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The Structure of Social Disparities in Education

Gender and Wealth

Deon Filmer

Wealth gaps in educational outcomes are large in many developing countries. And gender gaps, though absent in many societies, are large in some, particularly in South Asia and North, Western, and Central Africa. In some countries with a female disadvantage, household wealth interacts with gender to create an especially large gender gap among the poor.

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Summary findings

Using internationally comparable household data sets (Demographic and Health Surveys), Filmer investigates how gender and wealth interact to generate within-country inequalities in educational enrollment and attainment. He carries out multivariate analysis to assess the partial relationship between educational outcomes and gender, wealth, household characteristics (including level of education of adults in the household), and community characteristics (including the presence of schools in the community). He finds that:

- Women are at a great educational disadvantage in countries in South Asia and North, Western, and Central Africa.
- Gender gaps are large in a subset of countries, but wealth gaps are large in almost all of the countries studied. Moreover, in some countries where there is a heavy female disadvantage in enrollment (Egypt, India, Morocco, Niger, and Pakistan), wealth interacts with gender to exacerbate the gap in educational outcomes. In India, for example, where there is a 2.5 percentage point difference between male and female enrollment for children from the richest households, the difference is 34 percentage points for children from the poorest households.
- The education level of adults in the household has a significant impact on the enrollment of children in all the countries studied, even after controlling for wealth. The effect of the education level of adult females is larger than that of the education level of adult males in some, but not all, of the countries studied.
- The presence of a primary and a secondary school in the community has a significant relationship with enrollment in some countries only (notably in Western and Central Africa). The relationship appears not to systematically differ by children's gender.

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Comment Welcome

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The Structure of Social Disparities in Education: Gender and Wealth[1]

I) 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 year 2000 was set as the target for achieving this goal. It is now 1999 and we are still not near to achieving universal primary education – and as pointed out dramatically in a recent report by Oxfam International (1999) we do not appear to be closing in on it.

This paper uses a collection of internationally comparable household datasets to investigate the correlates of educational enrollment and attainment gaps within countries. The data from the Demographic and Health Surveys (DHS) for 57 surveys in 41 countries are used to carry out country specific analyses, which are comparable across countries. Specifically, the effects of gender, household wealth, the education of adult household members, and the presence of schools in the community on the educational outcomes of children are assessed in each country and compared across countries.

Using household based surveys allows the analysis to go beyond comparing country aggregates which are reported in several large "international databases" (e.g. UNESCO data or derivatives thereof such as Barro and Lee, 1993; Nehru, Swanson and Dubey, 1993; Dubey and King, 1994; Ahuja and Filmer, 1996). The DHS have a drawback in that they lack data on household consumption expenditures, the usual variable used to rank households by their socio-

[1] This paper has benefited greatly from comments from Jere Behrman, Jeff Hammer, Elizabeth King, Julian Lampietti, Andrew Mason, Lant Pritchett, Martin Ravallion, Jee-Peng Tan and participants at a workshop on Gender and Development in June 1999. Errors are of course my own. Please see http://www.worldbank.org/research/projects/edattain/edattain.htm for more information on education gaps generated as a part of this project.

economic standing. This analysis uses the results from Filmer and Pritchett (1998) which argued that an index of housing characteristics and assets owned by the household members, which are collected in the DHS, is a good measure of a household's long run wealth in predicting educational outcomes.

The particular goal here is to investigate the association between educational disparities and gender, household wealth, adult education, and "access" to schools. The analysis leads to four main findings. First, the extent of the female disadvantage in education varies enormously across countries. At one extreme there are some countries, primarily located in Western and Central Africa, North Africa, and South Asia where the gaps are large in all the measures used. For example, in India there is a 16.6 percentage point difference between the school enrollment of girls and boys aged 6 to 14. In Benin, the enrollment rate of boys aged 6 to 14 is 63 percent higher than the enrollment rate of girls. At the other extreme there are countries, mostly in Latin America, where there is no female disadvantage in and in fact a small female *advantage* in some of the measures used. In Colombia, the enrollment rate of boys is 98 percent that of girls.

Second, while gender gaps are large in a subset of countries, wealth gaps are large in almost all the countries studied. For example, in Senegal the enrollment of 6 to 14 year olds from the poorest households is 52 percentage points lower than for those from the richest households. In Zambia, there is a 36 percentage point difference in the enrollment rate of children from the richest and poorest households. Disturbingly, in some countries where there is a high degree of female disadvantage in enrollment, wealth interacts with gender to exacerbate gaps in educational enrollment among the poor (Niger, Egypt, Morocco, India, and Pakistan). The magnitude of this difference can be quite large. For example, in India there is a 2.5 percentage point difference in the enrollment of male and female children from the richest household whereas the difference is 34 percentage points for children from the poorest households.

Third, the education of adults in the household has a significant relationship with the enrollment of children in practically all the countries studied, even after controlling for household wealth. The results do not however confirm the notion that the education of adult females is *always* more strongly related to the education of children that that of adult males. While this is true in some countries, the story is complicated and varies across countries. The findings do however confirm that in a subset of countries with a large female disadvantage in enrollment, the education of adult females has a larger impact on the enrollment of girls than that of boys. This outcome is consistently found in India, Nepal, and Pakistan.

Fourth, the presence of a primary and a secondary school in the community has a significant relationship to enrollment in some countries only (notably the Western and Central African countries). Moreover, the presence of a school does not appear to be differentially related to the education of boys and girls in a systematic way across countries, even those with a high female disadvantage in enrollment.

II) Data and methodological approach

The data used in this paper are those collected as a part of the Demographic and Health Surveys (DHS). These are large, nationally representative household surveys, and the data from 57 surveys (from 41 countries) are analyzed here.[2] Basic information on the number of households in each sample, as well as the number of individuals in the sample of 6 to 14 years olds, and 15 to 19 year olds, are in Table 1. The DHS were not designed to collect information on education. Rather, they were a systematic data collection effort whose main purpose was to obtain nationally representative and cross-nationally comparable household-level data related to

[2] There are three main designs of the survey instrument. DHS I surveys were carried out between 1985 and 1989 and do not contain the requisite education data. DHS II were collected between 1990 and 1993, and

family planning, and maternal and child health. The more recent surveys did record data on school enrollment (for household members aged 6 to 25) and educational attainment (for household members aged 6 and above) as reported by a chosen respondent.

Data on education outcomes

The education variables analyzed here are based on the answers to three questions about those aged 6 and above: whether they had ever been to school; if they had ever been to school, what was the highest level of schooling attended; and what was the highest grade attained at that level. Those aged 6 to 25 were asked, in addition, whether they were still "in school" (if they report ever attending). In the rest of this paper, children who report being "in school" are referred to as being enrolled.

The countries have been grouped into eight regions for the analytical purposes of this paper. These are, ranked roughly from lowest to highest enrollment of girls aged 6 to 14 from the poorest households: Western and Central Africa, North Africa, South Asia, Eastern and Southern Africa, Central America and the Caribbean, East Asia and the Pacific, South America, and Middle East and Central Asia.

Measuring wealth using DHS data

The DHS do not ask about household income or consumption expenditures, the variables usually used to rank households according to their standard of living. The surveys carried out since 1990 do however include two sets of questions related to the socio-economic status of the household.[3] First, households are asked to report about ownership of various assets, such as whether any member owns a radio, television, refrigerator, bicycle, motorcycle, or car. Second,

DHS III are those that have been carried out since 1994 This analysis is limited to datasets with the requisite education and asset information.

[3] This section relies heavily on information contained in Filmer and Pritchett (1998 and 1999a).

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 15 or 16 but varies from 9 to 21 (shown in the last column of Table 1).[4]

In order to use these 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.[5] This is done here using the statistical technique of principal components. Principal components is a technique for summarizing the information contained in a large number of variables to 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 details of the methodology are described and defended in Filmer and Pritchett (1998) which shows that the asset index performs as well as a more traditional measure, such as household-size-adjusted consumption expenditures, in predicting educational enrollment and attainment.[6] The methodology was applied in Filmer and Pritchett (1999a) to analyze wealth

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[4] A detailed description and assessment of the methodology is in Filmer and Pritchett (1999a). The variables used in the construction of the index are (in a typical case such as Mali): (1) a set of six dummy variables 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; (6) a dummy variable equal to one if the dwelling's floors are made of finished materials (such as cement, parquet, vinyl).

[5] If 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 (cf. Montgomery et al. 1997)

[6] While it is relatively easy to interpret the first principal component, an intuitive explanation of the second and higher order components is more problematic. One generally hopes for only one factor with an eigen value greater than 1, the commonly used cut-off value for "significant" components. In this case, although the first eigen value is relatively high, the second eigen value is also generally above 1. This suggests that

Table 1: Summary information of data used from DHS surveys

	Sample sizes analyzed			Information on the creation of the asset indexes			
	Number of households	Number of household members aged 6-14	Number of household members aged 15-19	Proportion of variance explained by first Principal Component	Value of first eigen value	Difference between first and second eigen values	Number of assets in wealth index
Benin 1993	4,499	7,604	2,459	0.268	4.3	2.7	16
Burkina Faso 1992-93	5,143	9,224	3,471	0.276	4.0	2.3	15
Cameroon 1991	3,358	5,121	1,997	0.247	3.8	2.0	15
C.A.R. 1994-95	5,551	7,092	2,513	0.240	3.8	2.0	16
Chad 1996	6,840	9,970	3,407	0.247	4.2	2.2	17
Cote d'Ivoire 1994	5,935	9,860	3,696	0.223	3.3	1.7	15
Ghana 1993	5,822	5,978	1,854	0.211	3.2	1.6	15
Mali 1995-96	8,716	13,236	4,053	0.230	3.4	1.4	15
Niger 1992	5,242	8,840	3,118	0.265	4.2	2.6	16
Niger 1997	5,242	9,516	3,454	0.265	4.2	2.6	16
Senegal 1992-93	3,528	8,303	3,181	0.237	3.6	2.0	15
Togo 1998	7,517	12,829	4,086	0.229	3.2	1.7	14
Egypt 1992	10,760	14,290	6,476	0.266	3.5	1.9	13
Egypt 1995-96	15,567	21,073	10,039	0.250	3.3	1.9	13
Morocco 1992	6,577	9,432	4,348	0.286	4.6	3.2	16
Bangladesh 1993-94	9,174	12,688	4,998	0.285	4.0	2.3	14
Bangladesh 1996-97	8,682	11,533	4,982	0.309	4.0	2.5	13
India 1992-93	87,175	109,326	50,625	0.256	5.4	3.7	21
Nepal 1996	8,082	11,044	4,482	0.219	2.6	0.9	12
Pakistan 1990-91	7,193	14,077	5,367	0.283	4.2	2.7	15
Comoros 1996	2,252	3,788	1,689	0.230	3.5	1.7	15
Kenya 1993	7,950	11,365	3,856	0.264	4.0	2.4	15
Kenya 1998	8,380	10,536	3,865	0.252	4.0	2.5	16
Madagascar 1997	7,171	8,395	3,622	0.230	3.4	1.8	15
Malawi 1992	5,323	6,767	2,511	0.186	2.6	1.1	14
Malawi 1996	2,798	3,269	1,265	0.199	2.6	1.0	13
Mozambique 1997	9,282	11,779	4,447	0.240	3.6	1.3	15
Namibia 1992	4,101	6,136	2,845	0.300	4.5	3.1	15
Rwanda 1992	6,252	8,256	2,997	0.200	2.8	1.3	14
Tanzania 1991-92	8,327	11,804	4,831	0.187	2.8	1.0	15
Tanzania 1996	7,969	10,317	3,735	0.202	3.0	1.1	15
Uganda 1995	7,550	9,533	3,211	0.192	2.9	1.0	15
Zambia 1992	6,209	8,930	4,170	0.259	3.9	2.1	15
Zambia 1996-97	7,286	10,346	4,143	0.275	4.1	2.7	15
Zimbabwe 1994	5,984	8,247	3,252	0.273	4.1	2.2	15
Dominican Rep. 1991	7,144	7,590	3,808	0.249	4.2	2.7	17
Dominican Rep. 1996	8,831	8,593	4,152	0.241	3.8	2.4	16
Guatemala 1995	11,297	16,324	6,394	0.264	4.0	2.5	15
Haiti 1994-95	4,818	5,966	2,580	0.266	4.0	2.2	15
Nicaragua 1998	11,528	16,817	7,456	0.238	3.6	2.0	15
Indonesia 1991	26,858	30,090	14,136	0.296	2.7	1.1	9
Indonesia 1994	33,738	36,652	16,607	0.258	3.4	1.6	13
Indonesia 1997	34,255	33,424	16,235	0.216	2.8	1.1	13
Philippines 1993	12,995	16,315	7,159	0.257	3.6	2.2	14
Philippines 1998	12,407	14,567	6,644	0.261	3.9	2.5	15
Bolivia 1993-94	9,114	10,529	4,032	0.311	3.7	2.3	12
Bolivia 1997	12,109	13,182	5,250	0.313	4.4	2.8	14
Brazil 1996	13,283	11,822	6,208	0.226	3.2	1.3	14
Brazil, Northeast 1991	6,064	6,789	3,319	0.263	4.2	2.9	16
Brazil, Northeast 1996	4,663	4,945	2,494				
Colombia 1990	7,412	7,153	3,618	0.216	3.2	2.0	15
Colombia 1995	10,112	9,063	4,506	0.240	3.6	2.3	15
Peru 1991-92	13,479	16,912	7,666	0.283	4.2	2.9	15
Peru 1996	28,122	32,808	13,525	0.267	4.0	2.5	15
Kazakhstan 1995	4,178	3,038	1,355	0.203	3.0	1.5	15
Turkey 1993	8,612	8,304	4,567	0.234	2.8	1.5	12
Uzbekistan 1996	3,703	4,242	2,037	0.190	2.7	0.9	14
Unweighted average	10,564	13,257	5,663	0.248	3.6	2.0	14.7
Unweighted std. dev.	12,302	14,748	6,907	0.032	0.6	0.7	1.6
Unweighted median	7,517	9,860	4,032	0.250	3.7	2.1	15.0

gaps in educational attainment in 35 countries, and in Filmer and Pritchett (1999b) which investigates the determinants of education gaps in India, and how these vary across states. This paper extends these previous analyses by highlighting how gender interacts with wealth, adult education and the presence of schools in the community, and how these relationships differ across countries and regions.

The fourth column of Table 1 shows how well the first principal component of the asset variables (which is the asset index) "fits" the underlying variables, reporting the proportion of the variation captured. The proportion is remarkably stable, and reasonably high, at between 20 and 30 percent of the variance (ranging from Malawi, Tanzania and Uganda at 19 percent to Bolivia at 31 percent).[7]

The asset index is calculated separately for each country. Within each country individuals are sorted by the asset index, and cutoffs for the bottom 40 percent, the middle 40 percent, and the top 20 percent of the population are derived. Households are then assigned to each of these groups on the basis of their value of the asset index.[8] From here on these groups are referred to as "the poor," "the middle," and "the rich". Reference to a "poor" child should be read as "a child from a household in the group in which 40 percent of the population with the lowest asset indexes live."

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there is more than one factor underlying the "co-movement" of the assets. Interpreting this second principal component in a consistent way across countries is not straightforward, and it is ignored in the current analysis. It is reasonable to assume that the factor which explains the largest amount of the "co-movement" of the different assets can be interpreted as a household's economic status. Since, by construction, principal components are orthogonal to one another, the "omitted variables" problem of ignoring the second principal component should not be severe. But this rationalization would not be true of omitted variable bias for additional control variables, such as urban residence, which may be correlated with either component.

[7] Since random measurement error will tend to "flatten" the household wealth/enrollment relationship the fact that the fit is similar across countries is comforting as the cross-country comparisons are therefore not likely to be greatly affected by differing degrees of measurement error.

[8] This method of ranking households is analogous to fairly standard approaches used in the analyses of the correlates of poverty or the benefit incidence of public spending which use consumption quantiles. In this application, while the cut-off is based on all individuals, the analysis is carried out only for those aged 6 to 14 or 15 to 19 so there can be more or less than 40 percent of that cohort in the poorest households.

A note of caution is warranted here: the principal components procedure normalizes the mean of the index to zero for each country. Therefore, when comparing the "poor" in Kenya to the "poor" in Turkey or India it is important to keep in mind that the measure is relative, and 40 percent of the individuals are defined as living in "poor households" in every country. This paper does not attempt to generate an absolute poverty measure based on the asset index approach.[9] As a rough benchmark, Table 2 reports the percentage of the population living below the national poverty line, the dollar-a-day and the two-dollar-a-day poverty lines for the countries analyzed here as reported in the World Bank's World Development Indicators database (World Bank, 1999). The percent who live below a dollar a day clearly varies tremendously across countries, from below two percent in Morocco to almost 90 percent in Haiti. In an (unweighted) average across these countries the percentage living below this internationally comparable poverty line is about 40 percent – the percentage defined as the "poorest group" in the analysis in this paper. National poverty lines produce a much more stable proportion of each country defined as poor: again, the cross-country (unweighted) average is again about 40 percent.

What to take from this? Although using an asset index approach does not provide an internationally comparable cutoff (in the sense that a dollar-a-day day does) it does identify a group of individuals in each country whose size is comparable to other breakdowns that are frequently made. In particular, using the 40 percent cutoff in this paper corresponds approximately to the percentage of people living below the national poverty line in many countries (Cameroon, Bangladesh, India, Nepal, Kenya, Philippines) or the percentage living under a dollar-a-day in Zimbabwe two-dollars-a-day in Brazil.[10]

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[9] An attempt to do this would require benchmarking the index derived in each country to an international standard, or pooling the data to derive weights. Attempting this interesting work is left for a separate research endeavor and the interpretation of the present analysis is limited to relative gaps within a country.
[10] We do not simply include the list of variables that make up the index to "control" for wealth in the regression as advocated by Montgomery et al, 1997, as for a substantial part of the paper we will interested in the effect of wealth per-se. More applications of this "asset index" approach using the DHS can be found

Table 2: Poverty rates based on national and international standards

	Nationally based standard		Internationally based standard		
	Population below the poverty line	Year	Population below $1 a day	Population below $2 a day	Year
Benin	33	1995			
Cameroon	40	1984			
Chad	64	1995-96			
Cote d'Ivoire			18	55	1988
Niger	63	1989-93	32	92	1992
Senegal	33	1991	54	80	1991-92
Togo	32	1987-89			
Egypt			8	52	1990-91
Morocco*	26	1984-85	<2	20	1990-91
Bangladesh	43	1991-92			
Bangladesh	36	1995-96			
India	41	1992	47	88	1994
Nepal	42	1995-96	50	87	1995
Pakistan	34	1991	11	57	1991
Kenya	42	1992	50	78	1992
Madagascar			72	93	1993
Malawi	54	1990-91			
Rwanda	51	1993	46	89	1983-85
Tanzania	51	1991			
Uganda	55	1993	69	92	1989-90
Zambia	86	1993	85	98	1993
Zimbabwe	26	1990-91	41	68	1990-91
Dominican Rep.	21	1992	20	48	1989
Guatemala			53	77	1989
Haiti	65	1987	88	98	1991
Nicaragua	50	1993	44	75	1993
Indonesia	15	1990	8	50	1996
Philippines	41	1994	27	63	1994
Brazil	17	1990	24	44	1995
Colombia	17	1991	7	22	1991
Kazakhstan*	35	1996	1	12	1993
Unweighted average	41		37	67	
Unweighted std. dev.	17		26	26	
Unweighted median	41		41	75	
Maximum	86		88	98	
Minimum	15		<2	12	

Source: World Development Indicators, World Bank (1999)

III) The magnitude of gender and wealth differences in enrollment

Gender differences in enrollment

The basic outcomes disaggregated by gender are reported in Table 3. These are the percentage of girls aged 6 to 11 and aged 12 to 14 enrolled, as well as the percentage of females aged 15 to 19 who have completed grade 5 or higher. In addition, the table reports the "male-female gap," which is the difference in the level of the outcome between males and females, and the "male/female ratio" which is the ratio of the outcomes. For example, in Benin, 34.1 percent of girls aged 6 to 11 are enrolled. The male-female gap is equal to 18.0, indicating that the enrollment rate of boys 52.1 percent (34.1 + 18.0). The male/female ratio is equal to 1.53 (52.1 / 34.1) indicating that the enrollment of boys is 53 percent higher than that of girls.

