9	0.97*	99.1	1.00	79.9	1.04**	98.5	1.01*
Bolivia 1997	92.0	1.02**	82.5	1.08**	89.6	1.09**	73.6	1.28**
Brazil 1996	93.8	1.00	73.5	0.86**	90.3	1.08**	51.6	1.65**
Colombia 2000	91.4	0.97**	89.3	0.96**	85.9	1.11**	78.4	1.23**
Dominican Rep. 1996	94.2	0.99*	81.3	0.85**	90.4	1.08**	61.3	1.43**
Guatemala 1999	71.6	1.09**	54.8	1.11**	64.9	1.33**	33.7	2.39**
Haiti 1994–95	73.4	1.00	44.6	1.02	60.5	1.45**	22.0	2.81**
Nicaragua 1998	80.0	0.94**	72.5	0.91**	67.2	1.33**	48.2	1.82**
Peru 2000	93.1	1.02**	92.2	1.01*	91.8	1.06**	86.6	1.14**
Indonesia 1997	86.6	0.99	90.3	0.99**	81.7	1.12**	83.5	1.14**
Philippines 1998	88.4	0.95**	95.4	0.94**	80.7	1.15**	85.7	1.14**
Central Western Africa	42.8	1.31	35.0	1.61	35.1	2.05	26.0	2.98

Table 1 (continued)

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
	School enrollment of 6–14 year olds	Gender inequality	Grade 5 completion of 15–19 year olds	Gender inequality	School enrollment of 6–14 year olds	Wealth inequality	Grade 5 completion of 15–19 year olds	Wealth inequality
	Female level (%)	Gender inequality	Female level (%)	Gender inequality	Poorest 50% level (%)	Wealth inequality	Poorest 50% level (%)	Wealth inequality
<i>South Asia</i>	61.9	1.24	46.2	1.46	58.3	1.42	38.6	1.85
<i>North Africa</i>	60.8	1.26	55.9	1.36	51.4	1.93	46.3	2.04
<i>East and Southern Africa</i>	63.6	1.04	52.9	1.13	57.6	1.36	42.5	2.23
<i>Europe and Central Asia</i>	79.4	1.05	96.7	1.02	77.8	1.09	96.7	1.01
<i>Latin America/Caribbean</i>	86.2	1.00	73.8	0.97	80.1	1.19	56.9	1.72
<i>East Asia</i>	87.5	0.97	92.9	0.96	81.2	1.14	84.6	1.14
<i>All</i>	64.3	1.13	57.2	1.26	58.2	1.51	47.3	2.14

Notes: *(**) Indicates that the Male/Female (or Rich/Poor) inequality is significantly different from zero at the 5(1)% level. Regional and overall averages are unweighted averages across countries. Inequality measure is the ratio. Source: Authors calculation from DHS data.

Asian countries—even when statistically significant—sometimes implying a female disadvantage, sometimes a female advantage. Only Turkey stands out as having a significant female disadvantage.

Columns III and IV of Table 1 show the percentage of a recent cohort—those aged 15–19—that have completed grade 5 and the corresponding measure of gender inequality.¹² Attainment captures both the share of children that enrolls and the proportion that subsequently drops out of school in the first 5 years. In general the results are consistent with those on inequalities in enrollment, but some countries with small inequalities in enrollment have statistically significant and substantial inequalities in attainment.

Ghana, Bangladesh and Malawi emerge with gender inequality measures in attainment of 1.07, 1.12 and 1.35, respectively, all of which are statistically significant. This suggests that while boys and girls might enroll in relatively equal proportion in these countries, boys tend to go further along in the school system. Alternatively this could reflect very recent (relative to the survey) increases in the school participation of girls in these countries, changes not yet reflected in the attainment of the older aged cohort.

