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Disability, Poverty and Schooling in Developing Countries: Results from 11 Household Surveys

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This paper analyzes the relationship between whether a young person has a disability, the poverty status of their household, and their school participation using 11 household surveys from nine developing countries. Between 1 and 2 percent of the population is identified as having a disability. Youth with disabilities sometimes live in poorer households, but the extent of this concentration is typically neither large nor statistically significant. However, youth with disabilities are almost always substantially less likely to start school, and in some countries have lower transition rates resulting in lower schooling attainment. The order of magnitude of the school participation disability deficit is often larger than those associated with other characteristics such as gender, rural residence, or economic status differentials.

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1. Introduction

With over 100 million primary school age children not in school worldwide (UNESCO 2005) the target of universal education, endorsed by over 180 countries as a part of the Millennium Development Goals, remains elusive. Children with disabilities face particular hurdles to attend, and complete, school in developing countries. While there has been much policy discussion about interventions to increase access to schooling for children with disabilities (for example see Peters 2003, World Bank 2003), there has been little systematic empirical analysis on which to base this policy. A large part of this is due to the lack of appropriate and comparable data. Despite Elwan's (1999) description of the more general lack of empirical work on the association between disability and poverty in the developing world, such work is still missing.[1] This study aims to start filling some knowledge gaps using existing data on the prevalence of disability and its association with poverty and schooling among youth in 8 developing and 1 transition country.

Defining disability is complicated—and controversial. Purely medical definitions used in the past are giving way to definitions that incorporate continuous measures of the activities that people can undertake, the extent of participation in society and social and civic life, as well as the role of adaptive technologies. The World Health Organization's International Classification of Functioning, Disability and Health (ICF) describes disability as an umbrella term for impairments, activity limitations, and participation restrictions as a part of a broader classification scheme covering three main domains: body functioning and structure, activities and participation, and environmental factors.[2] The interaction of aspects of all three of these domains determines individual welfare and social policy choices facing governments.

The main goal of this paper is descriptive. Many of the basic facts about disability, poverty and schooling in developing countries are unknown, or not systematically addressed. In order to contribute to the foundations of policy development, this paper analyzes available data to investigate the interactions between physical impairment and participation in schooling, and the intermediary relationship with poverty. The analysis finds that disability among youth is sometimes, but not always, associated with household poverty, but that it is systematically and significantly related to lower school participation.

The paper proceeds as follows. Section 2 compares definitions and the prevalence of disability across the household surveys covered. Section 3 investigates the association

[1] An early exception to this is Afzal (1992) who analyzes disability and its correlates in Pakistan. Yeo and Moore (2003) review some of the literature on poverty and disability but the literature they refer to is typically not based on large-scale surveys.
[2] An online guide to the ICF is available at http://www3.who.int/icf/.

with poverty by examining the extent to which young people with disabilities live in households with lower economic status. Section 4 investigates the long run association with poverty by examining the association between disability and school participation among school-aged youth.

2. Data

The data used for this analysis are from 11 nationally representative household surveys from 9 countries. Three of the surveys are associated with the Living Standards Measurement Study (LSMS) surveys: Jamaica 1998, Jamaica 2000, and Romania 1995. Three of the surveys are national socio-economic surveys (SES): Cambodia 1999, Indonesia 2000, and Mozambique 1996. One survey is a Demographic and Health Survey (DHS): Cambodia 2000. Four of the surveys are End of Millennium Multiple Indicator Cluster Surveys (MICS2) carried out under the guidance of UNICEF in 2000: Burundi, Myanmar, Mongolia, and Sierra Leone.[3] These surveys are typically used to calculate poverty statistics, or derive basic health indicators such as child mortality or the use of health services, and underlie much empirical poverty and social analysis in developing countries. Most of the surveys have a sample size of between about 4,000 and 25,000 households (with Jamaica and Myanmar being outliers with 1,800 and over 65,000 households surveyed respectively).

In order to select these datasets all LSMS, DHS, and MICS surveys were reviewed for any questions on disability and all those with a clear question on disability for a relevant age-range were included. In addition, the SES from Cambodia, Indonesia and Mozambique are accessible from national statistics offices and are some of the most recent in the world with information on disability. There is relatively little data of this kind in developing countries: the datasets, and therefore the countries, for this analysis were selected on the basis of data availability. The countries were not selected to be representative of developing countries in general.

This is clearly a heterogeneous group of countries. Population living on less than a dollar a day ranges from 55 percent in Burundi to two percent in Jamaica and Romania; under-5 mortality—an indicator of basic health status—ranges from 206 per thousand live births in Mozambique to 15 in Romania (Table 1). There are three countries from Africa, four countries from Asia, one country from the Caribbean, and one country from Eastern Europe. While country variety is good since the results will reflect on a range of underlying conditions, little draws these countries together besides having the data available for this analysis.