It is important to consider both the gap and the ratio as these highlight different aspects of the potential disparity. For example, the male-female gap in enrollment of 11 to 14 year olds is 13.2 percentage points in Cameroon with an associated male/female ratio of 1.67. In India, the absolute gap is larger at 21.4 percentage points, but the associated ratio is lower at 1.40. The discrepancy exists because overall enrollment is much lower in Cameroon and although the absolute gap is smaller (one can't have less that zero years of schooling), the relative gap is larger. Although the two measures tend to track each other relatively closely, both concepts are independently relevant.

From Table 3, even in the youngest age group — 6 to 11 — it is clear that girls are at a large disadvantage relative to boys in the Western and Central African, North African, and South Asian regions. In several countries the male female gap in enrollment is over 10 percentage points (Benin, Central African Republic—C.A.R—Cote d'Ivoire, Egypt, Morocco, India, Nepal,

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in Bonialla-Chacin and Hammer (1999), Rutstein (1999), Stecklov et al (1999), Wagstaff and Watanbe

Table 3: Gender gaps in enrollment of 6-11 and 12-14 year olds, and attainment of 15-19 year olds (percent)

	6-11 year olds in school			12-14 year olds in school			15-19 year olds who have completed grade 5		
	Female	Male-Female gap	Male / female ratio	Female	Male-Female gap	Male / female ratio	Female	Male-Female gap	Male / female ratio
Benin 1996	34.1	18.0	1.53	29.0	26.6	1.92	19.9	17.6	1.88
Burkina Faso 1992-93	23.2	8.3	1.36	19.6	13.2	1.67	19.3	10.8	1.56
Cameroon 1991	61.4	8.5	1.14	70.4	5.0	1.07	59.9	10.3	1.17
C.A.R. 1994-95	49.9	13.9	1.28	46.6	24.3	1.52	27.7	16.6	1.6
Chad 1998	23.7	12.5	1.53	28.0	22.5	1.8	9.5	18.2	2.91
Cote d'Ivoire 1994	42.6	12.4	1.29	39.4	18.4	1.47	35.6	19.4	1.55
Ghana 1993	75.2	2.6	1.03	70.9	8.0	1.11	72.0	5.4	1.07
Mali 1995-96	22.6	6.5	1.29	21.5	12.5	1.58	14.8	9.9	1.67
Niger 1992	11.3	6.6	1.58	13.5	14.4	2.07	14.2	11.6	1.82
Niger 1997	18.0	8.0	1.44	21.0	7.4	1.35	17.0	15.3	1.9
Senegal 1992-93	27.0	6.5	1.24	28.3	12.8	1.45	31.1	9.6	1.31
Togo 1998	64.9	9.7	1.15	63.3	20.5	1.32	34.9	21.5	1.62
Egypt 1992	77.4	11.3	1.15	67.5	7.6	1.11	70.8	15.0	1.21
Egypt 1995-96	79.2	9.9	1.13	68.4	9.8	1.14	71.8	12.0	1.17
Morocco 1992	50.8	17.4	1.34	37.0	19.1	1.51	39.8	22.3	1.56
Bangladesh 1993-94	73.3	1.4	1.02	60.2	3.2	1.05	44.0	7.6	1.17
Bangladesh 1996-97	76.8	-0.7	0.99	67.5	-2.3	0.97	50.7	6.0	1.12
India 1992-93	61.9	14.3	1.23	53.1	21.4	1.4	51.4	21.5	1.42
Nepal 1996	57.9	18.3	1.32	50.3	25.4	1.51	35.0	28.6	1.82
Pakistan 1990-91	45.5	18.0	1.4	41.5	26.3	1.63	37.4	24.1	1.64
Comoros 1996	43.4	5.3	1.12	59.4	16.5	1.28	40.1	12.2	1.3
Kenya 1993	70.5	1.0	1.01	88.6	2.1	1.02	84.6	-3.2	0.96
Kenya 1998	86.0	-0.3	1	89.0	3.5	1.04	85.1	-1.7	0.98
Madagascar 1997	62.1	-2.5	0.96	50.0	4.1	1.08	26.4	0.3	1.01
Malawi 1992	55.8	-2.5	0.96	64.4	7.4	1.12	37.0	8.6	1.23
Malawi 1996	91.4	-0.8	0.99	87.0	-0.9	0.99	34.6	12.0	1.35
Mozambique 1997	49.5	6.4	1.13	56.1	14.7	1.26	25.2	16.7	1.66
Namibia 1992	84.4	-4.3	0.95	93.0	-1.5	0.98	72.8	-15.5	0.79
Rwanda 1992	51.6	0.6	1.01	49.8	2.3	1.05	56.4	-3.7	0.93
Tanzania 1991-92	34.6	-3.6	0.89	73.4	3.9	1.05	76.7	-4.2	0.95
Tanzania 1996	35.2	-4.1	0.88	77.4	0.0	1	70.8	-2.7	0.96
Uganda 1995	65.3	2.5	1.04	69.6	9.3	1.13	48.9	6.9	1.14
Zambia 1992	69.0	-3.5	0.95	76.8	5.5	1.07	72.1	4.5	1.06
Zambia 1996-97	54.1	-1.4	0.97	73.8	2.0	1.03	69.5	2.0	1.03
Zimbabwe 1994	82.7	0.8	1.01	88.1	2.0	1.02	91.6	1.0	1.01
Dominican Republic 1991	60.3	-5.8	0.9	88.3	-7.1	0.92	79.9	-13.5	0.83
Dominican Republic 1996	94.2	-1.6	0.98	94.2	-0.8	0.99	81.2	-13.0	0.84
Guatemala 1995	59.5	5.1	1.09	58.0	10.8	1.19	51.9	6.5	1.13
Haiti 1994-95	70.2	-0.7	0.99	79.8	2.4	1.03	44.0	0.8	1.02
Nicaragua 1998	80.4	-4.7	0.94	79.4	-4.8	0.94	72.4	-6.5	0.91
Indonesia 1991	79.0	-2.4	0.97	70.6	6.0	1.08	86.0	3.1	1.04
Indonesia 1994	88.4	-1.2	0.99	74.3	4.0	1.05	88.4	-0.3	1
Indonesia 1997	88.5	-1.2	0.99	83.1	0.6	1.01	90.3	-1.2	0.99
Philippines 1993	71.9	-2.3	0.97	91.1	-2.3	0.97	93.7	-5.7	0.94
Philippines 1998	87.1	-3.7	0.96	91.0	-6.0	0.93	95.3	-6.0	0.94
Bolivia 1993-94	90.3	1.0	1.01	78.7	8.8	1.11	82.1	7.1	1.09
Bolivia 1997	94.6	0.4	1	86.5	5.1	1.06	82.4	6.4	1.08
Brazil 1996	94.4	-0.4	1	92.7	-0.4	1	73.3	-10.7	0.85
Brazil, Northeast 1991	43.1	-8.1	0.81	75.6	-10.4	0.86	42.2	-13.8	0.67
Brazil, Northeast 1996	91.9	-0.4	1	90.8	-0.8	0.99	55.7	-14.1	0.75
Colombia 1990	79.9	-0.5	0.99	72.2	5.0	1.07	80.4	-7.8	0.9
Colombia 1995	92.6	-1.9	0.98	84.0	-1.9	0.98	83.1	-4.6	0.94
Peru 1991-92	87.4	0.5	1.01	87.3	2.3	1.03	90.0	1.9	1.02
Peru 1996	89.0	0.0	1	89.6	3.6	1.04	86.8	2.8	1.03
Kazakstan 1995	77.9	-0.2	1	99.0	-0.2	1	99.7	-0.7	0.99
Turkey 1993	72.2	4.3	1.06	48.6	22.4	1.46	90.2	6.1	1.07
Uzbekistan 1996	75.1	-2.7	0.96	98.9	-1.1	0.99	99.0	0.0	1
Unweighted mean	64.6	3.0	1.09	66.8	7.1	1.18	59.6	4.8	1.20
Unweighted std. Dev.	22.6	6.7	0.18	22.8	9.1	0.27	26.2	10.6	0.38
Maximum	94.6	18.3	1.58	99.0	26.6	2.07	99.7	28.6	2.91
Minimum	11.3	-8.1	0.81	13.5	-10.4	0.86	9.5	-15.5	0.67
Median	70.2	0.5	1.01	70.9	5.0	1.07	69.5	5.4	1.07

and Pakistan). In several of the Western and Central African countries where the absolute gap is less than 10 percentage points, the ratio is large (that is, between 1.24 and 1.58 in Burkina Faso, Mali, Niger, and Senegal). There are exceptions however, in Ghana the gap is only 2.5 percentage points and the ratio is 1.03, and in Cameroon and Togo it is close to 9 percentage points and the ratio of about 1.15. Perhaps surprisingly, in Bangladesh in the most recent year (1996-97) there is no female disadvantage (and there is even a small female advantage). Although the regional patterns are strong, there is still within-region variability.

In most of the other countries covered by the DHS data, there is close to no gender gap in the youngest age group, and in many cases there is a female advantage. There are exceptions however, such as Comoros, Guatemala, Mozambique, and Turkey.

When moving to the slightly older age group, ages 12 to 14, the pattern remains much the same. In most countries where there was a gender disadvantage among 6 to 11 year olds, it is exacerbated both as an absolute and relative measure (although this doesn't hold for Egypt and Morocco). The male-female gap reaches over twenty percentage points in Benin, C.A.R., Chad, India, Nepal, Pakistan and Togo. The male/female ratio was as high as 2.06 in Niger although it has gone down since 1992. In Benin the ratio was 1.92 in 1996 with 56 percent of boys enrolled but only 29 percent of girls. Again, in the rest of the world, Comoros, Guatemala, Mozambique and Turkey stand out as having a large female disadvantage. In two of the countries that did not have a large disadvantage among 6 to 11 year olds, Bolivia and Uganda the male/female ratio is 1.11 for ages 12 to 14.

The bulk of this paper will focus on disparities in enrollment of 6 to 14 year olds, but Table 3 also reports levels, gaps, and ratios for the percentage of a recent cohort — those aged 15 to 19 — that have completed grade 5. This is a summary measure that captures both the share of

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(1999).

children who enroll and the proportion who drop-out of school in the first 5 years.[11] The pattern is again consistent. Ghana is the only Western and Central African country which does not have a large gender gap, and Bangladesh is the only South Asian one which does not. Among countries outside of Western and Central Africa, North Africa, and South Asia, the same set of countries who performed poorly with respect to gender equality reappear. An exception is Malawi where there is a relatively large gap. Malawi has two surveys separated by four years and a comparison of enrollment rates of 12 to 14 year olds in school between the survey dates reveals that although there was a gender disadvantage in 1992, it had vanished by 1996. The gap in the percentage of 15 to 19 year olds who have completed grade 5 is therefore most likely a reflection of a gender disadvantage which existed some time ago.

Although we are focused here in female *disadvantages* in education, it should not go unnoticed that in several countries there is a female *advantage*. Of the 41 countries analyzed (counting only the most recent survey in countries where there are two) 16 have a female advantage in the enrollment of 6 to 11 year olds, 10 have a female advantage in the enrollment of 12 to 14 year olds, and 11 have a female advantage in the completion of grade 5. The fact that the countries for which these data are drawn were not randomly selected makes it hard to draw strong conclusions, however it is indicative that a large disadvantage of girls in education may not be a worldwide problem, but is quite localized in certain regions or countries.[12]

Comparison with other data sources

At this point it might be useful to digress and compare the findings based on these (generally) nationally representative household surveys to those reported in standard cross-country tables. Table 4 reports the primary net enrollment rate for girls as derived from the DHS

[11] In a subsequent section, the properties of the entire "attainment profile" of this cohort are investigated.
[12] Filmer, King, and Pritchett (1998) and Filmer and Pritchett (1999b) disaggregate the data within India and find substantial heterogeneity across the different states.

surveys (averaging over the various surveys when is there are more than one) and as reported in the World Bank's World Development Indicators (WDI) (World Bank, 1999) database which is based on UNESCO data (averaging over all available data between 1990 and 1999).[13] Overall the two data sources tell a similar story. The primary net enrollment rate for girls averaged across all the countries is very similar from the two sources: 58.6 percent based on the DHS surveys and 58.3 based on the WDI statistics (when restricting the sample to countries that have number from both surveys – the average over all DHS surveys is 63.4 percent). The average male/female ratio is similar when using the two sources as well (1.14 from DHS and 1.22 from WDI). Other characteristics of the distribution (standard deviation, maximum, minimum and median) are very similar as well.

The overall similarity, however, masks some large discrepancies at the country level. The difference between the enrollment rate based on the two sources ranges from –22 percentage points (Turkey where the DHS implies a rate of 71 percent and the WDI 93 percent) to 47 percentage points (Haiti where the DHS implies a rate of 70 percent and the WDI 23 percent). After Haiti, the next largest discrepancy is 19 percentage points (Mozambique where the DHS implies a rate of 54 percent and the WDI a rate of 35 percent).

In most countries, the two datasets tell a similar story with respect to gender differences as well. The main difference occurs in the Western and Central African countries where (except for Cote d'Ivoire and Senegal) the WDI numbers imply a male/female ratio that is substantially larger than what the DHS show. For example, in Chad the WDI imply a male/female ratio of 1.80 whereas the DHS imply a ratio of 1.53. Relying on the WDI one would overstate the male "advantage" by almost 30 percentage points. Outside of this region, the data for Bangladesh,

[13] The primary net enrollment rate is defined as the percentage of children of primary school age who are indeed in primary school. Unlike the 6 to 11 years cutoff used in Table 3 the definition of primary school age varies across countries. In 8 of the 41 countries the range in 6 to 11, in another 8 it is 7 to 12, in another 5 it is 6 to 10, in another 4 it is 6 to 12, and another 4 it is 7 to 13. The rest are somewhere around a similar range.

Table 4: Comparison of gender gaps in education: DHS, UNESCO, Barro-Lee.

	Primary net enrollment rate				Average years of schooling in population over 15			
	Female level (years)		Male/ female ratio		Female level (years)		Male / female ratio	
	DHS (average of DHS years)	WDI (1990-1999 average)	DHS (average of DHS years)	WDI (1990-1999 average)	DHS (average of DHS years)	BL (1990)	DHS (average of DHS years)	BL (1990)
Benin	30.4	39.8	1.6	1.82	1.2	1.0	2.5	2.36
Burkina Faso	27.3	22.3	1.3	1.56	0.8	.	2.0	.
C.A.R.	41.9	42.3	1.3	1.52	1.7	1.2	2.2	2.12
Cameroon	61.4	.	1.1	.	2.8	2.5	1.6	1.47
Chad	23.7	32.8	1.5	1.80	0.7	.	3.5	.
Cote d'Ivoire	42.6	46.4	1.3	1.34	1.9	.	2.0	.
Ghana	73.0	.	1.0	.	4.4	2.0	1.5	2.60
Mali	25.4	17.6	1.3	1.60	0.8	0.5	1.9	2.54
Niger	17.3	17.6	1.6	1.74	0.6	0.5	2.1	2.51
Senegal	32.4	47.3	1.3	1.26	1.4	1.7	1.9	1.73
Togo	64.9	66.8	1.2	1.37	2.0	1.7	2.1	2.54
Egypt	78.3	84.7	1.1	1.14	4.9	3.2	1.5	1.71
Morocco	49.1	56.3	1.36	1.35	2.0	.	1.83	.
Bangladesh	75.1	59.7	1.0	1.14	2.5	1.4	1.7	2.13
India	61.5	.	1.22	.	3.0	2.8	1.91	1.96
Nepal	57.3	.	1.3	.	1.3	0.7	2.7	3.36
Pakistan	39.7	.	1.4	.	1.8	2.8	2.3	1.93
Comoros	41.5	46.6	1.1	1.23	2.2	.	1.6	.
Kenya	81.2	.	1.01	.	5.2	2.9	1.3	1.58
Madagascar	60.4	62.7	1.0	0.92	3.2	.	1.2	.
Malawi	74.4	59.2	1.0	0.99	2.2	2.1	2.0	1.65
Mozambique	54.3	35.2	1.1	1.30	1.6	0.6	2.0	1.88
Namibia	91.1	92.7	1.0	0.93	5.0	.	1.0	.
Rwanda	61.0	70.3	1.0	1.01	2.8	1.3	1.3	1.78
Tanzania	52.4	49.8	1.0	0.98	3.6	2.1	1.3	1.54
Uganda	66.6	.	1.0	.	3.2	1.4	1.6	1.49
Zambia	72.9	74.9	1.0	1.02	4.7	3.5	1.4	1.71
Zimbabwe	84.3	.	1.0	.	5.9	2.7	1.2	1.54
Dominican Rep.	72.1	82.7	0.9	0.96	6.8	4.5	1.0	0.99
Guatemala	66.5	.	1.11	.	3.8	2.7	1.22	1.28
Haiti	70.2	22.6	1.0	0.96	2.8	2.0	1.4	2.00
Nicaragua	83.1	78.2	1.0	0.97	5.4	3.7	1.0	1.00
Indonesia	91.1	95.0	1.0	1.05	5.2	4.1	1.3	1.27
Philippines	90.0	.	0.97	.	8.3	6.9	0.99	0.99
Bolivia	91.6	86.7	1.0	1.09	6.1	4.2	1.3	1.33
Brazil	94.7	.	0.99	.	5.8	3.7	0.97	1.04
Colombia	88.1	.	1.0	.	6.4	5.1	1.0	0.83
Peru	88.2	90.3	1.0	1.01	6.9	5.9	1.2	1.11
Kazakstan	90.4	.	1.0	.	9.5	.	1.1	.
Turkey	70.8	92.8	1.05	1.05	4.2	3.1	1.48	1.45
Uzbekistan	62.8	.	1.0	.	9.7	.	1.1	.
Unweighted mean*	58.6	58.3	1.1	1.22	3.7	2.6	1.6	1.73
Unweighted std. Dev.*	23.0	24.7	0.2	0.28	2.1	1.6	0.5	0.58
Maximum*	91.6	95.0	1.6	1.82	8.3	6.9	2.7	3.36
Minimum*	17.3	17.6	0.9	0.92	0.6	0.5	1.0	0.83
Median*	61.0	59.2	1.1	1.14	3.4	2.6	1.5	1.68
Unweighted mean	63.4		1.1		3.8		1.6	
Unweighted std. Dev.	21.7		0.2		2.4		0.5	
Maximum	94.7		1.6		9.7		3.5	
Minimum	17.3		0.9		0.6		1.0	
Median	66.5		1.0		3.2		1.5	

* Countries with data from both sources only.