Although the focus is on female *disadvantages* in education, several countries have a female *advantage* which in some cases is both statistically and substantively significant. Of the 44 countries analyzed, seven have a statistically significant female advantage in enrollment and five have a statistically significant female advantage in attainment. Countries with a female advantage appear to be concentrated in the Latin American and Caribbean region: Brazil, Dominican Republic, and Nicaragua all stand out with substantive female advantages in attainment. The fact that the countries included in this study were not randomly selected makes it hard to draw strong conclusions, however this is

¹²Selecting grade 4 as the relevant grade as was done by Lloyd, Kaufman, and Hewett (2000) makes no qualitative difference to the results.

indicative that a large disadvantage of girls in education may not be a worldwide problem, but is quite localized in certain regions or countries.¹³

Gaps in educational enrollment and attainment across different wealth groups are large in almost all developing countries.¹⁴ Wealth inequalities in both enrollment and attainment are significant in almost all the countries (Columns VI and VIII of Table 1). The three regions with large gender inequalities reappear as having large wealth inequalities: Central and Western Africa (with an average of 2.05), South Asia (averaging 1.42), and North Africa (averaging 1.93). In some countries the differential can be truly staggering. For example, 12.9% of children from the poorest 50% are enrolled in Mali whereas about 40% of those from the richest 50% were enrolled (yielding inequality of 3.09). This differential grows over the school cycle: only 5.4% from the poorest 50% have completed grade 5 compared with 31.2% from the richest 50% (yielding inequality of almost 5.75).

Unlike gender, wealth inequalities are typically statistically significant outside of these three regions. The regional average inequality in enrollment is lowest in Europe and Central Asia (1.09) where overall enrollment and attainment of grade 5 tend to be high, next lowest in East Asia (1.14), Latin America and Caribbean (1.19), and Eastern and Southern Africa (1.36). The ordering is the same for inequalities in attainment, with similar or larger magnitudes.

Many policy discussions focus on gender disparities in education, or on poverty targeted approaches. The DHS data can be used to compare gender to wealth inequalities. Fig. 1 shows gender inequality in enrollment on the horizontal axis and wealth inequality in enrollment on the vertical axis. Along the 45° line gender and wealth inequalities would be equal (Annex Fig. A.1 shows the corresponding figure for attainment).

The main implication of Fig. 1 is that almost all countries lie above the 45° line, that is, wealth inequalities are typically larger than gender inequalities.¹⁵ Countries break out into three main groups. First, those that lie along or around the vertical axis where gender inequalities are small and wealth inequalities range from very small (close to the horizontal axis) to fairly large (Tanzania at 1.60 or Nigeria at 1.90). These are countries where concern for school participation among the poor would be unambiguously more of a priority than participation among girls. Second, there are countries where wealth and gender inequalities are both high, with wealth inequalities being somewhat larger than gender inequalities: for example Egypt where wealth inequality equals 1.32 and gender inequality equals 1.13, or Pakistan where wealth inequality equals 1.88 and gender inequality 1.46. In these countries wealth inequalities are marginally more important than gender inequalities and policies targeted at increasing overall enrollment would likely need to address both simultaneously. Last, there is a group of countries with high gender inequality, and substantially higher wealth inequality. For example Mali has wealth inequality of 3.09 and gender inequality of 1.37, or Morocco where wealth inequality equals 2.54 and gender inequality equals 1.39. In these countries the policy issue is more mixed. Both wealth and gender play substantial roles in capturing relevant dimensions of

¹³Filmer, King, and Pritchett (1998) and Filmer and Pritchett (1999b) disaggregate the data within India and find substantial heterogeneity even across the different states.

¹⁴Filmer and Pritchett (1999a), using a subset of the countries analyzed here, show that the difference in the median grade attained by 15–19 year olds from the richest and poorest households reaches as high as 10 years (India), and is commonly between 3 and 5 years in other countries.

¹⁵Country codes used in the figures are in the Annex Table A.1.