[3] LSMS data are available online at http://www.worldbank.org/lsms; national socio-economic surveys are available from the countries' national statistics offices; DHS data are available online at http://www.measuredhs.com; MICS2 data are available online at http://www.childinfo.org.

Table 1. Basic statistics about the countries and surveys

	GDP per capita PPP	*Population <$1 a day*	*Under-5 mortality*	*Number of households surveyed*
Burundi 2000	590	55	190	3,979
Cambodia 1999	1710	34	135	6,001
Cambodia 2000	1804	34	135	12,236
Indonesia 2003	3213	8	48	65,762
Jamaica 1998	3366	2	20	7,375
Jamaica 2000	3395	2	20	1,800
Mongolia 2000	1620	27	75	6,000
Mozambique 1996	700	38	206	8,250
Myanmar 2000	-	-	110	25,545
Romania 1995	5965	2	15	24,560
Sierra Leone 2000	464	-	186	3,916

Source: World Bank, World Development Indicators. Poverty rates are for the following years: Burundi 1998; Cambodia 1997; Indonesia 2002; Jamaica 1999 and 2000; Mongolia 1998; Mozambique 1996; Romania 1998. Under-5 mortality data are for 2000 except Romania which is for 1995.

The datasets covered in this study are all most closely consistent with an impairment definition of disability—and as such fall under ICF's "body functioning and structure" domain. The definition does not include mental health, chronic illness or the inability to carry out specific activities. The latter approach is an alternative that is attractive since it is arguably easier to verify. Indeed, selective misreporting of morbidity has long been recognized as a potential problem in studies of the relationship between health and other socio-economic characteristics (Gertler, Rose and Glewwe 2000). To overcome this problem Gertler and Gruber (2002) use responses on questions regarding Activities of Daily Living (ADLs) when analyzing the impact of disability on household consumption in Indonesia, and Yount and Agree (2005) use ADLs when analyzing sex and gender differences in disability among older women and men in Egypt and Tunisia. The impairments reported in the surveys in this study are typically easily verified, for example blindness or missing a limb. Nevertheless it is possible that there is selective reporting in so far as some respondents and interviewers interpret blindness as partial sight whereas to others it means complete inability to see, for example. Or it is possible that mental disability is selectively recognized and reported by some respondents. Typically, however, selective reporting is assumed to operate such that higher socio-economic groups report higher morbidities. Under this assumption, the estimates reported below would be underestimates of the relationship between disability and poverty.[4]

[4] Interestingly, Benitez-Silva, Buchinsky, Chan, Cheidvasser, and Rust (2004) find no bias in self-reported disability as compared to bureaucratic assessment among adult US social security benefit applicants.

Table 2. Types of disabilities included in definition of "person with a disability"

	Type of survey	*Visual disability*	*Hearing disability*	*Speech disability*	*Physical disability*	*Mental disability*
Burundi 2000	MICS2				X	
Cambodia 1999	SES	X	X	X	X	X
Cambodia 2000	DHS				X	
Indonesia 2003	SES	X	X	X	X	X
Jamaica 1998	LSMS				X	X
Jamaica 2000	LSMS	X	X	X	X	X
Mongolia 2000	MICS2	X	X			
Mozambique 1996	NHS	X	X	X	X	X
Myanmar 2000	MICS2	X	X			
Romania 1995	LSMS	X	X	X	X	X
Sierra Leone 2000	MICS2	X	X	X	X	

Note: See Annex Tables more precise wording and disaggregations.

Despite the fact that all 11 surveys have an impairment definition of disability, non comparable definitions remain an issue in any effort to compile data across countries. Table 2 summarizes the items covered in each survey that define a person as having a disability. Clearly the definitions are non-comparable, even across surveys within the same country. Six of the surveys use an "extensive" definition that includes visual, hearing, speech and physical disability. But even in this group of six surveys, the definition of each type of impairment varies. For example, in Cambodia 1999 the physical disability category contains a detailed list of potential cases—"amputation of one limb; amputation of more than one limb; unable to use one limb; unable to use more than one limb; paralyzed lower limbs only; paralyzed all four limbs"—whereas in Jamaica 2000 there is simply one category described as "physical disability (legs and arms)". More generally, in some countries the definition is stricter than in others. In Mongolia and Myanmar sight and hearing are described as "problematic" whereas in other surveys they are characterized as "blind" and "deaf".[5]

The second main data constraint in carrying out this analysis is the fact that surveys do not identify large numbers of individuals as having a disability. Therefore, any subsequent analysis such as the correlation between disability and poverty, or disability and schooling, will suffer from imprecision. Table 3 highlights this point by showing the number of youth identified in each survey and the subset with a disability. For some surveys the small sample problem is especially acute, for example the Jamaica 2000 survey identifies only 14 youth as having a disability, the Sierra Leone survey identifies only 28.