Mozambique, and Comoros have a similar discrepancy. Despite these differences, of the 27 countries which have data from both sources, all but three show the same sign for the difference between the enrollment of girls and of boys (the exceptions are Bangladesh, Indonesia, and Zimbabwe where the difference is close to zero in any case).

Another comparison one can make on the basis of these data is that to the stock of education as reported by Barro and Lee (1993) which has been used in numerous papers to investigate the determinants of growth. Table 4 reports the average years of schooling of the female population over 15 from the DHS data as well as the average years of schooling of the population over 15 based on the Barro-Lee (BL) data. Here the DHS imply a stock of schooling that is slightly higher than that in the alternative data source: the mean of the average years of schooling among women 15 and older across all the countries is 3.7 in the DHS data and 2.6 in the BL data. A possible explanation for this is that the DHS are from a period spanning 1990 to 1998 whereas the BL data are an estimate for 1990. The discrepancy for some countries is substantial ranging from a high of 3.2 years in (Zimbabwe where the DHS imply an average of 5.9 years and the BL where the average is 2.7 years) to –1.1 (Pakistan where the DHS imply 1.8 years and BL estimate 2.8).

Focusing on the male/female ratio in the stock of education, the DHS tend to imply a lower degree of male advantage. The cross-country average male/female ratio from the DHS is 1.58 whereas that in BL is 1.73. Again, this would be true if male advantage were declining over time and the DHS were capturing a later period. In some countries the discrepancy is especially large, for example in Ghana BL imply that men have 2.6 times the schooling of women but the DHS implies they have only 1.46 times as much. Other countries where the difference is large are Bangladesh, Haiti, Mali, Niger, Nepal, Rwanda and Togo.

In summary, the aggregate statistics based on the DHS are similar to those that are frequently used to describe education outcomes across countries, although there is a larger discrepancy in the measures of the stock of education relative to the enrollment rate. Whether or not the DHS are "better" is left for a different forum, but the fact that those from the DHS are transparently based on household surveys make these data particularly attractive.

Wealth differences in enrollment

The main advantage of using household surveys to carry out this analysis, however, is that various dimensions of inequality can be explored, and in particular wealth using the asset index approach. Gaps in educational enrollment and attainment across different wealth groups are large in almost all developing countries. Filmer and Pritchett (1999a), using a subset of the countries analyzed here, show that the difference in the median grade attained by 15 to 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.

Why would we expect to see wealth differences in education? A review of the elasticity between "income" and several educational outcomes can be found in Behrman and Knowles, (1997). As those author's discuss, a simplistic economic model where education is a pure investment, households are perfectly inter-generationally linked, credit markets are perfect and investment opportunities in education are equally distributed across households implies that investments in education will not be related to a family's present financial wealth. The assumptions of such models can break down on many fronts. Credit markets may not be perfect and the poor may have less access to it, there may be a large "consumption" component to education and wealthier households will therefore consume more of it. In addition, the opportunity costs of children's time spent in schooling, as well as the expected return to that schooling, may differ by household wealth leading to differential observed investment. [14]

[14] For more discussion on these reasons for wealth differences see Filmer and Pritchett (1999b). In particular, that paper argues that large cross-state variation within India in the magnitudes of wealth gaps cast doubt that credit constraints are a compelling reason for explaining wealth gaps.

Table 5 reports the gender and wealth gaps in the enrollment of 6 to 14 year olds. Again, gaps are expressed both in terms of absolute differences (male-female gaps, rich-poor gaps) as well as relative differences (male/female ratio, rich/poor ratio). The countries identified in Table 3 as having large gender gaps reappear when the outcome measure is derived from the sample of 6 to 14 year olds (as opposed to the 6-11, 12-14, or 15-19 age groups).

A striking result from Table 5 is the magnitude of the wealth gaps in enrollment in many countries, both in absolute terms, as well as relative to gender gaps. Except for Ghana, the rich-poor gaps range from 28 percentage points (Togo) to almost 52 percentage points (Senegal) in the Western and Central African countries. The same order of magnitude is seen in the North Africa, as well as in South Asia. Even Bangladesh which has a slight female advantage in enrollments, has a rich-poor gap of 17 percentage points (and a rich/poor ratio of 1.25). The wealth gaps appear as well in many of the countries in the other regions as well. For instance in Eastern and Southern Africa, Madagascar, Rwanda, Tanzania, and Zambia all have small (or negative) female disadvantages but all have wealth gaps of over 19 percentage points.

Figure 1 presents the same data in a different format: the left panel shows the scatter plot of the rich-poor gap against the male-female gap, the right panel shows the equivalent scatter plot for the ratios.[15] Most countries have a substantial rich-poor gap and a large wealth gap does not imply a large gender gap. However, countries with large gender gaps also tend to have large wealth gaps.

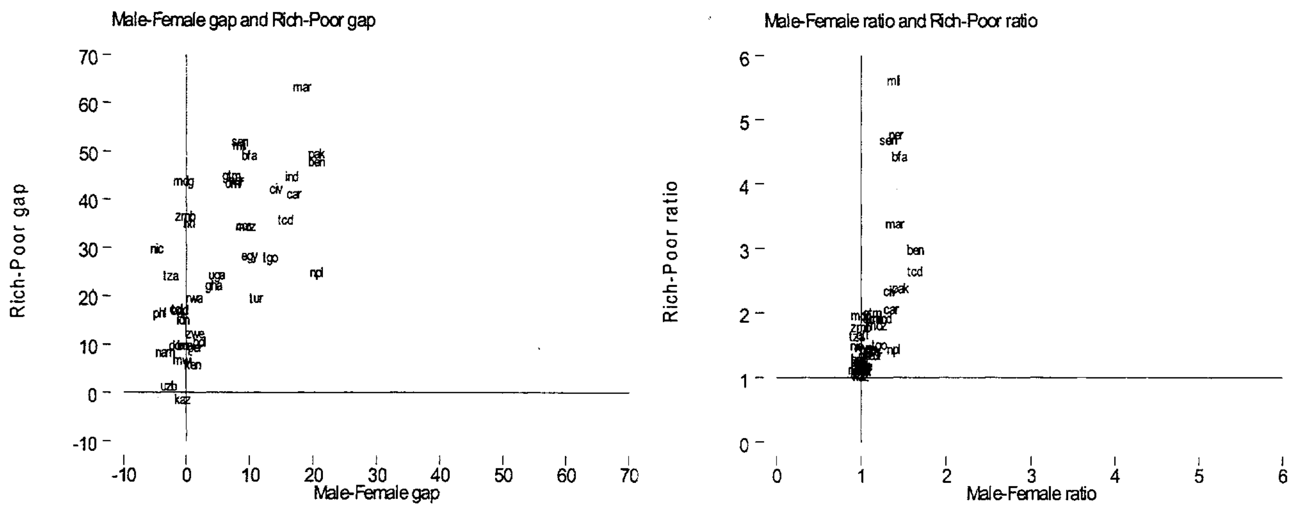
Perhaps the most striking feature of Figure 1 is the magnitude of the wealth gaps relative to the magnitude of the gender gaps: wealth gaps are in general much larger. The male-female gap ranges from –5 percentage points (Nicaragua) to 21 percentage points (Benin and Nepal). The male/female ratio ranges from 0.94 (Nicaragua and Tanzania) to 1.73 (Niger 1992). The rich-poor gap ranges from –2 percentage points (Kazakhstan which is the only country with a

Table 5: Gender and wealth gaps in enrollment of 6-14 year olds

	6-14 year olds in school			6-14 year olds in school		
	Female	Male-Female gap	Male / Female ratio	Poor	Rich-Poor gap	Rich / Poor ratio
Benin 1996	32.6	20.5	1.63	24.3	47.2	2.94
Burkina Faso 1992-93	22.1	9.8	1.44	14.3	48.5	4.39
Cameroon 1991	64.0	7.4	1.12	49.3	42.8	1.87
C.A.R. 1994-95	48.9	16.9	1.35	40.0	40.7	2.02
Chad 1998	24.9	15.5	1.62	22.0	35.2	2.60
Cote d'Ivoire 1994	41.7	14.1	1.34	31.9	41.5	2.30
Ghana 1993	73.9	4.2	1.06	69.3	21.5	1.31
Mali 1995-96	22.3	8.2	1.37	11.1	50.7	5.57
Niger 1992	11.9	8.7	1.73	9.5	30.2	4.19
Niger 1997	18.9	7.8	1.41	11.6	43.4	4.75
Senegal 1992-93	27.4	8.4	1.31	14.1	51.5	4.66
Togo 1998	64.4	13.1	1.20	59.6	27.5	1.46
Egypt 1992	74.3	10.1	1.14	66.2	26.3	1.40
Egypt 1995-96	75.7	9.9	1.13	67.6	27.9	1.41
Morocco 1992	45.8	18.1	1.39	26.7	62.8	3.35
Bangladesh 1993-94	69.1	2.0	1.03	62.1	18.7	1.30
Bangladesh 1996-97	73.8	-1.2	0.98	66.8	16.6	1.25
India 1992-93	59.1	16.5	1.28	50.0	44.2	1.88
Nepal 1996	55.5	20.5	1.37	61.6	24.3	1.40
Pakistan 1990-91	44.3	20.4	1.46	36.6	49.0	2.34
Comoros 1996	48.3	8.9	1.18	39.2	34.1	1.87
Kenya 1993	76.5	0.9	1.01	75.1	8.7	1.12
Kenya 1998	87.0	0.9	1.01	86.9	5.2	1.06
Madagascar 1997	58.6	-0.6	0.99	46.8	43.2	1.92
Malawi 1992	58.6	0.8	1.01	46.9	34.8	1.74
Malawi 1996	89.7	-0.8	0.99	87.0	6.3	1.07
Mozambique 1997	51.7	9.3	1.18	43.9	33.8	1.77
Namibia 1992	87.1	-3.5	0.96	84.0	7.8	1.09
Rwanda 1992	51.0	1.1	1.02	45.9	19.1	1.42
Tanzania 1991-92	47.2	-0.9	0.98	41.7	18.4	1.44
Tanzania 1996	48.6	-2.7	0.94	39.8	23.6	1.59
Uganda 1995	66.6	4.7	1.07	59.0	23.7	1.40
Zambia 1992	71.5	-0.8	0.99	54.3	37.6	1.69
Zambia 1996-97	60.4	-0.3	0.99	48.8	36.0	1.74
Zimbabwe 1994	84.4	1.2	1.01	81.1	11.7	1.14
Dominican Republic 1991	69.5	-6.0	0.91	50.3	39.3	1.78
Dominican Republic 1996	94.2	-1.3	0.99	88.7	9.1	1.10
Guatemala 1995	59.0	7.0	1.12	46.4	44.4	1.96
Haiti 1994-95	73.4	0.3	1.00	55.2	34.5	1.62
Nicaragua 1998	80.0	-4.8	0.94	63.9	29.1	1.45
Indonesia 1991	76.4	0.2	1.00	66.6	23.1	1.35
Indonesia 1994	83.6	0.6	1.01	75.5	19.6	1.26
Indonesia 1997	86.6	-0.6	0.99	80.5	14.5	1.18
Philippines 1993	78.6	-2.7	0.97	70.0	16.3	1.23
Philippines 1998	88.4	-4.4	0.95	78.9	15.9	1.20
Bolivia 1993-94	86.4	3.7	1.04	81.0	14.9	1.18
Bolivia 1997	92.0	1.9	1.02	87.8	10.0	1.11
Brazil 1996	93.8	-0.4	1.00	89.0	9.2	1.10
Brazil, Northeast 1991	53.9	-9.0	0.83	32.8	37.4	2.14
Brazil, Northeast 1996	91.5	-0.5	0.99	88.6	9.6	1.11
Colombia 1990	77.4	1.2	1.02	68.3	21.2	1.31
Colombia 1995	89.7	-1.8	0.98	80.9	16.7	1.21
Peru 1991-92	87.4	1.1	1.01	83.9	6.5	1.08
Peru 1996	89.2	1.2	1.01	85.8	8.8	1.10
Kazakstan 1995	85.3	-0.7	0.99	85.8	-2.0	0.98
Turkey 1993	63.7	10.9	1.17	61.0	19.1	1.31
Uzbekistan 1996	82.9	-2.9	0.97	80.2	0.9	1.01
Unweighted mean	65.3	4.2	1.12	57.5	26.2	1.81
Unweighted std. dev.	21.8	7.3	0.20	23.4	15.1	1.04
Maximum	94.2	20.5	1.73	89.0	62.8	5.57
Minimum	11.9	-9.0	0.83	9.5	-2.0	0.98

negative wealth gap, albeit tiny) to 63 percentage points (Morocco). The rich/poor ratio ranges from 0.98 (Kazakhstan) to 5.57 (Mali).

Figure 1: Gender and wealth differences in the enrollment of 6 to 14 year olds.



There are two notes of caution about how one might interpret the results so far. First, the analysis does not imply that investments in girls education are not desirable where gender gaps are small. There is a large literature on the benefits of female education on a host of private and social outcomes (e.g. King and Hill, 1993, Schultz, 1993, Benefo and Schultz 1995, Pitt, 1995, Haddad et al, 1997). In that context it is the level of female education, not the gaps, that matter 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 from the previous section is not that gender gaps are unimportant because wealth gaps are more widespread or larger, rather it should be 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

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[15] In this and subsequent figures, in countries where there have been two surveys only the most recent is shown in the figures although data for both are reported in the tables.

analyzes how the interaction of gender and wealth result in large social gaps in educational outcomes.

IV) The interaction of wealth and gender: gender differences in enrollment by wealth, and wealth differences by gender

Gender differences in enrollment by wealth group

In order to investigate the interaction of wealth and gender and educational outcomes, the first four columns of Table 6 report the enrollment of 6 to 14 year olds disaggregated by wealth as well as by gender. The subsequent columns report the gender gap (ratio) by wealth group, and the wealth gap (ratio) by gender.[16] In order to ease the interpretation of this table, the left panels of Figure 2 plot the gap (ratio) among the poor against the gap (ratio) among the rich. Countries with points above the diagonal line are those where the gender gap (ratio) is larger among the poor than among the rich.

The points in the top left hand panel of Figure 2 separate (perhaps not perfectly) into four main groups. The first is a group of countries where the female disadvantage is small, or negative, both for the rich and for the poor (that is less than about 9 percentage points). The second group is the group for which the female disadvantage is large for both the rich and for the poor. This group separates into the primarily Western African countries where it is slightly larger for the rich than for the poor (Benin, Burkina Faso, Cote d'Ivoire, Mali, Niger, and Senegal) and countries for which it is slightly smaller (Chad, Comoros, Togo, and Turkey). Next there is a group with low female disadvantage among the rich, but a reasonably large (greater than about 9 but less than about 15 percentage points) disadvantage among the poor

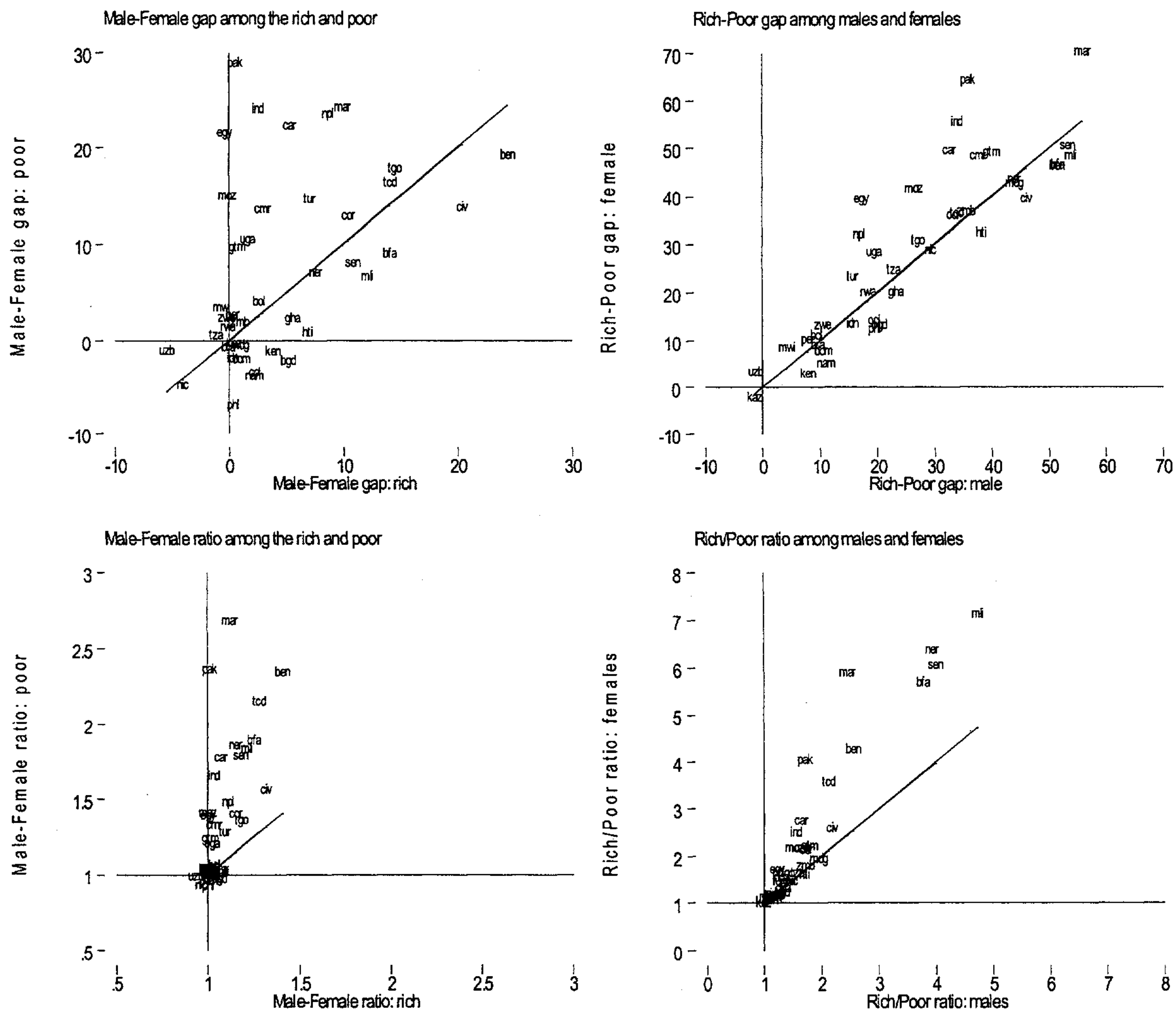
[16] These two are related by construction. For example, the difference in differences will be equal: (Emr – Emp) – (Efr-Efp) = (Emr-Efr) – (Emp-Efp) where Emr is the enrollment of rich males, Efp the enrollment of poor females, and so on.