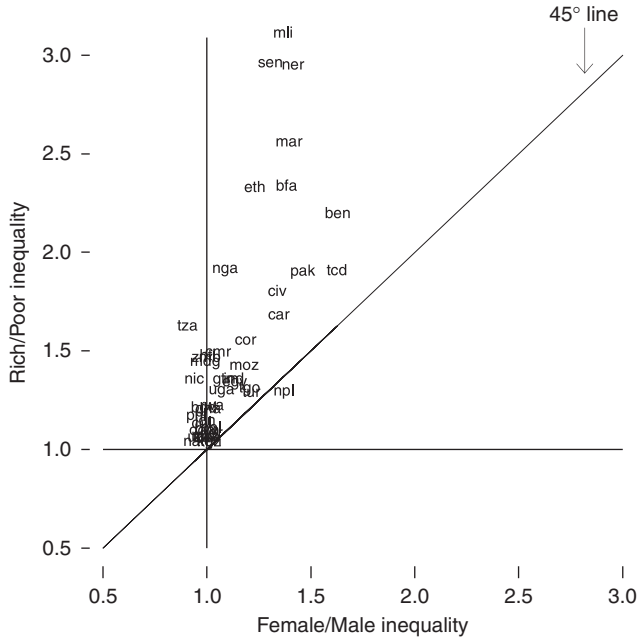


Fig. 1. Gender and wealth inequalities in enrollment. *Note:* Inequality measure is the ratio. Along the 45° line gender inequality is equal to wealth inequality.

education inequalities. Targeting both will be required to address overall enrollment, although the poverty dimension would probably hold slight priority.

There are two notes of caution about how one might interpret these results. First, even when gender gaps are small the analysis does not imply that investments in girls education are not desirable. There is a large literature on the benefits of female education on a host of private and social outcomes (including among many others [Benefo & Schultz, 1996](#); [Haddad, Hoddinott, & Alderman, 1997](#); [King & Hill, 1993](#); [Pitt, 1995](#); [Schultz, 1993](#); [Summers, 1992](#)). In that context it is the level of female education, not the gaps, that matters for policy. This does, however, leave open the issue of whether, when, and where additional public investments in girls' education should take priority over boys education when the two are roughly at the same level.

Second, the message to take is not that gender gaps are unimportant because wealth gaps are more widespread or larger, rather it is that gender gaps are more important in some regions and countries than others, and that wealth gaps should be an important part of any analysis of inequalities in educational outcomes. The next section examines how the interaction of gender and wealth sometimes result in large social gaps in educational outcomes.

4.2. Gender inequalities among the rich and poor

As discussed in Section 2 there is limited theoretical and empirical work on the interaction between wealth and gender in the determination of educational outcomes.

Investigating whether inequalities are focused within specific subgroups, for example among the poor, will be especially important for targeting policy interventions. In addition, if gender inequalities in education diminish with wealth then explanations of female disadvantage based on social norms and customs would not be valid since segments of the same society, sharing the same social norms and customs, do not behave the same way towards the education of girls.

Table 2 reports enrollment among girls aged 6–14 years old among the poorest and richest 50% of households (Columns I and II), as well as the corresponding gender inequalities within those groups (Columns III and IV). Columns V–VIII report corresponding statistics for the percentage of 15–19 year olds who have completed grade 5.

Comparing Columns III and IV reveals whether the measure of gender inequality in enrollment is larger or smaller for members of poorer and richer households. Fig. 2 reports the same information graphically. The horizontal axis is the gender inequality among children from the richest 50%, the vertical axis is the gender inequality among children from the poorest 50%. Along the 45° line, gender inequality would be equal among children from richer and poorer households. The further above the 45° line a point lies, the more gender inequality among poorer children is greater than gender inequality among richer children.

There are two main features of Fig. 2. First, the majority of countries lie very close to the origin suggesting that in many countries there is no gender inequality among richer nor among the poorer children. This is consistent with the earlier finding that overall gender inequality was limited to countries in Central and Western Africa, South Asia, and North Africa. Second, within countries with substantial overall gender inequality, this inequality is larger among poorer than richer households.

In the Central and Western African countries the degree of gender inequality decreases with wealth in all countries, although this difference is only statistically significant in Benin, Cameroon, Nigeria, and Togo. The difference is substantively and statistically significant in the South Asian and North African countries—except for Bangladesh where gender inequality in enrollment is small for both richer and poorer children. Egypt, in particular, has virtually no gender inequality among children from the richest 50%, but inequality of 1.30 among children from the poorest 50%.

Mozambique, Turkey, and Guatemala stood out above with overall statistically significant gender inequality in enrollment unlike most other countries in their regions. All three have significantly lower inequality among richer than among poorer children.