Table 6: Gender gaps by wealth, and wealth gaps by gender, for enrollment of 6-14 year olds

	Male	Male	Female	Female	Male-Female gap		Rich-Poor gap		Male / Female ratio		Rich / Poor ratio	
	Rich	Poor	Rich	Poor	Rich	Poor	Male	Female	Rich	Poor	Male	Female
Benin 1996	84.7	33.2	60.3	14.2	24.4	19.0	51.5	46.0	1.41	2.33	2.55	4.23
Burkina Faso 1992-93	70.2	18.7	56.2	9.9	14.0	8.8	51.5	46.2	1.25	1.88	3.76	5.65
Cameroon 1991	93.6	55.9	90.6	42.5	2.9	13.4	37.6	48.1	1.03	1.32	1.67	2.13
C.A.R. 1994-95	83.3	50.8	78.0	28.7	5.3	22.1	32.6	49.3	1.07	1.77	1.64	2.72
Chad 1998	64.2	30.4	50.2	14.2	14.0	16.2	33.9	36.0	1.28	2.14	2.12	3.54
Cote d'Ivoire 1994	84.6	38.6	64.2	24.9	20.4	13.6	46.0	39.2	1.32	1.55	2.19	2.57
Ghana 1993	93.6	70.3	88.1	68.2	5.5	2.1	23.3	19.9	1.06	1.03	1.33	1.29
Mali 1995-96	68.1	14.4	56.1	7.9	12.0	6.5	53.7	48.1	1.21	1.82	4.73	7.09
Niger 1992	44.2	14.1	34.9	4.9	9.3	9.3	30.0	30.1	1.27	2.91	3.12	7.18
Niger 1997	58.7	14.9	51.2	8.1	7.5	6.9	43.8	43.2	1.15	1.85	3.93	6.35
Senegal 1992-93	71.0	17.8	60.3	10.0	10.8	7.8	53.2	50.2	1.18	1.78	3.99	6.02
Togo 1998	94.7	67.6	80.3	50.0	14.4	17.6	27.1	30.3	1.18	1.35	1.40	1.61
Egypt 1992	93.2	76.3	91.7	55.6	1.5	20.8	16.9	36.2	1.02	1.37	1.22	1.65
Egypt 1995-96	95.2	77.9	95.7	56.5	-0.4	21.4	17.3	39.2	1.00	1.38	1.22	1.69
Morocco 1992	94.4	38.5	84.5	14.4	9.9	24.1	55.8	70.1	1.12	2.67	2.45	5.87
Bangladesh 1993-94	82.0	63.0	79.7	61.2	2.2	1.9	19.0	18.6	1.03	1.03	1.30	1.30
Bangladesh 1996-97	86.0	65.6	80.9	68.0	5.1	-2.4	20.4	12.9	1.06	0.96	1.31	1.19
India 1992-93	95.4	61.4	92.9	37.5	2.5	23.9	34.0	55.3	1.03	1.64	1.55	2.47
Nepal 1996	90.1	73.3	81.5	49.8	8.6	23.4	16.8	31.7	1.11	1.47	1.23	1.64
Pakistan 1990-91	85.8	50.0	85.4	21.3	0.5	28.7	35.8	64.1	1.01	2.35	1.72	4.01
Comoros 1996	78.8	45.5	68.4	32.7	10.4	12.7	33.3	35.6	1.15	1.39	1.73	2.09
Kenya 1993	84.5	74.7	83.2	75.5	1.4	-0.8	9.9	7.7	1.02	0.99	1.13	1.10
Kenya 1998	94.0	86.2	90.2	87.6	3.8	-1.4	7.8	2.6	1.04	0.98	1.09	1.03
Madagascar 1997	90.5	46.5	89.5	47.1	0.9	-0.7	44.0	42.4	1.01	0.99	1.95	1.90
Malawi 1992	82.5	48.0	81.0	45.9	1.5	2.0	34.5	35.0	1.02	1.04	1.72	1.76
Malawi 1996	93.0	88.7	93.6	85.4	-0.7	3.3	4.2	8.2	0.99	1.04	1.05	1.10
Mozambique 1997	77.6	51.2	77.8	36.4	-0.2	14.8	26.4	41.3	1.00	1.40	1.52	2.13
Namibia 1992	93.0	81.9	90.8	86.0	2.2	-4.0	11.1	4.9	1.02	0.95	1.14	1.06
Rwanda 1992	65.0	46.5	65.0	45.3	-0.1	1.2	18.4	19.8	1.00	1.03	1.40	1.44
Tanzania 1991-92	60.1	41.4	60.0	42.0	0.0	-0.6	18.7	18.0	1.00	0.99	1.45	1.43
Tanzania 1996	62.8	40.0	64.0	39.6	-1.2	0.4	22.8	24.4	0.98	1.01	1.57	1.62
Uganda 1995	83.5	64.1	81.9	53.8	1.6	10.3	19.5	28.1	1.02	1.19	1.30	1.52
Zambia 1992	92.8	54.5	91.2	54.2	1.6	0.4	38.3	37.0	1.02	1.01	1.70	1.68
Zambia 1996-97	85.3	49.7	84.4	48.0	0.9	1.7	35.6	36.4	1.01	1.04	1.72	1.76
Zimbabwe 1994	92.6	82.2	92.9	80.0	-0.3	2.2	10.4	12.9	1.00	1.03	1.13	1.16
Dominican Republic 1991	86.9	49.1	91.8	51.7	-5.0	-2.7	37.8	40.1	0.95	0.95	1.77	1.77
Dominican Republic 1996	98.3	87.7	97.3	89.9	1.0	-2.2	10.6	7.4	1.01	0.98	1.12	1.08
Guatemala 1995	91.2	51.3	90.5	41.7	0.7	9.5	39.9	48.8	1.01	1.23	1.78	2.17
Haiti 1994-95	93.6	55.5	86.8	54.9	6.8	0.6	38.1	31.9	1.08	1.01	1.69	1.58
Nicaragua 1998	90.8	61.4	94.9	66.4	-4.1	-5.0	29.4	28.5	0.96	0.92	1.48	1.43
Indonesia 1991	90.5	66.6	88.8	66.5	1.7	0.1	23.8	22.3	1.02	1.00	1.36	1.33
Indonesia 1994	96.2	75.6	94.0	75.5	2.2	0.0	20.6	18.5	1.02	1.00	1.27	1.24
Indonesia 1997	95.1	79.4	94.9	81.5	0.3	-2.1	15.7	13.3	1.00	0.97	1.20	1.16
Philippines 1993	86.6	68.4	86.0	71.8	0.6	-3.4	18.2	14.3	1.01	0.95	1.27	1.20
Philippines 1998	95.0	75.5	94.6	82.5	0.3	-7.1	19.5	12.1	1.00	0.91	1.26	1.15
Bolivia 1993-94	96.6	84.8	95.3	77.0	1.3	7.8	11.8	18.3	1.01	1.10	1.14	1.24
Bolivia 1997	99.1	89.7	96.5	85.8	2.6	3.9	9.4	10.7	1.03	1.05	1.10	1.12
Brazil 1996	98.2	88.6	98.3	89.5	-0.1	-0.9	9.6	8.8	1.00	0.99	1.11	1.10
Brazil, Northeast 1991	69.6	27.5	70.7	38.5	-1.1	-11.0	42.1	32.2	0.98	0.71	2.53	1.84
Brazil, Northeast 1996	99.4	87.7	96.4	89.4	2.9	-1.7	11.6	7.0	1.03	0.98	1.13	1.08
Colombia 1990	89.8	69.0	89.3	67.7	0.5	1.2	20.9	21.5	1.01	1.02	1.30	1.32
Colombia 1995	98.7	79.1	96.5	82.7	2.2	-3.6	19.5	13.8	1.02	0.96	1.25	1.17
Peru 1991-92	90.3	85.0	90.4	82.7	-0.1	2.3	5.3	7.7	1.00	1.03	1.06	1.09
Peru 1996	94.7	87.0	94.4	84.5	0.3	2.5	7.8	9.9	1.00	1.03	1.09	1.12
Kazakstan 1995	84.0	85.5	83.6	86.0	0.4	-0.5	-1.5	-2.4	1.00	0.99	0.98	0.97
Turkey 1993	83.7	68.0	76.6	53.6	7.0	14.4	15.7	23.0	1.09	1.27	1.23	1.43
Uzbekistan 1996	78.4	79.6	83.8	80.8	-5.5	-1.3	-1.2	3.0	0.93	0.98	0.98	1.04
Unweighted mean	85.5	60.3	81.9	54.5	3.6	5.7	25.3	27.4	1.06	1.28	1.67	2.13
Unweighted std. Dev.	12.0	21.9	14.5	25.8	5.8	9.3	14.7	16.8	0.10	0.47	0.81	1.62
Maximum	99.4	89.7	98.3	89.9	24.4	28.7	55.8	70.1	1.41	2.91	4.73	7.18
Minimum	44.2	14.1	34.9	4.9	-5.5	-11.0	-1.5	-2.4	0.93	0.71	0.98	0.97
Median	90.1	64.1	86.0	54.2	1.6	2.1	20.9	28.1	1.02	1.03	1.36	1.52

(Mozambique, Guatemala, Uganda, and Cameroon). Last there is a group made up primarily of the North African and South Asian countries where the gender disadvantage is small among the rich but quite large among the poor (Egypt, Pakistan, India, Central African Republic, Nepal, Morocco).[17]

Figure 2: The interaction of gender and wealth differences in the enrollment of 6 to 14 year olds.



[17] Bonilla-Chacin and Hammer (1999) find that within Egypt, India, and Pakistan, the difference in gender gaps in child mortality disappear as wealth increases.

The somewhat different message conveyed by the lower left panel shows the relevance of using the differences versus the ratios approach to analyzing the gender disadvantage. By contrast to the absolute differences, the relationship between the male/female ratios among the rich and poor separates into three main groups. First, the group where the ratio is very close to one (less than 1.1) for both groups. Second, a group where the ratio is either small or moderate among the rich and moderate (between 1.1 and 1.5) among the poor (Bolivia, Cameroon, Comoros, Egypt, Guatemala, Mozambique, Nepal, Togo, Turkey, Uganda). Last is the group with a small or moderate ratio among the rich, but a large ratio for the poor (Benin, Burkina Faso, Central African Republic, Chad, Cote d'Ivoire, India, Mali, Morocco, Niger, Pakistan, Senegal).

Wealth differences in enrollment by gender

In contrast to the gender gaps by wealth, the right panels of Figure 2 show much more consistency between wealth gaps among males and females: in most countries the gap and the ratio are close to being equal for boys and girls. There is a group of countries however where the wealth gap is substantially larger among females than among males. The countries with the largest discrepancies (starting with the highest) are Pakistan (35 percentage points for boys and 64 percentage points for girls), Egypt (17 for boys and 39 for girls), and India (34 for boys and 55 for girls). Cameroon, Central African Republic, Mozambique, Morocco and Nepal are all close behind. In this case, the same set of countries is identified as having large discrepancies when using the ratios as the measure of disparity.

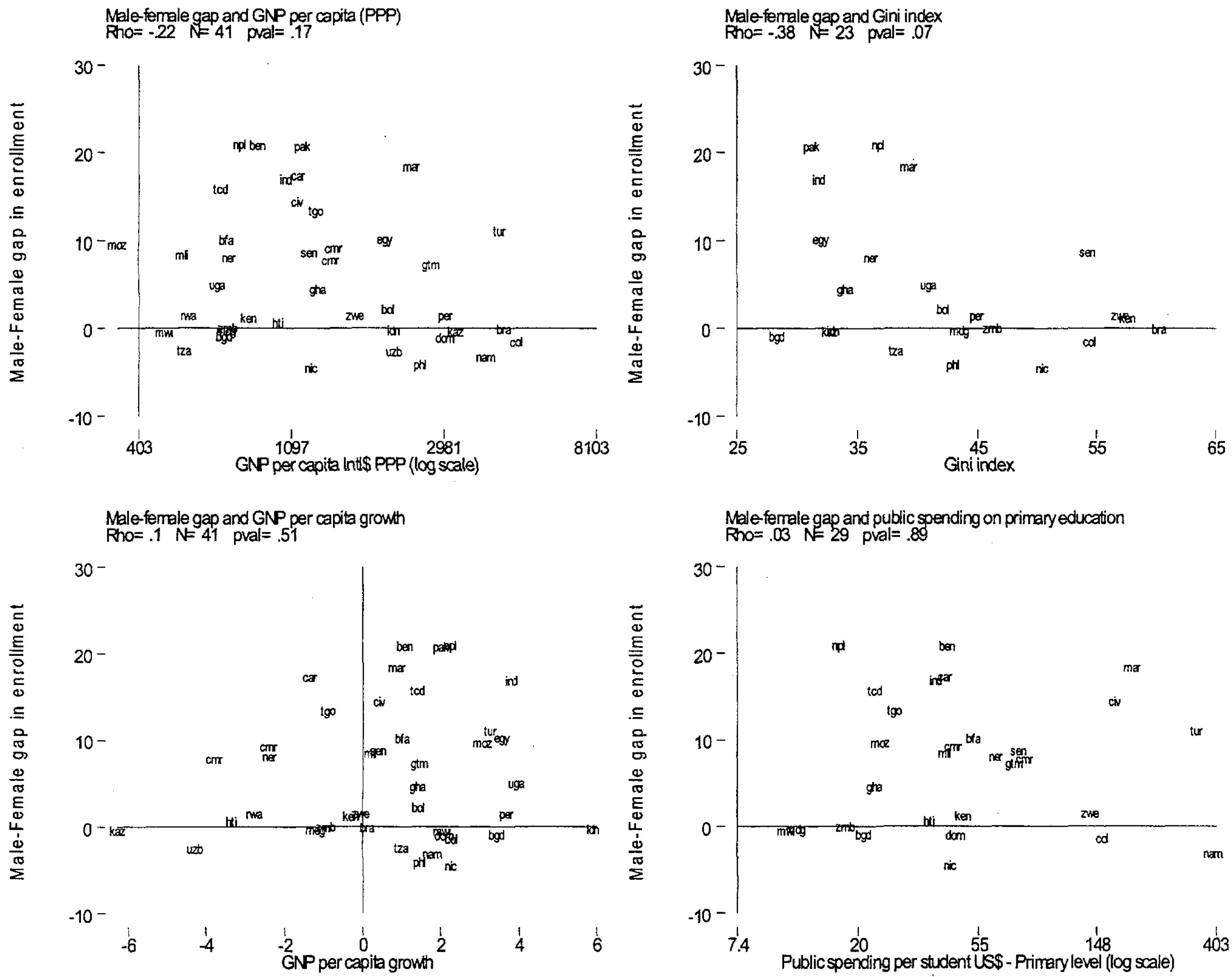
International correlates of the gender gap

In the descriptive exercise so far region appears to be a strong correlate of gender disparities. Figure 3 explores the relationship to four country level correlates in a series of bivariate scatterplots between the magnitude of the male-female gap and (the log of) GNP per capita in Purchasing Power Parity (PPP – which adjusts for differences in the cost of living across countries), income inequality as measured by the Gini index, income growth as measured by the GNP per capita growth rate, and public spending on primary education per student. All these variables are from the World Bank's World Development Indicators (World Bank, 1999) and are averaged over the period since 1990 (Annex Figure 3a shows the same figures for the male/female ratio).[18]

The story that emerges from these graphs is not one of a systematic relationship between the variables and the magnitude of the gender gap. The only correlate with a significant relationship at the ten percent level is a country's income inequality as measured by the Gini index (correlation coefficient equal to -.38, pvalue=.07, N=23). Other than the Gini index, income level is negatively but insignificantly related to the male female gap, and GNP per capita growth and public spending per student on primary education have close to zero and insignificant correlations. Of course this exploration is limited by its very narrow bivariate approach. As an indication though, the results do suggest that the few variables analyzed do not give a strong lead on this and more work needs to be done to explore the international correlates and determinants of gender gaps in education (for more discussion and a further exploration of this see Dollar and Gatti, 1999, Filmer, King, and Pritchett 1998).

[18] The annex is available from the author at dfilmer@worldbank.org or directly from http://www.worldbank.org/research/projects/edattain/edattain.htm

Figure 3: Country level correlates of gender differences in the enrollment of 6 to 14 year olds.



V) Gender and wealth differences in attainment profiles

The attainment profile

The results presented so far have focused on gender and wealth differences in the enrollment of 6 to 14 year olds. The analysis of this young cohort yields informative, and relatively up-to-date results on the extent of gender and wealth gaps. However, it limits what one can say about where in the education system gaps occur. A different approach, one which looks at the highest grade completed by an older cohort consisting of people who have largely completed their schooling (or at least the schooling under analysis), yields insights on this (Mingat and Tan, 1999, Filmer and Pritchett, 1999a).

The attainment profiles, pictured in Figure 4, show graphically the proportion of individuals of the particular cohort that have completed each grade or higher. For example, this means that the level of the curve at grade 1 shows the proportion that ever attended school and completed first grade. One minus this proportion is the proportion that never completed even one year of schooling.[19] The difference between the proportion that completed grade 1 or higher and those that completed grade 5 or higher is an estimate of the proportion of all children that dropped out between grades 1 and 5.

Figure 4 shows the attainment profiles for each of the countries with the profile of males and females from the poor, middle, and rich households identified. As an example of how to interpret these figures, take the case of Morocco. In Morocco, 98 percent of males aged 15 to 19 from rich households have completed grade 1 or higher, 89 percent have completed grade 5 or higher, and 43 percent have completed grade 9 or higher. This can be compared to females from rich households whose completion rates for grades 1, 5, and 9 are 85 percent, 78 percent, and 41 percent respectively. Again, this can be compared to males from poor households where the

[19] With this data one cannot distinguish between having attended school but never completing even one grade and never having attended school at all.

completion rates are 55 percent, 35 percent, and 5 percent, and females from poor households at 21 percent, 10 percent, and 1 percent.

Figure 4: Educational attainment profiles for ages 15-19 by gender and wealth (Vertical axis is proportion of children who have completed grade).

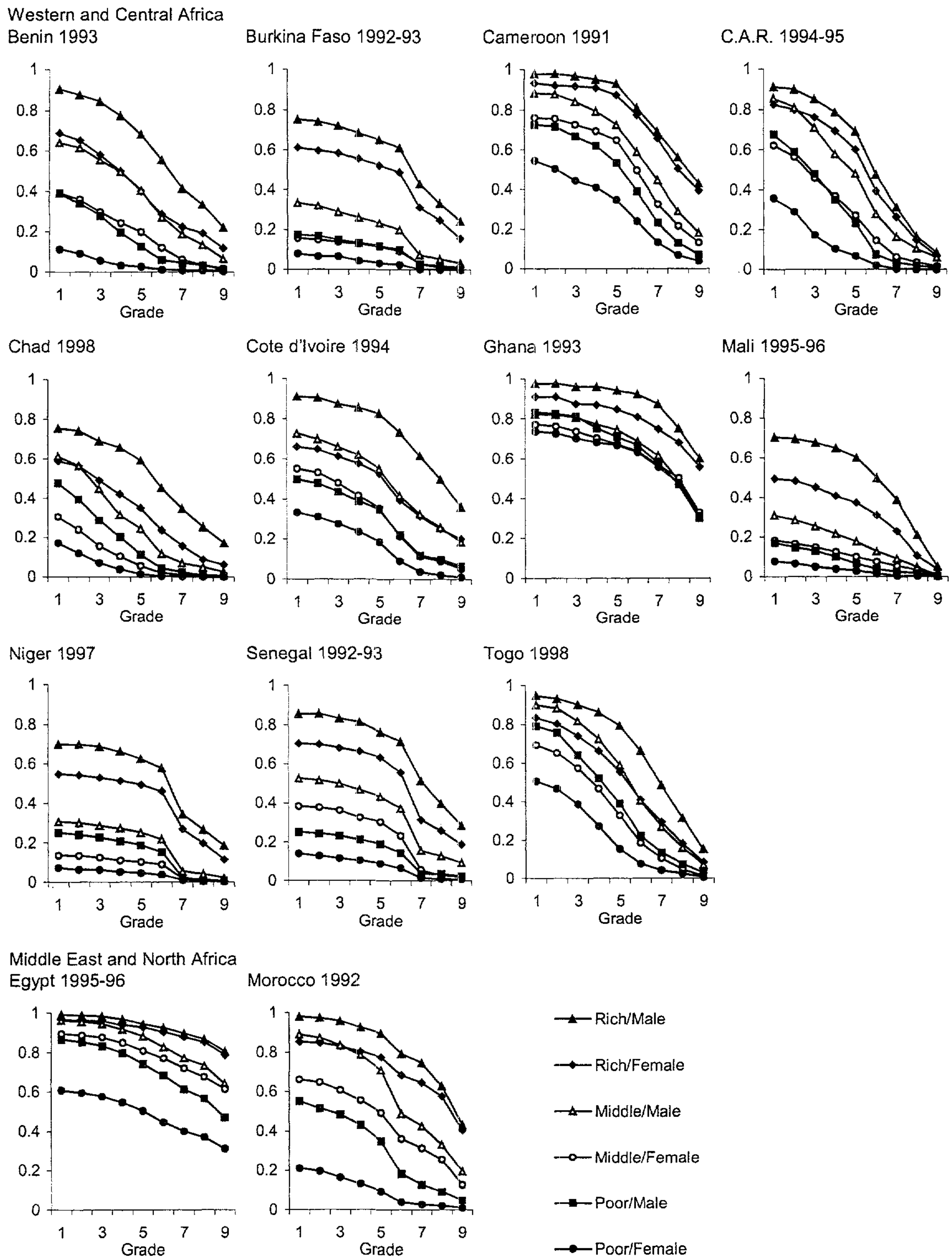


Figure 4 continued: Educational attainment profiles for ages 15-19 by gender and wealth (Vertical axis is proportion of children who have completed grade).

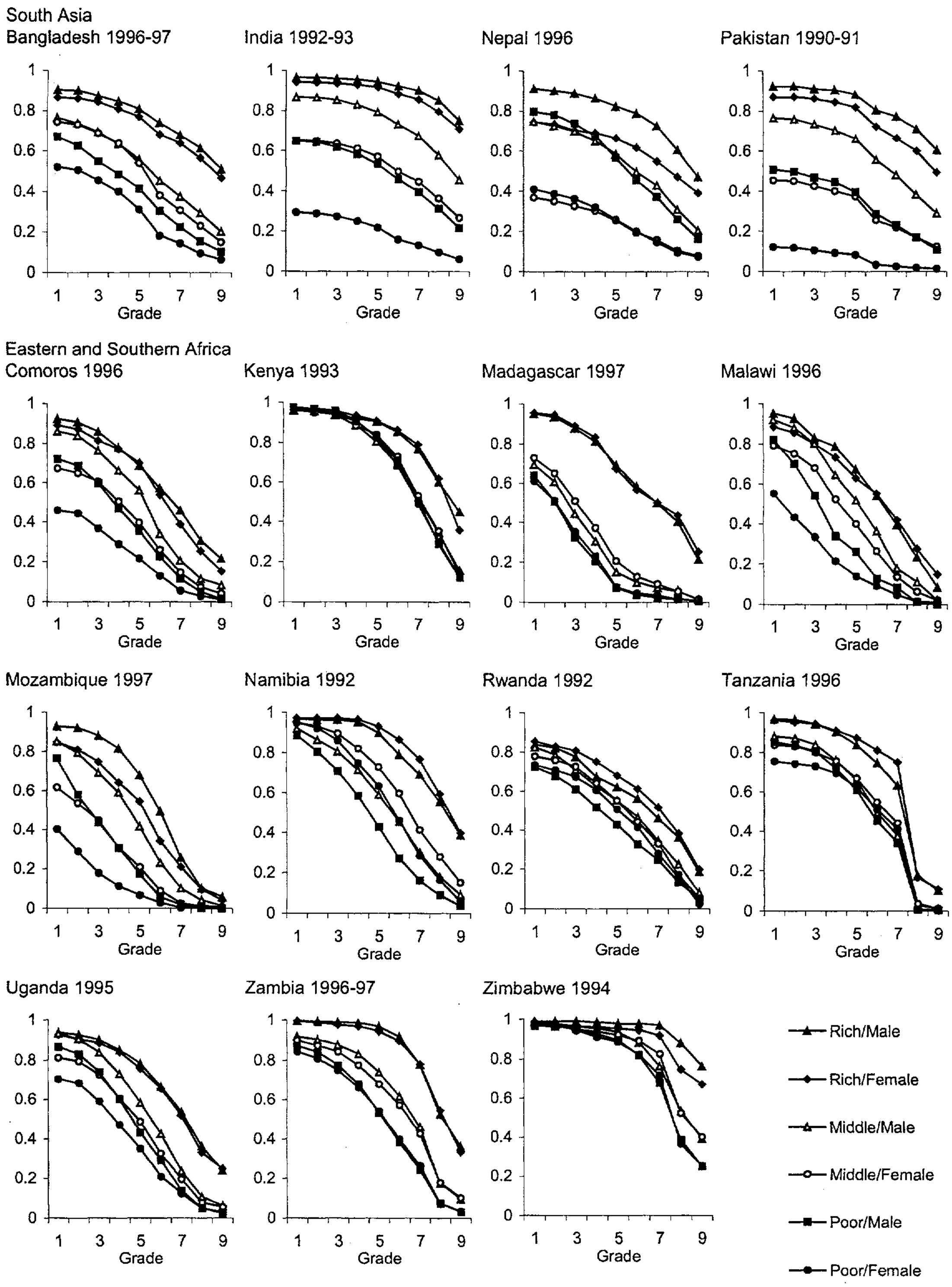
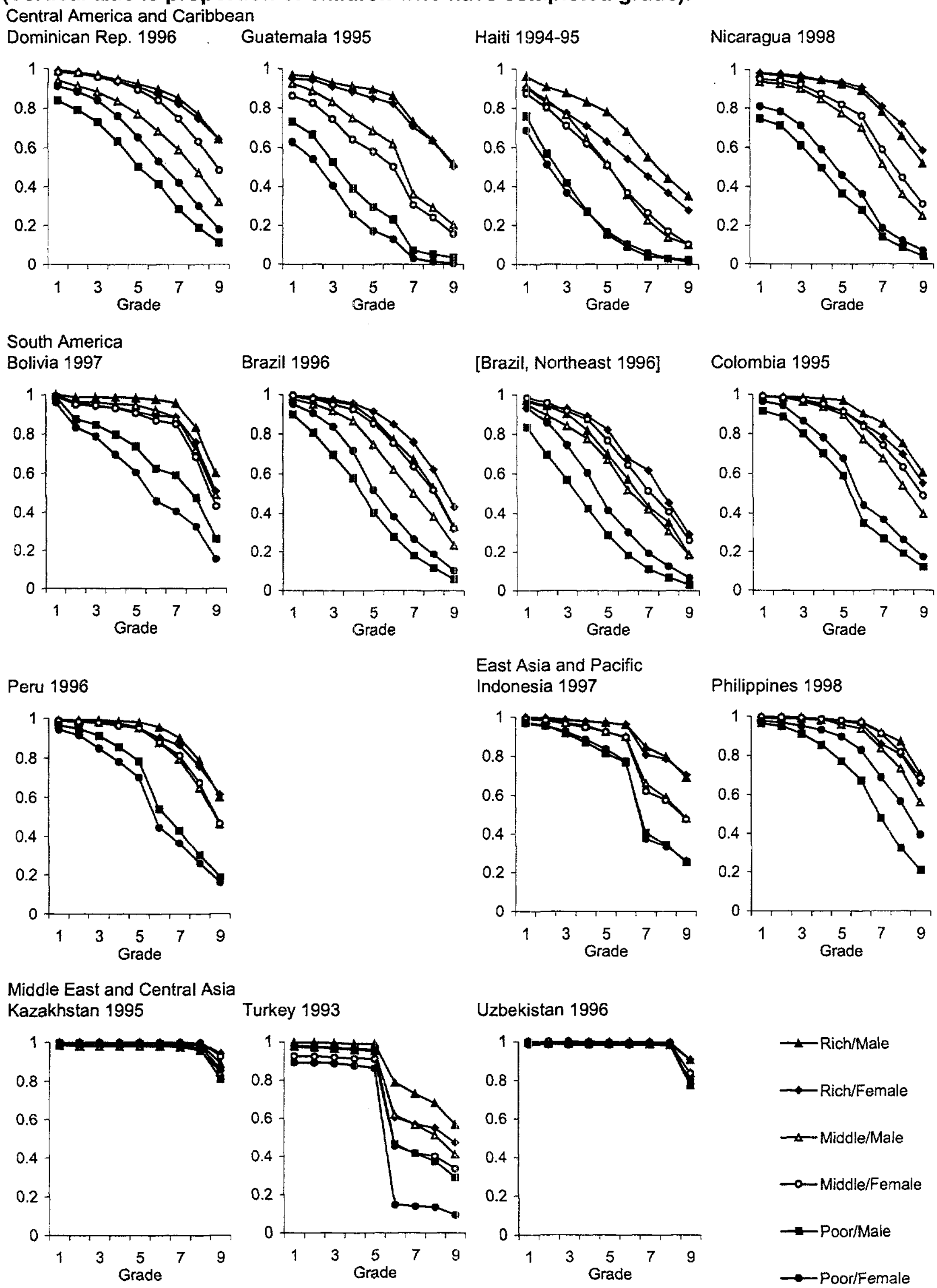


Figure 4 continued: Educational attainment profiles for ages 15-19 by gender and wealth (Vertical axis is proportion of children who have completed grade).



Patterns of gender and wealth differentials in attainment

There are regions where there is a large female disadvantage in the entire attainment profile: these are largely those in Western and Central Africa, North Africa, and South Asia, as well as a few countries in the rest of the world where the profiles for females lie substantially below those for males (Mozambique, Turkey). In addition, there is a substantial number of countries where the profile for males is below that for females, that is there is a female advantage (Brazil, Colombia, Dominican Republic and the Philippines).

Similarly to the enrollment analysis, it is important to consider the interaction between gender and wealth. Here there are two main results that stand out. First, the countries with large female disadvantages fall into two types: those with a "generalized" female disadvantage, and those with a female disadvantage only for the poor (or poor and middle) group. The Western and Central African countries, even those where attainment is fairly high for the rich, tend to have a generalized disadvantage. On the other had, the countries in North Africa and South Asia tend to have eliminated the female disadvantage among the rich, but it is large among the poor (except in Bangladesh). Second, in the countries where there appears to be a female advantage, this advantage appears to exist only among those from poor households.

Focusing now on the gender gap in poor households, Table 7 reports the male-female gap and the male/female ratio in the percentage of 15 to 19 year olds that have completed grades 1, 5, and 9. The results on the male-female gap conform well to the visual impression created by the attainment profiles: in countries with a large female disadvantage in grade 1 completion, the male-female gap remains similar, or diminishes, successively between the different grades. For example, in Benin it is 28 percentage points in grade 1, 9.9 percentage points in grade 5, and 0.8 percentage points in grade 9. In Egypt the gaps are 26, 24, and 16 percentage points for grades 1, 5, and 9 respectively whereas in Pakistan they are 39, 31, and 9.4 percentage points respectively.

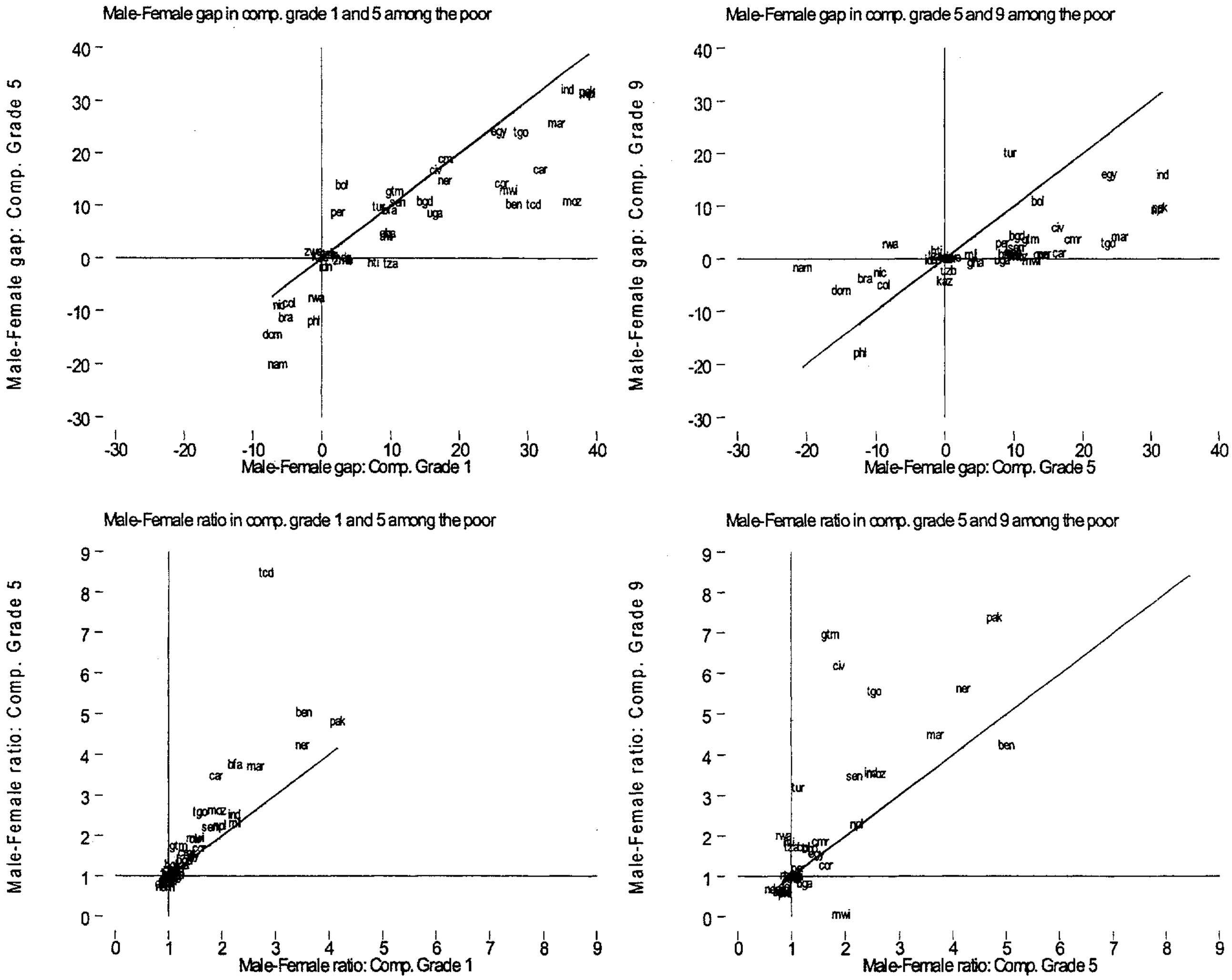
Table 7: Gender differences among the poor in the percentage of 15 to 19 year olds who have completed grades 1, 5, and 9