The results on gender inequality in attainment (Columns VII and VIII of Table 2 and Appendix Fig. A.2) are generally qualitatively similar. Where there are inequalities, these are typically smaller among richer children than among poorer children. The countries where the differential is statistically significant is not exactly the same as for enrollments but the pattern of magnitudes suggests a high degree of consistency.

One result emerges more clearly when looking at attainment. There are several countries where there is a female *advantage* in attainment among poorer households that falls significantly among richer households. In Brazil, Colombia, Dominican Republic, Nicaragua, and the Philippines—all countries with an overall significant female advantage in attainment—this female advantage is substantially lower among richer children, and is

Table 2
School enrollment and attainment: gender inequalities among richer and poorer households

	(I) School enrollment of 6–14 year olds				(V) Grade 5 completion of 15–19 year olds			
	(II) Female level (%)		(III) Gender inequality		(VI) Female		(VII) Gender inequality	
	Poorest 50%	Richest 50%	Poorest 50%	Richest 50%	Poorest 50%	Richest 50%	Poorest 50%	Richest 50%
Benin 1996	17.0	46.7**	2.11	1.50*	4.3	30.8**	3.73	1.80**
Burkina Faso 1999	9.9	31.4**	2.01	1.22	4.4	26.0**	2.90	1.47
C.A.R. 1994–95	31.4	64.4**	1.70	1.20**	9.8	42.4**	2.60	1.44
Cameroon 1998	57.4	87.8**	1.11	1.03	44.4	82.8**	1.09	1.02
Chad 1998	14.9	35.3**	2.07	1.40	1.7	17.7**	7.55	2.28**
Cote d'Ivoire 1994	28.0	54.4**	1.49	1.30	22.1	44.1**	1.69	1.58**
Ghana 1998	70.3	83.5**	1.02	1.01	65.5	83.6**	1.14	1.04
Mali 1995–96	9.5	35.2**	1.72	1.28	3.3	24.0**	2.31	1.62**
Niger 1998	7.7	29.6**	1.98	1.28	5.4	28.1**	3.28	1.55
Nigeria 1999	40.6	82.8**	1.19	1.04*	50.5	87.4**	1.28	1.06**
Senegal 1992–93	12.4	42.4**	1.60	1.25	10.8	47.3**	1.93	1.28
Togo 1998	53.7	75.1**	1.30	1.15**	18.5	45.4**	2.23	1.53
Bangladesh 1996–97	68.2	80.1**	0.97	1.00	32.0	67.6**	1.31	1.01**