	Male-Female gap among the poor			Male/Female ratio among the poor		
	Grade 1	Grade 5	Grade 9	Grade 1	Grade 5	Grade 9
Benin 1996	27.8	9.9	0.8	3.51	4.98	4.17
Burkina Faso 1992-93	9.7	8.7	0.4	2.23	3.72	.
Cameroon 1991	18.1	18.5	3.2	1.33	1.53	1.82
C.A.R. 1994-95	31.7	16.5	0.7	1.88	3.43	.
Chad 1998	30.7	9.9	0.2	2.80	8.42	.
Cote d'Ivoire 1994	16.5	16.3	5.5	1.50	1.88	6.14
Ghana 1993	9.4	4.3	-1.2	1.13	1.06	0.96
Mali 1995-96	9.3	3.7	0.3	2.23	2.28	.
Niger 1992	12.7	10.6	1.5	2.36	2.67	.
Niger 1997	17.8	14.3	0.5	3.49	4.18	5.57
Senegal 1992-93	10.9	10.2	1.8	1.77	2.16	3.43
Togo 1998	28.8	23.7	2.5	1.57	2.53	5.51
Egypt 1992	29.4	30.0	16.3	1.53	1.63	1.57
Egypt 1995-96	25.6	23.9	15.7	1.42	1.47	1.50
Morocco 1992	34.1	25.4	3.8	2.62	3.66	4.43
Bangladesh 1993-94	14.4	8.6	3.7	1.33	1.37	1.81
Bangladesh 1996-97	14.9	10.4	4.0	1.29	1.33	1.64
India 1992-93	35.7	31.7	15.4	2.22	2.46	3.51
Nepal 1996	38.8	30.9	9.1	1.95	2.20	2.24
Pakistan 1990-91	38.6	31.3	9.4	4.15	4.77	7.32
Comoros 1996	26.0	13.8	0.3	1.56	1.63	1.23
Kenya 1993	0.4	-1.5	2.0	1.00	0.98	1.22
Kenya 1998	1.2	0.2	-0.3	1.01	1.00	0.97
Madagascar 1997	2.8	-0.3	0.0	1.05	0.96	0.99
Malawi 1992	14.4	8.7	0.9	1.24	1.35	2.24
Malawi 1996	27.0	12.4	-0.9	1.49	1.90	0.00
Mozambique 1997	36.4	10.6	0.0	1.90	2.57	3.49
Namibia 1992	-6.5	-20.6	-2.1	0.93	0.67	0.63
Rwanda 1992	-0.8	-7.9	2.4	0.99	0.84	1.96
Tanzania 1991-92	2.9	-2.0	-0.3	1.04	0.97	0.43
Tanzania 1996	9.8	-1.5	0.2	1.13	0.98	1.68
Uganda 1995	16.4	8.2	-0.6	1.23	1.23	0.79
Zambia 1992	8.4	6.3	0.4	1.11	1.13	1.84
Zambia 1996-97	3.0	-0.8	-0.4	1.04	0.99	0.89
Zimbabwe 1994	-1.3	0.9	-0.2	0.99	1.01	0.99
Dominican Republic 1991	-5.1	-20.9	-6.8	0.95	0.69	0.54
Dominican Republic 1996	-7.2	-15.0	-6.5	0.92	0.77	0.63
Guatemala 1995	10.4	12.3	3.2	1.17	1.71	6.90
Haiti 1994-95	7.3	-1.3	1.0	1.11	0.93	1.80
Nicaragua 1998	-6.3	-9.4	-3.1	0.92	0.80	0.57
Indonesia 1991	4.8	7.1	4.7	1.05	1.10	1.29
Indonesia 1994	1.0	1.3	1.8	1.01	1.02	1.10
Indonesia 1997	0.5	-2.1	-0.7	1.01	0.97	0.97
Philippines 1993	0.5	-11.0	-16.2	1.01	0.87	0.61
Philippines 1998	-1.2	-12.4	-18.3	0.99	0.86	0.53
Bolivia 1993-94	4.2	12.8	12.1	1.04	1.20	1.91
Bolivia 1997	2.8	13.4	10.6	1.03	1.22	1.69
Brazil 1996	-5.4	-11.7	-4.3	0.94	0.78	0.57
Brazil, Northeast 1991	-10.6	-11.2	-1.1	0.87	0.39	0.27
Brazil, Northeast 1996	-10.2	-12.9	-3.5	0.89	0.69	0.46
Colombia 1990	-4.3	-10.9	-5.9	0.96	0.83	0.54
Colombia 1995	-4.9	-8.9	-5.5	0.95	0.87	0.69
Peru 1991-92	1.6	4.7	5.0	1.02	1.06	1.26
Peru 1996	2.3	8.3	2.5	1.02	1.12	1.15
Kazakstan 1995	-0.3	-0.1	-4.7	1.00	1.00	0.94
Turkey 1993	8.1	9.4	19.7	1.09	1.11	3.14
Uzbekistan 1996	0.8	0.4	-2.7	1.01	1.00	0.97
Unweighted mean	10.2	5.4	1.3	1.44	1.70	1.91
Unweighted std. Dev.	13.7	12.9	6.6	0.72	1.38	1.76
Maximum	38.8	31.7	19.7	4.15	8.42	7.32
Minimum	-10.6	-20.9	-18.3	0.87	0.39	0.00
Median	8.1	7.1	0.4	1.11	1.12	1.25

In the three examples mentioned above the results on the male/female ratio tell a different story: in Benin the ratio changes from 3.5 to 5.0 to 3.7 — that is, in relative terms, the disadvantage grows from grade 1 to 5, but then diminishes from grade 5 to 9. In Egypt the relative disadvantage changes from 1.4 to 1.5 to 1.5, that is it remains quite stable. By contrast, in Pakistan, the ratio goes from 4.2 in grade 1, to 4.8 in grade 5, and then to a very large 7.3 in grade 9.

Figure 5 summarizes the change in these gaps and ratios from grade 1 to 5, and grade 5 to 9. The top two panels show the change in the male-female gap. Most of the points are below the 45 degree line showing that indeed where there was a female disadvantage, the gap generally diminishes as one gets further along in the school system. By contrast, the bottom two panels show the change in the male/female ratio from grade 1 to 5, and 5 to 9. Here most of the points lie above the 45 degree line showing that the relative female disadvantage tends to increase as one advances through the school system. In some cases the increase is truly astounding from grade 5 to grade 9: from 1.9 to 5.9 in Cote d'Ivoire, from 4.8 to 7.8 in Pakistan, and from 1.7 to 7.4 in Guatemala. In all these extreme cases, however, the completion of grade 9 is very close to zero for females (6.5 for males versus 1.1 in Cote d'Ivoire, 10.9 versus 1.5 in Pakistan, and 3.7 versus 0.5 in Guatemala, see Annex Table A). It should also be noted that in several cases the ratio is "infinite" because the percentage of 15 to 19 year old females from poor households who have completed grade 9 is estimated to be zero (Burkina Faso, Central African Republic, Niger, Chad, Mali and Senegal)

Figure 5: Gender differences in the attainment of 15 to 19 year olds from poor households.



VI) Multivariate analysis: the role of gender, wealth, the education of parents, and the availability of schools.

Empirical specification

To disentangle the confounding relationships between school enrollment and child, household and community variables, we now turn to a multivariate model which analyzes the relationships simultaneously. The model, estimated country by country, is specified for child i in household j as

$$E_{ij}^* = \underbrace{\beta \times M_{ij}}_{\text{Gender}} + \underbrace{\delta_2 \times W_{2,j} + \delta_3 \times W_{3,j}}_{\text{Wealth}} + \underbrace{\gamma_2 \times (M_{ij} \times W_{2,j}) + \gamma_3 \times (M_{ij} \times W_{3,j})}_{\text{Interaction of gender and wealth}}$$

$$+ \underbrace{\lambda_m \times Y_{m,j} + \lambda_f \times Y_{f,j}}_{\text{Education of adults}} + \underbrace{\lambda_h \times H_{m,j} + \lambda_a \times H_{a,j}}_{\text{Characteristics of head}}$$

$$+ \underbrace{\mu_m \times (M_{ij} \times Y_{m,j}) + \mu_f \times (M_{ij} \times Y_{f,j}) + \mu_h \times (M_{ij} \times H_{m,j}) + \mu_a \times (M_{ij} \times H_{a,j})}_{\text{Interaction of gender with adult and head variables}}$$

$$+ \underbrace{\alpha \times X_{ij}}_{\text{Other characteristics}} + \varepsilon_{ij} \qquad (1)$$

E_{ij}^* is an unobserved variable whose observed counterpart, whether or not child i from household j is currently in school, is defined as

$$E_{ij} = 1 \text{ if } E_{ij}^* >= 0$$
$$= 0 \text{ otherwise.}$$

E_{ij}^* can be thought of as the underlying demand for child schooling and we only observe whether it exceeds the threshold zero. The error term ε is assumed to follow the normal distribution and therefore the model can be estimated using probit regression. The variable M is a dummy variable equal to one if the child is male, W_2 and W_3 are dummy variables equal to one if the child is from a household from the middle and rich wealth groups respectively (the poor group is the reference group). Y_m and Y_f are variables equal to the average years of schooling of the adult males and the adult females in the household.[20] H_m is a dummy variable equal to one if the head of the household is male, and H_a is a the age of the head of the household. The vector X includes the child's age and age squared, as well as a dummy variable equal to one if the household lives in an urban area.

The effect of wealth and gender

Table 8 reports the marginal effects of being a male, being from the middle or rich wealth group, and the interaction of the two. These marginal effects correspond to the change in the percentage probability of a child being enrolled as a result in a change in the dummy variable from zero to one, holding all other variables in the equation at their sample mean. Marginal effects which are significant at the 5 percent level are indicated by an "s" following the estimate. It is important to keep in mind that the relationship specified by the probit model is non-linear and the effect is estimated for an "average" child in the sample. Unlike the linear model this effect will be different for children with different background characteristics—even if no specific interaction term is specified. An implication of this is that the marginal effect is estimated at different points in the distribution in different countries. Still, the ultimate estimate of the marginal effects is a guide to what the effect is for the child with the average characteristics in each country.

Since marginal effects can be difficult to interpret, the last six columns of Table 8 report the predicted probability of being enrolled in school for the children in the sample. These probabilities are evaluated at the means of the variables included in the regression but not shown

[20] In the estimation, additional variables equal to one if there are no adult males, or adult females, over

Table 8: Marginal effects (x100) of gender and wealth on the probability of enrollment of 6-14 year olds, and predicted probabilities of enrollment of 6 to 14 year olds urban and rural areas (Probit results for selected variables)

						Predicted probabilities					
						Males			Females		
	Male	Middle	Richest	Male *Middle	Male *Richest	Poor	Middle	Rich	Poor	Middle	Rich
Benin 1996	28.7 s	20.7 s	34.1 s	-1.2	-1.3	40.6	60.2	73.0	16.2	32.3	45.9
Burkina Faso 1992-93	14.8 s	9.1 s	27.2 s	-1.3	-3.5	30.7	39.7	56.0	16.3	24.3	41.7
Cameroon 1991	20.8 s	13.6 s	15.3 s	-5.3	0.9	83.9	90.2	94.6	61.5	77.8	81.1
C.A.R. 1994-95	29.3 s	12.7 s	20.8 s	0.0	-7.6	65.4	76.7	78.2	35.2	48.1	57.8
Chad 1998	21.5 s	6.9 s	14.3 s	-3.7	-1.6	42.3	45.7	55.8	20.8	26.8	33.5
Cote d'Ivoire 1994	23.6 s	15.9 s	21.1 s	-2.0	6.7	51.2	64.9	77.0	28.4	43.3	48.8
Ghana 1993	3.3	-0.6	2.9	6.0 s	9.4 s	78.7	84.2	90.1	75.1	74.5	78.4
Mali 1995-96	14.5 s	12.9 s	28.1 s	-1.5	-0.2	21.3	33.5	50.7	10.0	19.4	32.2
Niger 1992	16.9 s	4.4 s	11.9 s	-4.0 s	-4.6 s	26.4	26.3	35.0	7.1	10.5	16.8
Niger 1997	12.0 s	4.2	17.6 s	1.0	-3.1	23.4	29.6	39.3	12.0	15.3	27.3
Senegal 1992-93	19.7 s	14.9 s	18.5 s	-3.6	-0.9	29.3	41.4	47.6	12.7	24.1	26.5
Togo 1998	15.9 s	10.9 s	7.3 s	-3.2	10.3 s	75.3	82.5	90.2	57.2	70.4	66.5
Egypt 1992	5.8	14.8 s	13.9 s	-10.8 s	-12.1 s	81.3	87.9	89.2	73.8	90.9	92.3
Egypt 1995-96	7.7 s	13.3 s	15.4 s	-11.0 s	-16.0 s	83.4	88.9	92.5	72.9	90.5	95.3
Morocco 1992	31.1 s	41.3 s	43.6 s	-16.3 s	-13.9 s	51.9	78.3	87.3	22.1	64.8	75.1
Bangladesh 1993-94	-2.4	7.9 s	10.2 s	0.0	-3.7	65.8	74.1	73.4	68.4	76.4	78.9
Bangladesh 1996-97	-4.3	6.6 s	6.7 s	-1.0	6.1 s	67.9	74.1	81.4	72.6	79.2	79.5
India 1992-93	14.1 s	17.0 s	23.4 s	-2.8 s	-8.0 s	71.8	85.1	89.6	55.7	75.5	85.5
Nepal 1996	20.4 s	-3.2	14.7 s	0.6	-7.1	78.0	75.7	85.0	57.4	53.8	74.1
Pakistan 1990-91	27.9 s	20.5 s	36.3 s	-5.8	-26.6 s	62.7	76.3	76.8	34.4	55.4	75.4
Comoros 1996	14.6 s	19.9 s	22.7 s	-6.8	4.1	49.3	62.7	75.3	35.0	54.9	58.4
Kenya 1993	-1.9	-1.4	1.4	5.0 s	6.3 s	79.6	83.6	87.4	81.6	80.1	83.0
Kenya 1998	-0.5	-2.6 s	-1.2	2.5	4.6 s	90.2	90.3	93.9	90.7	87.9	89.6
Madagascar 1997	-0.3	4.8	22.8 s	-3.3	1.3	57.8	59.4	81.6	58.1	63.0	80.9
Malawi 1992	11.4 s	11.2 s	22.1 s	-4.0	1.8	62.1	69.2	83.6	50.4	62.0	73.7
Malawi 1996	8.3	3.5	3.8	-6.7	-3.9	95.0	93.4	95.4	87.2	91.3	91.8
Mozambique 1997	11.5	10.6 s	23.0 s	-5.7 s	-16.2 s	58.7	63.6	66.9	47.0	57.8	71.0
Namibia 1992	-1.4	-1.0	-3.6	0.9	5.3 s	88.9	88.8	91.9	90.3	89.3	86.8
Rwanda 1992	5.5	3.6	15.6 s	0.3	0.6	50.0	53.9	65.9	44.5	48.1	60.1
Tanzania 1991-92	-10.1	4.6 s	18.4 s	-2.0	-1.8	30.8	33.2	46.8	40.5	45.1	59.0
Tanzania 1996	6.7	10.6 s	20.0 s	-7.3 s	3.9	39.3	42.5	63.1	32.9	43.2	52.5
Uganda 1995	11.6 s	13.3 s	16.3 s	-8.1 s	-7.0	70.9	76.5	81.3	58.3	72.9	77.1
Zambia 1992	7.5	12.4 s	19.3 s	-2.2	4.0	69.4	80.5	92.1	60.3	75.3	84.7
Zambia 1996-97	6.9	4.9 s	18.8 s	-0.7	5.2	59.1	63.4	81.9	51.8	57.0	72.1
Zimbabwe 1994	6.3	3.5 s	6.1 s	-1.9	-1.7	91.7	93.2	95.9	84.2	88.9	92.7
Dominican Rep. 1991	4.0	17.0 s	26.7 s	-4.0	-6.7	60.5	75.2	86.8	55.9	75.1	88.3
Dominican Rep. 1996	-5.2 s	4.5 s	3.0 s	-0.2	1.5	86.6	94.8	95.7	95.3	98.6	98.1
Guatemala 1995	2.6	15.0 s	21.7 s	-3.3	-4.2	55.3	68.0	76.4	52.4	68.7	77.7
Haiti 1994-95	7.0	20.8 s	13.8 s	0.3	10.8 s	67.9	88.9	92.1	59.1	83.6	77.7
Nicaragua 1998	-1.1	10.8 s	10.6 s	-0.4	-2.6	72.1	84.2	83.2	73.6	85.5	86.5
Indonesia 1991	-2.7	11.0 s	13.2 s	-1.9	1.2	73.2	84.2	90.3	76.5	88.1	91.2
Indonesia 1994	0.6	5.7 s	7.2 s	0.5	2.7	85.6	92.2	95.7	84.8	91.3	93.5
Indonesia 1997	-3.0	3.7 s	5.5 s	0.9	1.6	87.0	92.5	95.2	90.7	94.2	96.0
Philippines 1993	-1.6	7.0 s	4.4 s	0.2	1.5	80.1	88.0	86.9	82.1	89.2	87.0
Philippines 1998	-0.1	4.4 s	4.3 s	0.8	2.7	86.4	92.2	94.2	86.5	91.6	91.9
Bolivia 1993-94	1.8	8.8 s	7.4 s	-3.0	0.2	86.7	93.8	96.1	84.1	94.6	94.9
Bolivia 1997	1.5	6.0 s	3.5 s	-3.3 s	2.3	92.6	96.8	98.8	90.0	97.7	96.3
Brazil 1996	-2.7	2.5 s	2.9 s	0.6	0.0	91.7	96.4	96.9	95.8	98.0	98.6
Brazil, NE 1991	-2.7	20.6 s	18.8 s	1.1	9.9	34.6	56.1	62.9	37.1	57.6	55.9
Brazil, NE 1996	-10.0 s	2.6 s	1.3	1.7	4.7 s	85.5	93.2	97.4	97.3	98.5	98.0
Colombia 1990	-1.0	4.9	5.4	1.3	-0.5	80.1	85.9	85.0	81.1	85.7	86.2
Colombia 1995	-5.0	4.4 s	3.4 s	-0.8	3.4 s	86.5	92.1	96.1	93.3	96.9	96.6
Peru 1991-92	2.8	3.8 s	-1.6	-0.9	-0.3	89.8	92.5	87.8	86.7	90.9	84.8
Peru 1996	2.8	2.9 s	1.4	-0.8	1.3	93.2	95.2	95.8	89.8	93.4	91.8
Kazakstan 1995	-4.4	-1.9	-5.5	0.7	2.2 s	95.8	94.1	95.7	99.2	98.3	96.5
Turkey 1993	10.6	6.1 s	7.1 s	-0.5	2.4	75.6	80.8	84.2	64.3	71.2	72.5
Uzbekistan 1996	-7.3	0.8	-1.0	0.5	0.0	91.3	93.6	89.4	98.7	99.0	98.3

Notes: Each marginal effect (change in the dummy from zero to one) is evaluated at the means of all other regressors.
Significance at the 5 percent level is indicated by an "s".
Other variables in the regression are age and age squared, average education of adult males in the household (ages 20-64) and adult females in the household, a dummy variable for whether or not the head of the household is male, the age of the head of the household, and a dummy variable for urban area.

in this table (i.e. child characteristics, education of adults, characteristics of the head, urban residence).

The coefficients on the dummy variable for being male confirm those reported earlier on the bivariate relationships. The effect is significant for all of the Western and Central African countries (except for Ghana), for the North African countries (Egypt in 1995-96 and Morocco), and for the South Asian countries (other than Bangladesh). In these countries, the effect of being male increases the probability of being enrolled by between 14 percentage points (India) and 29 percentage points (Central African Republic) except for Egypt where it is 7.7 percentage points. In the other regions, the only countries with a significant female disadvantage are Comoros, Malawi (although the effect is significant in 1992 but not so in 1996), and Uganda.

Virtually all countries have a significant (both in the statistical sense as well as in magnitude) wealth gap in the percentage enrolled, especially comparing the poorest to the richest group. The sole exceptions to this pattern are Ghana, Kenya, Malawi in 1996, Namibia, Colombia in 1990 (although the gaps are significant in the 1995 sample), Kazakhstan, and Uzbekistan. The five largest rich-poor gaps occur in Morocco (44 percentage points), Pakistan (36), Benin (34), Mali (28), and Burkina Faso (27). In two of these (Morocco and Pakistan) being male significantly mitigates (but not completely) the wealth gap, although this is not the case in the other countries. For example, in Pakistan, the marginal effect of being in the richest group is 43 percentage points, but if the child is male this is reduced by 14 percentage points. The other countries where the effect of being male significantly reduces the wealth gap are Egypt, India, Morocco, Mozambique and Pakistan. Typically though, the wealth gap is not mitigated by being male.

The results from Table 8 are derived from a pooled sample of urban and rural households, and include a dummy variable equal to one for urban residence. As discussed in

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which to take this average, are included. In those cases, the average is set to zero.

Filmer and Pritchett (1998) the principal components method of deriving the asset index may overstate the difference between urban and rural areas, ascribing more rural households into the poor category than would a ranking based on consumption expenditures. If the dummy variable does not capture this difference the results may mis-state the interpretation of the wealth groups. In order to check the robustness, all these results were repeated using only households in rural areas. The results are virtually unchanged compared to the pooled sample (see Annex Table 8a). The magnitudes of the effects are all roughly of the same order, and the pattern of significance is virtually the same. One interesting difference is in Morocco where in rural areas the effect of being male no longer mitigates the wealth gap.[21]

The effect of the schooling of adults

As described in equation (1), the schooling of adult members of the household was included in the empirical multivariate specification. The two variables used are the average years of schooling of 20 to 64 year old females, and the average years of schooling of 20 to 64 year old males.

The first two columns of Table 9 report the estimates of the marginal effect of increasing the average years of schooling of female or male adults in the household by one year on the percentage probability of being enrolled.[22] In practically all cases the effect is statistically significantly positive. In some of the cases where the effect is insignificant it is likely to be because there is not much variation in the data, either on the side of the education of the adults (e.g. females in Benin and Burkina Faso where their attainment is consistently very low) or on the side of the enrollment of children (e.g. Kazakhstan and Uzbekistan where enrollment is consistently very high). Among the countries where the marginal effect is significant there is

[21] Another alternative specification includes the maximum years of schooling completed by adult males and adult females in the household. The results on gender and wealth are not substantially altered by this change.

Table 9: Marginal effects (x100) of adult education on the probability of enrollment of 6-14 year olds, urban and rural areas
(Probit results for selected variables)-using MEAN years of adult schooling

	Average adult years of schooling		Interaction: Male*Average adult years of school		P-value (test of equality of adult education parameters)	
	Female adults	Male adults	Female adults	Male adults	Girls	Boys
Benin 1996	0.2	2.1 s	2.6 s	1.3 s	0.004 s	0.584
Burkina Faso 1992-93	0.6	2.2 s	2.3 s	0.8	0.005 s	0.814
C.A.R. 1994-95	4.3 s	3.2 s	-1.2	-0.2	0.128	0.876
Cameroon 1991	6.0 s	3.5 s	-1.5 s	0.4	0.021 s	0.539
Chad 1998	6.1 s	4.5 s	-1.3	0.1	0.034 s	0.753
Cote d'Ivoire 1994	2.3 s	2.7 s	1.4 s	1.2 s	0.548	0.855
Ghana 1993	1.6 s	2.3 s	0.0	-0.5	0.063	0.491
Mali 1995-96	2.0 s	3.2 s	1.3 s	0.2	0.097	0.936
Niger 1992	2.2 s	1.5 s	-0.7	0.4	0.305	0.530
Niger 1997	3.0 s	2.0 s	-0.5	0.4	0.048 s	0.804
Senegal 1992-93	3.9 s	3.6 s	-1.1	0.0	0.732	0.276
Togo 1998	2.2 s	2.3 s	0.4	0.6	0.877	0.612
Egypt 1992	1.6 s	1.5 s	-0.9 s	0.0	0.666	0.006 s
Egypt 1995-96	1.4 s	1.1 s	-0.4	-0.1	0.284	0.829
Morocco 1992	0.1	2.2 s	1.9 s	0.7	0.007 s	0.331
Bangladesh 1993-94	0.9 s	2.1 s	1.5 s	0.2	0.015 s	0.875
Bangladesh 1996-97	0.4	2.1 s	1.1 s	-0.3	0.001 s	0.477
India 1992-93	3.4 s	2.8 s	-1.5 s	0.0	0.010 s	0.000 s
Nepal 1996	4.1 s	4.0 s	-3.2 s	-0.4	0.908	0.009 s
Pakistan 1990-91	4.9 s	3.3 s	-2.6 s	0.4	0.020 s	0.044 s
Comoros 1996	2.2 s	2.6 s	-0.6	-0.4	0.651	0.468
Kenya 1993	1.8 s	1.0 s	0.0	-0.3	0.031 s	0.004 s
Kenya 1998	1.0 s	0.6 s	0.5 s	0.2	0.090	0.003 s
Madagascar 1997	3.8 s	3.3 s	0.9	1.2 s	0.465	0.778
Malawi 1992	2.2 s	3.3 s	0.5	0.0	0.113	0.394
Malawi 1996	1.0 s	0.6	0.4	-0.4	0.478	0.094
Mozambique 1997	5.1 s	1.9 s	-1.2	0.7	0.017 s	0.417
Namibia 1992	1.8 s	0.7 s	0.2	-0.2	0.001 s	0.000 s
Rwanda 1992	2.0 s	1.6 s	-0.9	0.0	0.509	0.373
Tanzania 1991-92	0.6	1.7 s	0.6	0.1	0.081	0.454
Tanzania 1996	1.9 s	1.8 s	0.2	-0.3	0.919	0.338
Uganda 1995	2.8 s	1.4 s	-0.8 s	0.4	0.003 s	0.829
Zambia 1992	2.0 s	1.7 s	0.9 s	-0.2	0.634	0.016 s
Zambia 1996-97	3.2 s	2.8 s	-0.4	-0.2	0.389	0.609
Zimbabwe 1994	1.5 s	0.5 s	-0.1	0.1	0.004 s	0.026 s
Dominican Republic 1991	2.4 s	0.1	-0.2	1.3 s	0.000 s	0.284
Dominican Republic 1996	0.5 s	0.1	0.4	0.1	0.063	0.000 s
Guatemala 1995	2.9 s	2.7 s	-0.1	-0.1	0.761	0.699
Haiti 1994-95	1.5 s	1.4 s	0.9	0.5	0.864	0.521
Nicaragua 1998	2.4 s	1.0 s	-0.5 s	0.0	0.000 s	0.021 s
Indonesia 1991	1.1 s	0.9 s	0.1	0.0	0.582	0.427
Indonesia 1994	1.0 s	0.9 s	0.2	0.2	0.597	0.724
Indonesia 1997	0.9 s	0.6 s	0.1	0.1	0.171	0.167
Philippines 1993	1.4 s	0.7 s	0.2	0.3	0.030 s	0.036 s
Philippines 1998	0.9 s	0.6 s	0.2	0.3	0.288	0.755
Bolivia 1993-94	0.6 s	0.3 s	-0.4	-0.1	0.422	0.784
Bolivia 1997	0.3 s	0.1	-0.1	0.2	0.107	0.972
Brazil 1996	0.6 s	0.2 s	-0.1	0.1	0.037 s	0.245
Brazil, Northeast 1991	1.9 s	1.0	0.8	1.1 s	0.277	0.478
Brazil, Northeast 1996	0.7 s	0.3	0.7 s	0.3	0.360	0.041 s
Colombia 1990	1.6 s	0.5	-0.3	0.5	0.052	0.700
Colombia 1995	0.7 s	0.7 s	0.6 s	0.2	0.911	0.113
Peru 1991-92	0.5 s	0.4 s	-0.3	0.1	0.435	0.374
Peru 1996	0.5 s	0.5 s	-0.2 s	-0.1	0.720	0.076
Kazakstan 1995	0.3	0.0	0.1	0.2	0.387	0.711
Turkey 1993	2.6 s	2.3 s	-1.1 s	-0.1	0.564	0.158
Uzbekistan 1996	0.6	0.3	0.2	0.1	0.512	0.355

Notes: Each marginal effect (or change in the dummy from zero to one) is evaluated at the means of all other regressors.
Significant difference from zero at the 5 percent level is indicated by an "s". Other variables in the regression are age and age squared, a dummy variable for gender, dummy variables for wealth group, and a dummy variable for urban area.
P-value reported is the p-value of the two-sided test for equality between the underlying probit coefficients on male and female education.

quite a range in the estimates of the effect of female education: from under a one percentage point increase in the probability of enrollment to a 6 percentage point increase (in Cameroon). A separate specifications which includes the maximum years of schooling instead of the average was estimated and the results are qualitatively, and almost quantitatively, unchanged (see Annex Table 9b).

The third and fourth columns of Table 9 investigate the hypothesis that the education of the male and female adults differs according to the gender of the child. If it were true that adult female education had a larger impact on girls children than on boy children, then one would expect the coefficient on the interaction term between male and years of schooling of adult females to be negative and significant. This is true in 9 countries: Cameroon, Egypt (1992), India, Nepal, Nicaragua, Pakistan, Peru, Turkey and Uganda. In 11 of the countries there is the opposite result, that is the schooling of adult females in the household has a significantly larger positive impact on boys than it does on girls. These countries are Bangladesh, Benin, Burkina Faso, Colombia (1995), Cote d'Ivoire, Kenya (1993), Morocco, Mali, Northeast Brazil (1996), Zambia (1992). Some of these may be explained by the very low level of adult female schooling (Benin, Burkina Faso, Bangladesh 1993-94, Morocco) where the effect of adult female education was insignificant.

The interaction between gender of the child and education of male adults is rarely significant. In the 5 countries where there is a significant relationship (Benin, Cote d'Ivoire, Madagascar, Dominican Republic 1991, Northeast Brazil 1991) the results imply that education of adult males positively increases the enrollment of boys more than it increases the enrollment of girls.

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[22] The results on the characteristics of the head of the household are included in Annex Table 9a.

The fifth and sixth columns of Table 9 report the p-values of tests for equality between the coefficient on female education and the effect of male education for boys and girls.[23] A p-value of less than 0.05 indicates that the coefficients are different from one-another with 95 percent confidence. The results here provide some support for the notion frequently put forward that the effect of education of women has a stronger impact than that of men in stopping the cycle of low education outcomes (among other things). In this analysis the coefficient for females is significantly larger than that of males in Brazil, Cameroon, Chad, Dominican Republic (1991), India, Kenya (1993), Mozambique, Namibia, Nicaragua, Niger (1997), Philippines (1993), Uganda, Zimbabwe, Pakistan.

In some cases the difference is significant but implies that the effect of the years of schooling of adult males is larger than that of females. This is the case in Bangladesh, Benin, Burkina Faso, and Morocco. This type of result is usually explained as an effect of income (i.e. male education is more closely related to household income than is female education and male education is merely picking up this fact) but such an argument is less valid here because these effects control for a household's wealth status. Of course, to the extent that the wealth measure is imperfect, the usual caveat would still hold. An alternative specification which includes all of the individual assets instead of the wealth groups as derived from the asset index was carried out as well. This approach will allow the asset variables to explain as much of the variation in enrollment "as possible" reducing the chance of overstating the impact of other variables (e.g. adult education). While the coefficients on the female and male education terms are not substantially altered the test for the equality of coefficients is no longer significant for girls in 5 of the countries, and that for boys in 1 of the countries (see Annex Table 9c).

[23] The test is carried out on the underlying probit coefficients.

The effect of the presence of schools

The last relationship reported here is that between educational enrollment and the presence of schools within the community. The sample is restricted here to rural settings as identifying "communities" in urban settings for this purpose is very difficult. In addition, the number of countries for which this relationship can be estimated is much lower as community questionnaires were not carried out in the majority of the DHS (the results are available for 21 surveys in 19 countries).

The estimating equation given in (1) is augmented with a dummy variable equal to one if there is a primary school in the community, a dummy variable equal to one if there is a primary and a secondary school in the community, and interaction terms between these and the dummy for male gender.[24] These school presence variables are constructed from the response by the community survey respondent to the questions "is there a primary school in this community" and "is there a secondary school in this community". Although the children under analysis (ages 6 to 14) are not likely to be attending secondary school, the access to secondary places may have an impact on primary schooling and the dummy variables for secondary school are therefore included in the multivariate analysis (see Lavy, 1997).

In addition to these school facility variables, the equation includes a set of community infrastructure variables in order to ensure that a relationship with school presence is not simply reflecting the fact that communities with more infrastructure in general, including schools, may tend to have higher enrollment. While the exact list of variables varies from survey to survey, the typical list includes: a dummy variable equal to one if the nearest urban center is less than 10 kilometers away; a set of dummy variables each equal to one if there is a post office, a local

[24] In addition a dummy (and interaction) equal to one if there is a secondary school, but no primary school, in the community is included for the countries where this occurs. This is a very rare occurrence even in countries where the relationship can be estimated and the results are not reported here.

market, a bank, cinema, public transport in the community; dummy variables each equal to one if there is a pharmacy, a health center, a hospital, or a clinic in the community.

Table 10 reports the marginal effects of the gender and wealth variables, as well as of the school presence variables. The results on the gender and wealth variables are extremely similar to those when the presence of schools is not included in the regression (i.e. compare these estimates to those in Annex Table 8a). The magnitudes and the pattern of significance are very close. The results on the school presence variables suggest that the presence of primary schools has a significant impact on the enrollment of 6 to 14 year olds in some countries (Benin, Burkina Faso, Chad, Cote d'Ivoire, Mali, Madagascar, Niger, and Zimbabwe). The magnitude of this effect reaches high levels in some countries. For example, children aged 6 to 14 in rural Benin are 25 percentage points more likely to be enrolled if they live in a village with a primary school than if they live in a village without a primary school. In Cote d'Ivoire the increase is 18 percentage points and in Mali it is 21 percentage points. In the other countries with a statistically significant relationship, the increase is smaller (ranging from 5.4 percentage points in Zimbabwe to 13 percentage points in Burkina Faso).

The effect of the presence of both a primary and a secondary school on enrollment is significant in 7 of the samples studied (Benin, Bolivia, Burkina Faso, India, Madagascar, Niger and Zimbabwe). Again, there is a large variation in the magnitude of the estimated effect: it ranges from 56 percentage points in Niger (1997) to a much smaller 12 percentage points in Burkina Faso, and about 9 percentage points in Bolivia, India and Zimbabwe.[25]

What conclusions can one draw from these estimates regarding the relationship between "access" to schools and enrollment? The data are clearly limited: the measure of access is a poorly measured one as there may be large spatial heterogeneity in the survey communities (i.e. some communities may be tightly centered around one area with a school whereas others might

Table 10: Marginal effects of(x100) gender, wealth, and the presence of primary and secondary schools in the community on the probability of enrollment of 6-14 year olds, rural areas (Probit results for selected variables)

	Male	Middle	Richest	Male * Middle	Male * Richest	Primary school only	Primary and seconda ry schools	Male * Primary school only	Male * Primary and seconda ry
Benin 1993	35.0 s	12.0 s	22.5 s	1.9	-4.4	25.2 s	49.5 s	-17.3 s	-14.1 s
Burkina Faso 1992-93	15.5 s	5.2 s	10.1 s	-0.9	9.0	12.5 s	12.2 s	2.4	-0.2
Cameroon 1991	33.6 s	9.1 s	11.5	-4.3	14.8	0.1	.	-0.1	.
Chad 1998	17.7 s	2.7	6.4	-0.9	-2.0	21.0 s	14.3	2.6	2.4
Cote d'Ivoire 1994	27.2 s	15.4 s	19.8 s	-2.7	7.4	17.9 s	-3.8	-3.4	31.0
Mali 1995-96	11.6 s	5.3 s	13.4 s	-0.6	0.9	20.9 s	.	-0.6	.
Niger 1992	10.3 s	1.6	8.6	-2.0	-4.3 s	9.6 s	3.7	0.5	2.4
Niger 1997	10.3 s	0.6	6.0	1.4	1.7	14.4 s	56.3 s	1.1	-0.3
Senegal 1992-93	12.6 s	6.8 s	-7.2	-2.2	25.4	-2.9	-8.2	-1.8	-0.7
Morocco 1992	37.6 s	36.9 s	54.4 s	-4.9	-10.7	8.6	-10.1	1.4	1.1
Bangladesh 1993-94	-9.6	6.8 s	10.6 s	1.6	-6.6	2.4	3.4	8.4 s	9.1 s
Bangladesh 1996-97	-4.2	4.8 s	4.4	0.6	8.2 s	4.8	4.7	1.3	2.3
India 1992-93	18.9 s	14.6 s	21.0 s	0.3	-0.6	4.4	9.0 s	-1.2	-6.2 s
Madagascar 1992	9.4	10.8 s	27.6 s	-5.0	-12.5 s	14.9 s	21.1 s	-7.6	-1.1
Tanzania 1991-92	-6.7	2.0	19.7 s	1.3	-4.3	6.7	-0.5	0.0	4.2
Uganda 1995	12.6 s	12.0 s	17.1 s	-6.6 s	-13.4 s	-0.5	4.9	-0.5	-7.9
Zimbabwe 1994	8.8 s	3.9 s	10.1 s	-2.5	-38.4	5.4 s	9.1 s	-0.3	-10.8 s
Dominican Rep. 1991	-15.2	22.0 s	42.9 s	-16.7	-27.7	2.3	11.5	7.9	-3.6
Haiti 1994-95	2.2	21.9 s	23.4 s	1.9	-28.3	7.5	8.9	-2.5	1.4
Philippines 1993	-8.1	6.9 s	5.7 s	0.5	1.6	4.0	4.8	-1.5	-2.3
Bolivia 1993-94	4.6	8.8 s	13.5 s	0.9	-88.8 s	4.7	9.4 s	0.1	-1.8

Notes: Each marginal effect (change in the dummy from zero to one) is evaluated at the means of all other regressors. Significance at the 5 percent level is indicated by an "s".
Other variables in the regression are age and age squared, average education of adult males in the household (ages 20-64) and adult females in the household, a dummy variable for whether or not the head of the household is male, the age of the head of the household, and a set of community infrastructure variables (e.g. presence of a post office, a cinema, health facilities, distance to the nearest urban center)

be highly dispersed). Moreover, this measure of access records only the "presence" of a school and contains no information on the quality of that school: a single room with a roof and no tables or chairs is recorded in the same way as a solid structure with many rooms with blackboards in each. In addition, schools may be purposively located by decision makers to locations where enrollments are low in order to boost them. The regression will then be understate the impact of schools on enrollment.