India 1998–99	61.2	89.8	1.24	1.04	36.3	83.2**	1.76	1.09**
Nepal 1996	46.0	66.2**	1.53	1.24**	23.3	45.1**	2.33	1.59
Pakistan 1990–91	22.8	67.0**	2.32	1.18**	12.1	58.4**	3.70	1.31**
Egypt 1995–96	60.8	92.4**	1.30	1.01**	54.8	87.9**	1.39	1.05**
Morocco 1992	20.1	76.5**	2.20	1.15	13.3	65.3**	3.15	1.22**
Comoros 1996	36.2	60.8**	1.32	1.13	23.8	54.7**	1.68	1.14*
Ethiopia 2000	14.0	39.2**	1.55	1.12	3.2	28.1**	3.02	1.29
Kenya 1998	86.8	87.2**	1.00	1.03	81.9	88.3**	0.99	0.98
Madagascar 1997	48.3	69.3**	0.99	0.98	8.8	43.8**	0.94	0.98
Malawi 1996	84.7	93.4**	1.05	0.95**	14.3	52.5**	2.01	1.13
Mozambique 1997	40.3	62.6**	1.32	1.10**	8.3	37.9**	2.63	1.49
Namibia 1992	86.8	87.5	0.95	0.97	63.9	83.6**	0.72	0.85
Rwanda 1992	46.5	55.2**	1.01	1.03	52.3	60.1**	0.86	0.98
Tanzania 1999	42.9	62.9**	0.82	0.99	51.8	73.1**	1.15	0.88*
Uganda 1995	56.9	75.8**	1.12	1.04	37.9	61.2**	1.18	1.11
Zambia 1996–97	48.9	72.0**	1.02	0.98	55.1	81.7**	1.01	1.04
Zimbabwe 1999	82.4	85.3**	0.99	1.00	91.4	95.4**	1.01	0.97*
Kazakhstan 1999	84.0	86.9**	0.99	1.00	99.7	99.4	0.99	0.99
Kyrgyz Rep. 1997	85.6	86.1	1.00	1.02	98.7	100.0	1.00	0.99
Turkey 1998	53.7	74.3**	1.32	1.12**	85.7	92.4**	1.11	1.04*
Uzbekistan 1996	81.4	84.5	0.96	0.97	98.6	99.6	1.00	1.00
Bolivia 1997	88.1	97.0**	1.03	1.01*	67.8	91.5**	1.16	1.06*
Brazil 1996	90.6	97.6**	0.99	1.00	58.3	88.7**	0.78	0.92*
Colombia 2000	87.8	95.8**	0.96	0.99*	81.8	95.9**	0.92	1.00**
Dominican Rep. 1996	91.4	97.2**	0.98	1.00	68.9	91.3**	0.80	0.92*
Guatemala 1999	60.3	84.7	1.15	1.04*	25.4	78.2**	1.61	1.07*
Haiti 1994–95	60.1	86.6**	1.01	1.03	21.7	59.5**	1.03	1.08
Nicaragua 1998	69.6	92.1**	0.93	0.95	52.4	89.0**	0.84	0.97**
Peru 2000	90.2	97.6**	1.04	1.00**	84.4	98.2**	1.05	1.00**
Indonesia 1997	82.2	91.7**	0.99	1.00	84.9	94.7**	0.97	1.01*
Philippines 1998	83.9	93.8**	0.93	0.98**	91.5	98.1**	0.89	0.99**
Central Western Africa	29.4	55.7	1.61	1.22	20.1	46.6	2.64	1.47
South Asia	49.5	75.8	1.51	1.11	25.9	63.6	2.27	1.25