Nevertheless, the results do suggest that in some countries access, even crudely described, matters for enrollments. The effect of the presence of a school can even be larger than going from the poorest to the richest group in the society. However, among the countries studied here, this is not the typical case. The crude measure of access is both small and insignificant in most of the countries, especially when compared to the magnitude of the relationship to wealth.

The last two columns of Table 9 report the coefficients and the significance of the interaction of the male dummy and the presence of schools variables. These therefore test whether the presence of schools has a different effect for boys than for girls. There are four cases that emerge in these data. First, in the majority of cases the interaction is small and insignificant: the presence of schools effects boys and girls equally. Second, in Benin the interaction terms are both negative and significant. This means that the presence of schools has a larger impact on the enrollment of girls than it does on the enrollment of boys. The rough number suggested by these estimates is that the presence of a primary school in Benin increases the probability that a girl is enrolled by 25 percentage points, but increases the probability of a boy being enrolled by 8 percentage points (25-17). This is admittedly a rough calculation as it is derived from summing the marginal effects. Nonetheless it reveals the orders of magnitudes. Benin is the only country that follows this pattern. Third, in India and Zimbabwe the presence of a primary and secondary school has a larger effect on girls than it does on boys, although the

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[25] The effect of the presence of schools is not substantially altered when including all the assets in the

magnitudes in question are much smaller. Last, in the first survey in Bangladesh (1993-94) the presence of primary, and primary and secondary schools, have positive and significant effects on the enrollment of boys but an insignificant effect on girls. Again the magnitudes in question are relatively small and, perhaps more importantly, had been wiped out by the time of the second survey (1996-97).

VII) Conclusions

This paper set out to document and analyze gender disparities in education. The results confirm prior studies that there are some countries where a female disadvantage in education outcomes is a major problem. This disadvantage appears to be less related to measures of a country's income level, income growth, or spending on primary education than to a fairly strict regional breakdown, although it is somewhat related to the level of income inequality within a country. The large female disadvantage exists in only few countries outside of the Western and Central Africa, North Africa, and South Asia regions. Moreover, the extent of the female disadvantage varies by the wealth of the household.

Even in countries with a relatively small gender gap there might be large inequalities. In many of the countries with a very small female disadvantage (or even with a small female advantage) the gaps between outcomes for the rich and the poor can be very large. Moreover, in some countries wealth and gender interact to create a very large female disadvantage among the poorest in society (for example in India). This study highlights the necessity to consider wealth and gender gaps simultaneously.

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regression instead of the wealth groups as derived from the asset index (Annex Table 10a).

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Table A: Enrollment and attainment of males and females, by wealth group

	Enrollment of 6-14 year olds						Completion of grade 1 by 15-19 year olds						Completion of grade 5 by 15-19 year olds						Completion of grade 9 by 15-19 year olds						Code used in figures
	Males			Females			Males			Females			Males			Females			Males			Females			
	Poor	Midl.	Rich	Poor	Midl.	Rich	Poor	Midl.	Rich	Poor	Midl.	Rich	Poor	Midl.	Rich	Poor	Midl.	Rich	Poor	Midl.	Rich	Poor	Midl.	Rich	
Benin 1996	33.2	58.0	84.7	14.2	33.6	60.3	38.9	64.1	90.4	11.1	39.1	68.9	12.4	40.4	68.2	2.5	19.9	40.0	1.1	6.5	21.9	0.3	1.7	11.8	ben
Burkina Faso 1992-93	18.7	28.1	70.2	9.9	17.3	56.2	17.5	33.5	75.3	7.9	15.7	61.2	11.9	23.4	65.2	3.2	11.5	52.4	0.4	3.2	24.3	0.0	1.2	15.7	bfa
Cameroon 1991	55.9	76.8	93.6	42.5	72.1	90.6	72.7	88.4	97.9	54.5	76.0	93.4	53.4	72.7	93.1	34.9	64.8	87.5	7.0	18.2	43.1	3.9	13.3	39.5	cmr
C.A.R. 1994-95	50.8	70.6	83.3	28.7	52.1	78.0	67.7	85.6	91.2	35.9	62.2	82.5	23.3	46.0	69.3	6.8	27.0	60.1	0.7	6.1	8.4	0.0	1.6	6.8	car
Chad 1998	30.4	38.5	64.2	14.2	23.5	50.2	47.7	61.4	75.5	17.1	30.4	58.7	11.2	24.3	59.0	1.3	5.4	35.0	0.2	2.4	17.0	0.0	0.4	5.9	tcd
Cote d'Ivoire 1994	38.6	59.9	84.6	24.9	45.3	64.2	49.9	72.9	91.0	33.3	55.0	66.3	34.9	55.1	82.6	18.6	35.5	52.8	6.5	18.6	36.2	1.1	5.2	20.0	civ
Ghana 1993	70.3	79.1	93.6	68.2	72.1	88.1	83.2	82.2	97.6	73.8	77.1	91.1	71.3	74.6	94.2	67.0	67.5	84.7	30.1	31.0	60.2	31.3	33.1	55.9	gha
Mali 1995-96	14.4	28.5	68.1	7.9	19.3	56.1	16.9	30.8	70.5	7.6	18.3	49.5	6.6	17.6	60.1	2.9	10.0	37.5	0.3	0.7	5.0	0.0	0.5	3.6	mli
Niger 1992	14.1	15.0	44.2	4.9	7.9	34.9	22.0	24.2	62.7	9.3	10.0	45.8	16.9	18.2	54.4	6.3	7.1	39.4	1.5	2.1	11.2	0.0	0.0	7.5	
Niger 1997	14.9	22.3	58.7	8.1	12.3	51.2	25.0	30.4	70.1	7.2	13.5	54.9	18.8	25.1	62.5	4.5	10.2	49.5	0.7	2.1	18.7	0.1	0.5	11.5	ner
Senegal 1992-93	17.8	38.5	71.0	10.0	28.6	60.3	25.0	52.6	85.8	14.1	38.3	70.5	19.0	43.3	76.2	8.8	30.2	63.4	2.5	9.3	28.2	0.7	2.2	18.9	sen
Togo 1998	67.6	80.9	94.7	50.0	70.4	80.3	79.3	90.1	94.8	50.6	69.4	83.6	39.2	58.9	79.4	15.5	32.7	55.4	3.0	7.1	15.3	0.5	1.3	8.5	tgo
Egypt 1992	76.3	89.1	93.2	55.6	86.1	91.7	85.2	95.3	98.5	55.8	85.9	94.1	77.5	89.5	95.9	47.5	81.8	91.7	44.8	57.9	80.6	28.6	55.1	76.2	
Egypt 1995-96	77.9	89.9	95.2	56.5	87.1	95.7	86.5	96.2	99.0	60.9	89.3	96.5	74.2	88.1	94.3	50.4	80.9	92.7	47.0	64.2	80.7	31.3	61.5	78.8	egy
Morocco 1992	38.5	79.0	94.4	14.4	64.8	84.5	55.2	89.0	98.0	21.1	66.2	85.4	34.9	70.9	89.4	9.5	49.3	77.6	5.0	19.8	43.3	1.1	13.0	40.7	mar
Bangladesh 1993-94	63.0	74.9	82.0	61.2	72.2	79.7	57.6	73.1	89.0	43.2	63.7	87.7	32.1	51.1	80.1	23.5	42.1	78.7	8.4	18.8	46.3	4.6	11.0	43.3	
Bangladesh 1996-97	65.6	74.6	86.0	68.0	76.7	80.9	67.1	76.6	90.5	52.2	74.5	86.7	41.4	56.0	80.8	31.0	54.0	77.0	10.2	20.0	51.0	6.2	14.9	46.7	bgd
India 1992-93	61.4	83.7	95.4	37.5	69.2	92.9	65.0	86.8	96.6	29.3	65.1	94.3	53.4	79.3	94.6	21.7	57.2	91.8	21.6	45.6	75.1	6.1	26.7	71.0	ind
Nepal 1996	73.3	72.7	90.1	49.8	49.7	81.5	79.7	74.8	91.2	40.9	36.8	74.5	56.8	58.6	82.3	25.8	25.4	66.5	16.4	20.5	47.0	7.3	7.8	39.1	npl
Pakistan 1990-91	50.0	71.9	85.8	21.3	48.7	85.4	50.8	76.6	92.4	12.2	45.4	87.0	39.6	66.1	88.3	8.3	37.5	81.9	10.9	29.0	60.5	1.5	12.5	49.4	pak
Comoros 1996	45.5	61.0	78.8	32.7	55.5	68.4	72.0	86.2	92.4	46.0	67.3	89.2	35.6	56.3	68.6	21.8	39.6	70.1	1.5	8.1	21.6	1.2	4.0	15.2	cor
Kenya 1993	74.7	77.3	84.5	75.5	74.7	83.2	96.5	95.7	96.7	96.1	93.1	95.6	82.7	78.0	86.6	84.3	82.7	88.3	11.1	9.1	31.0	9.1	11.8	31.9	
Kenya 1998	86.2	87.4	94.0	87.6	85.1	90.2	97.5	95.9	96.4	96.3	96.2	96.3	83.0	80.5	90.7	82.7	84.0	90.9	11.9	15.6	44.9	12.3	13.6	35.8	ken
Madagascar 1997	46.5	54.1	90.5	47.1	56.5	89.5	63.9	69.5	95.1	61.1	72.8	95.4	7.1	14.9	69.3	7.4	20.7	67.3	0.5	1.2	21.4	0.5	1.5	25.4	mdg
Malawi 1992	48.0	59.3	82.5	45.9	59.8	81.0	74.2	76.1	90.7	59.8	66.4	86.3	33.7	42.1	67.3	25.0	36.2	65.0	1.5	1.3	9.3	0.7	1.6	11.7	
Malawi 1996	88.7	86.9	93.0	85.4	90.9	93.6	82.2	92.2	95.2	55.2	79.1	88.6	26.2	51.9	67.4	13.8	39.9	63.0	0.0	2.0	8.3	0.9	2.0	14.7	mwi
Mozambique 1997	51.2	62.3	77.6	36.4	52.4	77.8	76.6	85.2	92.8	40.2	61.7	84.8	17.4	41.5	68.0	6.7	20.9	54.4	0.0	1.3	5.8	0.0	0.7	4.2	moz
Namibia 1992	81.9	82.1	93.0	86.0	86.9	90.8	88.6	92.0	96.8	95.1	94.7	97.1	42.8	59.0	89.8	63.4	72.8	93.0	3.7	9.3	38.7	5.8	15.2	39.7	nam
Rwanda 1992	46.5	51.6	65.0	45.3	49.8	65.0	72.5	82.4	84.0	73.4	77.9	85.4	42.9	55.3	62.1	50.8	55.2	68.1	5.0	8.1	18.6	2.5	5.3	19.9	rwa
Tanzania 1991-92	41.4	45.0	60.1	42.0	46.1	60.0	83.4	90.0	93.4	80.5	85.1	96.5	66.8	71.7	84.0	68.7	75.5	90.7	0.3	2.9	13.2	0.6	1.6	17.6	
Tanzania 1996	40.0	44.4	62.8	39.6	50.3	64.0	85.3	88.1	96.6	75.5	83.7	96.2	61.1	66.1	83.7	62.6	67.0	87.3	0.5	1.5	10.4	0.3	1.3	10.9	tza
Uganda 1995	64.1	72.7	83.5	53.8	70.4	81.9	86.7	93.2	93.6	70.3	81.1	92.5	43.2	58.2	78.1	35.0	48.6	75.6	2.4	6.3	24.1	3.0	5.6	25.0	uga
Zambia 1992	54.5	75.4	92.8	54.2	77.3	91.2	86.1	95.5	99.1	77.6	93.6	97.8	55.5	83.8	96.1	49.2	79.4	94.7	1.0	3.9	17.5	0.5	3.7	16.0	
Zambia 1996-97	49.7	59.2	85.3	48.0	61.0	84.4	87.3	91.9	99.5	84.3	89.9	99.5	53.3	74.0	96.7	54.1	68.0	94.4	3.1	9.7	36.2	3.5	10.2	33.5	zmb
Zimbabwe 1994	82.2	86.9	92.6	80.0	86.3	92.9	96.7	98.5	99.0	98.0	97.2	98.6	89.6	93.6	97.7	88.7	92.3	95.3	25.1	39.3	76.5	25.3	40.1	67.2	zwe
Dominican Rep. 1991	49.1	72.4	86.9	51.7	77.1	91.8	88.9	95.4	99.1	94.0	97.6	97.0	46.5	77.8	91.5	67.4	86.7	85.1	8.0	30.7	61.9	14.8	47.3	59.8	
Dominican Rep. 1996	87.7	96.4	98.3	89.9	97.0	97.3	84.0	94.1	99.1	91.3	98.4	99.1	50.2	76.9	92.5	65.2	89.5	91.1	11.3	32.2	64.2	17.9	48.4	64.0	dom
Guatemala 1995	51.3	72.3	91.2	41.7	66.7	90.5	73.1	92.7	97.0	62.7	86.3	95.1	29.6	68.5	89.7	17.3	58.0	85.3	3.7	20.4	51.7	0.5	15.9	50.6	gtm
Haiti 1994-95	55.5	85.4	93.6	54.9	84.7	86.8	76.0	91.2	96.4	68.7	87.7	91.0	15.5	51.5	78.1	16.8	50.9	62.9	2.3	10.4	35.3	1.3	10.6	27.8	hti
Nicaragua 1998	61.4	83.9	90.8	66.4	88.4	94.9	74.8	93.8	98.2	81.1	95.2	98.3	36.6	77.7	92.6	46.0	82.3	93.7	4.1	25.0	51.8	7.2	31.1	58.5	nic
Indonesia 1991	66.6	79.9	90.5	66.5	80.2	88.8	97.0	98.6	99.3	92.3	98.7	99.3	81.3	91.2	97.6	74.2	89.8	95.9	21.0	45.4	69.7	16.3	39.7	62.7	
Indonesia 1994	75.6	87.7	96.2	75.5	87.2	94.0	96.4	99.1	99.6	95.3	98.3	99.4	79.3	91.8	95.2	78.1	91.4	96.7	19.9	45.8	72.3	18.1	43.2	66.4	
Indonesia 1997	79.4	89.2	95.1	81.5	88.5	94.9	97.1	99.2	98.9	96.6	98.9	99.9	81.3	92.1	97.0	83.5	92.1	96.9	25.2	48.0	69.0	25.9	47.5	70.3	idn
Philippines 1993	68.4	80.6	86.6	71.8	83.0	86.0	97.5	99.3	99.5	97.0	99.2	99.9	75.5	94.9	97.6	86.5	95.9	98.0	25.2	57.0	77.5	41.5	67.0	72.1	
Philippines 1998	75.5	89.4	95.0	82.5	92.6	94.6	96.3	99.8	99.1	97.6	99.6	99.1	77.1	95.8	97.5	89.5	98.0	97.7	21.0	55.9	70.5	39.4	68.3	65.8	phl
Bolivia 1993-94	84.8	93.1	96.6	77.0	92.2	95.3	97.8	99.8	99.1	93.6	99.2	98.8	76.8	95.8	96.2	64.0	89.8	91.7	25.4	62.1	82.8	13.3	55.8	71.8	
Bolivia 1997	89.7	96.8	99.1	85.8	97.2	96.5	98.9	99.8	100.0	96.1	99.1	99.0	73.8	94.6	98.3	60.5	90.7	91.2	25.9	48.7	59.9	15.3	43.1	50.7	bol
Brazil 1996	88.6	97.0	98.2	89.5	97.0	98.3	89.9	97.7	99.0	95.3	99.5	99.4	40.3	75.0	87.4	51.9	65.3	91.6	5.8	23.4	32.9	10.2	32.1	43.3	bra
Northeast Brazil 1991	27.5	54.7	69.6	38.5	61.6	70.7	70.8	84.7	83.0	81.4	86.3	83.4	7.2	35.9	53.9	18.4	51.9	57.0	0.4	4.3	15.8	1.5	10.7	25.1	
Northeast Brazil 1996	87.7	97.5	99.4	89.4	96.1	96.4	83.3	95.1	97.1	93.4	98.4	96.4	28.6	67.2	70.0	41.5	76.7	81.9	3.0	18.2	19.0	6.5	26.1	29.0	
Colombia 1990	69.0	85.2	89.8	67.7	83.2	89.3	92.1	98.8	97.2	96.5	97.9	98.5	52.2	85.8	93.1	63.1	87.9	88.4	6.9	32.3	47.4	12.8	32.0	43.4	
Colombia 1995	79.1	93.5	98.7	82.7	94.4	96.5	91.6	98.9	99.0	96.5	99.0	98.7	58.8	89.7	97.0	67.7	91.4	91.8	11.9	39.4	60.3	17.3	48.7	55.0	col
Peru 1991-92	85.0	92.2	90.3	82.7	91.8	90.4	98.2	99.4	98.9	96.6	99.3	99.2	83.5	96.6	98.2	78.8	95.9	95.2	24.1	50.3	67.9	19.0	50.1	57.8	
Peru 1996	87.0	92.9	94.7	84.5	92.8	94.4	96.5	98.7	99.2	94.2	98.8	99.0	78.4	95.3	98.1	70.1	94.9	94.9	18.7	46.0	60.0	16.2	46.3	61.4	per
Kazakstan 1995	85.5	83.7	84.0	86.0	85.2	83.6	99.3	98.4	99.7	99.6	99.8	100.0	99.3	98.1	99.7	99.4	99.8	100.0	80.9	84.4	88.9	85.6	92.6	94.2	ka
Turkey 1993	68.0	77.5	83.7	53.6	68.3	76.6	97.4	97.9	99.7	89.4	92.7	97.7	93.9	95.4	99.0	86.5	91.2	95.9	28.9	41.1	56.6	9.2	33.4	47.4	tur
Uzbekistan 1996	79.6	81.3	78.4	80.8	84.5	83.8	99.4	99.6	100.0	98.6	100.0	99.5	98.7	99.0	99.7	98.3	99.4	99.5	77.2	83.7	90.5	80.0	83.5	90.7	uzb

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