Table 2 (continued)

	(I) School enrollment of 6–14 year olds				(V) Grade 5 completion of 15–19 year olds			
	(II)		(III) Gender inequality		(VI) Female		(VII) Gender inequality	
	Female level (%)		Poorest		Poorest		Poorest	
	Poorest 50%	Richest 50%	Poorest 50%	Richest 50%	Poorest 50%	Richest 50%	Poorest 50%	Richest 50%
North Africa	40.4	84.4	1.75	1.08	34.1	76.6	2.27	1.13
East and Southern Africa	56.2	70.9	1.10	1.03	41.1	63.4	1.43	1.07
Europe and Central Asia	76.2	83.0	1.07	1.03	95.7	97.8	1.03	1.01
Latin America/Caribbean	79.8	93.6	1.01	1.00	57.6	86.5	1.02	1.00
East Asia	83.1	92.7	0.96	0.99	88.2	96.4	0.93	1.00
All	54.9	74.0	1.28	1.08	43.7	68.3	1.74	1.18

Notes: **(**)** indicate that the values in the prior two columns are significantly different at the 5(1)% level. Regional and overall averages are unweighted averages across countries. Inequality measure is the ratio. Source: Author’s calculation from DHS data.

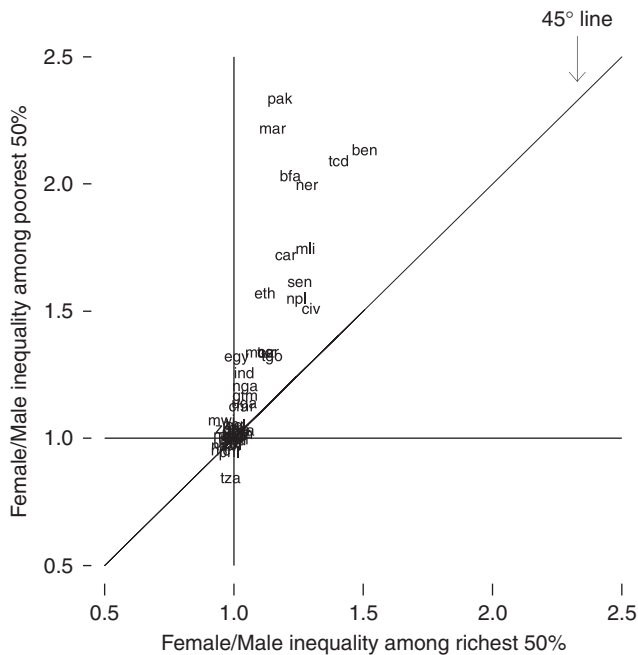


Fig. 2. Gender inequality in enrollment among the poorest and richest 50%. Note: Inequality measure is the ratio. Along the 45° line gender inequality is equal among the richest and poorest 50%.

close to zero among the rich in three of the countries (Columbia, Peru and Philippines). In these countries the factors driving girls to enroll and stay in school longer than boys are reduced as wealth increases.

5. Conclusions

This study set out to document and assess within-country gender and wealth disparities in education. The results highlight that there are some countries—regionally concentrated—where a female disadvantage in education outcomes is a major issue. In Central and Western Africa, North Africa, and South Asia gender gaps are large—especially in poorer households. At the other extreme there are countries, mostly in Latin America, where there is no female disadvantage, and often a small female advantage, in education. Policies need to be tailored to the specific magnitudes of the problem in each country. On the other hand, wealth inequalities are systematically large across countries. When there is a female disadvantage in schooling outcome, this disadvantage tends to be larger among the poorest households.

This paper has not been able to shed light on important aspects of education inequalities: for example detailed analysis into the social norms that might underlie educational differences, or how behaviors and outcomes might differ for the extremely poor. Nevertheless, the accumulation of results from numerous countries is new evidence on the broad trends in gender inequalities in schooling and their relation to—and interaction with—household wealth. While the analysis is largely descriptive, the patterns revealed suggest two considerations for policy. First, policies to overcome female disadvantage in schooling should be tailored to the magnitude of the gap in a specific country—rather than generic policies in all countries. Moreover, within countries, when there is a female disadvantage, a focus on the poorest girls is likely to yield the largest impact. In these settings, policy interventions that affect the economic incentives facing poor households to enroll girls could potentially have beneficial impacts, even if the social environment is one in which investments in girls are not prioritized. More generally, the relative size of wealth and gender gaps should be assessed in order to determine whether targeting girls specifically, or poor children more generally, is the right course of action for policy interventions.

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Appendix

See Figs. A.1 and A.2 and Table A.1.

Table A.1
Summary information of data used from DHS surveys

	Sample sizes analyzed			Information on the creation of the asset indexes			Background poverty statistics				
	Number of households	Number of household members aged 6–14	Number of household members aged 15–19	Proportion of variance explained by first PC	Value of first eigen value	Difference between first and second eigen values	Number of assets in wealth index	Population below \$1 a day	Population below \$2 a day	Year for poverty data	Code used in figures
Benin 1996	4499	7604	2459	0.268	4.3	2.7	16				ben
Burkina Faso 1999	4812	8960	3108	0.268	4.3	2.6	16	61	86	1994	bfa
C.A.R. 1994–95	5551	7092	2513	0.240	3.8	2.0	16	67	84	1993	car
Cameroon 1998	4697	6800	2625	0.225	3.6	2.0	16				cmr
Chad 1998	6840	9970	3407	0.247	4.2	2.2	17				ted
Cote d'Ivoire 1994	5935	9860	3696	0.223	3.3	1.7	15	12	49	1995	civ
Ghana 1998	5822	5978	1854	0.211	3.2	1.6	15	78	96	1997	gha
Mali 1995–96	8716	13,236	4053	0.230	3.4	1.4	15	73	91	1994	mli
Niger 1998	5242	9516	3454	0.265	4.2	2.6	16	61	85	1995	ner
Nigeria 1999	7647	9880	3928	0.220	7.1	4.1	32	70	91	1997	nga
Senegal 1992–93	3528	8303	3181	0.237	3.6	2.0	15	54	80	1991–92	sen
Togo 1998	7517	12,829	4086	0.229	3.2	1.7	14				tgo
Bangladesh 1996–97	8682	11,533	4982	0.309	4.0	2.5	13	29	78	1996	bgd
India 1992–93	87,175	109,326	50,625	0.256	5.4	3.7	21	47	88	1994	ind
Nepal 1996	8082	11,044	4482	0.219	2.6	0.9	12	38	82	1995	npl
Pakistan 1990–91	7193	14,077	5367	0.283	4.2	2.7	15	12	57	1991	pak
Egypt 1995–96	15,567	21,073	10,039	0.250	3.3	1.9	13	3	30	1995	egy
Morocco 1992	6577	9432	4348	0.286	4.6	3.2	16	0	8	1990–91	mar
Comoros 1996	2252	3788	1689	0.230	3.5	1.7	15				com
Ethiopia 2000	14,072	17,040	7441	0.230	5.3	3.5	23	31	76	1995	eth
Kenya 1998	8380	10,536	3865	0.252	4.0	2.5	16	27	62	1994	ken
Madagascar 1997	7171	8395	3622	0.230	3.4	1.8	15	60	89	1993	mdg
Malawi 1996	2798	3269	1265	0.199	2.6	1.0	13				mwi
Mozambique 1997	9282	11,779	4447	0.240	3.6	1.3	15	38	78	1996	moz
Namibia 1992	4101	6136	2845	0.300	4.5	3.1	15	35	56	1993	nmb
Rwanda 1992	6252	8256	2997	0.200	2.8	1.3	14	36	85	1983–85	rwa
Tanzania 1999	3615	4814	1865	0.213	3.2	1.7	15	20	60	1993	tza
Uganda 1995	7550	9533	3211	0.192	2.9	1.0	15	37	77	1992	uga
Zambia 1996–97	7286	10,346	4143	0.275	4.1	2.7	15	73	92	1996	zmb
Zimbabwe 1999	6369	7560	3354	0.334	6.7	4.7	20	36	64	1990–91	zwe
Kazakhstan 1999	5844	3837	1677	0.238	4.0	2.1	17	1	15	1996	kaz
Kyrgyz Rep. 1997	3672	3726	1488	0.206	2.9	1.2	14				kgz
Turkey 1998	8612	8304	4567	0.234	2.8	1.5	12	2	18	1994	tur
Uzbekistan 1996	3703	4242	2037	0.190	2.7	0.9	14	3	27	1993	uzb
Bolivia 1997	12,109	13,182	5250	0.313	4.4	2.8	14	11	39	1990	bol
Brazil 1996	13,283	11,822	6208	0.226	3.2	1.3	14	5	17	1997	bra
Colombia 2000	10,907	8836	4730	0.272	4.4	2.8	16	11	29	1996	col
Dominican Rep. 1996	8831	8593	4152	0.241	3.8	2.4	16	3	16	1996	dom
Guatemala 1999	11,297	16,324	6394	0.264	4.0	2.5	15	40	64	1989	gtm
Haiti 1994–95	4818	5966	2580	0.266	4.0	2.2	15	88	97	1991	hti
Nicaragua 1998	11,528	16,817	7456	0.238	3.6	2.0	15	3	18	1993	nic
Peru 2000	28,900	29,790	12,824	0.320	6.7	5.1	21	15	41	1996	per
Indonesia 1997	34,255	33,424	16,235	0.216	2.8	1.1	13	8	50	1996	idn
Philippines 1998	12,407	14,567	6644	0.261	3.9	2.5	15	0	19	1997	phl
Unweighted mean	10,304	12,895	5482	0.25	3.9	2.2	16	32	59		
Unweighted Std. Dev.	13,285	16,058	7533	0.03	1.0	1.0	3	27	29		
Unweighted median	7240	9525	3897	0.24	3.8	2.1	15	31	64		
Maximum	87,175	109,326	50,625	0.33	7.1	5.1	32	88	97		
Minimum	2252	3269	1265	0.19	2.6	0.9	12	0	8		

Sources: Author's calculation from DHS data. Poverty data from <http://www.worldbank.org/research/povmonitor/index.htm>.

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