[5] Note that another non-consistent aspect of the data is the coverage in terms of age: the upper age limit is sometimes 14 in Burundi and Myanmar.

In order to not give undue weight to these surveys, the results on poverty and schooling for datasets that identify fewer than 50 children with a disability are not reported.[6]

Table 3. Number of youth 6 to 17[+] defined as having a disability in each survey

Country and year	*Type of survey*	*Maximum age*	*Number of youth*	*Number of youth with a disability*
Burundi 2000	MICS2	14	5,865	73
Cambodia 1999	SES	17	10,881	96
Cambodia 2000	DHS	17	23765	214
Indonesia 2000	SES	17	64,136	326
Jamaica 1998	LSMS	17	6,964	58
Jamaica 2000	LSMS	17	1,640	14
Mongolia 2000	MICS2	17	7,645	245
Mozambique 1996	NHS	17	14,520	156
Myanmar 2000	MICS2	14	26,329	41
Romania 1995	LSMS	17	13,777	82
Sierra Leone 2000	MICS2	17	7,534	28

Note: Data are unweighted in order to show the actual number of observations underlying the analysis.
[+]Maximum ages are 18 in Mongolia, and 14 in Burundi and Myanmar.

A last data constraint concerns the measurement of household poverty. All LSMS and SES surveys include household per capita consumption expenditures (PCE), the variable typically used in poverty analysis. DHS and MICS2 data, however, do not include those variables. In this study, quintiles based on per capita consumption expenditures are used when available. In other datasets, an index of household consumer assets and housing characteristics (an economic status index) was used to classify households into quintiles (following Filmer and Pritchett 2000). The exception is the SES from Cambodia 1999 in which there was a problem in the collection of expenditures data. An economic status index is therefore used in that survey to classify economic status.[7]

3. Prevalence of disability and its association with household economic status

The first issue these data can be used to explore is the prevalence of disability and the association with household economic status. Prevalence estimates range between 0.13 (Myanmar) and 2.77 (Jamaica 2000) percent of the population as having a disability (Table 4). These numbers are consistent with those compiled by the United Nations statistical database on disability (DISTAT).[8] In that source of over 65 surveys and censuses between 1970 and 1992 in developing countries, the mean prevalence rate for the entire population

[6] Results for Jamaica 2000, Myanmar 2000, and Sierra Leone 2000 are available from the author on request.
[7] Consistent with typical poverty analysis, quintiles are derived on the basis of the distribution of people across the socio-economic status measure. Specifically, quintiles are defined such that 20 percent of youth live in each quintile.
[8] Available online at http://unstats.un.org/unsd/demographic/sconcerns/disability/disab2.asp.

is 1.7 percent, and for those countries with statistics for children under age 14 the prevalence rate is 0.7 (see Annex Tables for a summary of the data from DISTAT).

Perhaps surprisingly, of the 11 surveys analyzed here, those that list more types of impairments do not systematically identify a higher percentage of the population as disabled. For example in the six countries that include visual, hearing, speech, and physical disabilities the percentages are 1.51 (Cambodia 1999), 0.64 (Indonesia); 2.77 (Jamaica 2000); 1.19 (Mozambique); 1.32 (Romania); and 0.55 (Sierra Leone) which span close to the entire range of prevalence across all the surveys. In Mongolia which inquires only about visual/hearing impairments the prevalence is the highest observed in this collection of datasets (3.2 percent), while in Burundi and the 2000 DHS in Cambodia which cover only physical disabilities the prevalence rates are 1.24 and 0.86 percent respectively.

Table 4. The prevalence of disability among youth ages 6 to 17[+] by household economic status quintile

	All	*Poorest quintile*	*2nd quintile*	*3rd quintile*	*4th quintile*	*Richest quintile*	*Concen -tration Index*	*Std. Error of CI*
Burundi 2000	1.24	1.28	1.19	1.11	1.36	1.28	0.032	(0.064)
Cambodia 1999[#]	0.88	0.91	0.84	0.87	0.81	0.94	-0.007	(0.687)
Cambodia 2000	0.86	1.08	0.71	0.86	0.82	0.86	-0.044	(0.045)
Indonesia 2003[#]	0.51	0.70	0.55	0.41	0.50	0.38	-0.084	(0.038)**
Jamaica 1998	0.82	1.01	1.05	0.48	0.68	0.89	-0.064	(0.082)
Mongolia 2000	3.20	3.40	3.01	2.88	2.81	3.92	0.019	(0.037)
Mozambique 1996[#]	1.19	0.86	0.81	1.57	1.40	1.29	0.111	(0.045)**
Romania 1995[#]	0.60	0.91	0.47	0.54	0.47	0.58	-0.110	(0.067)*

Note: [+]Maximum age is 14 in Burundi and Myanmar. [#] Survey includes vision, hearing, speech, and physical disabilities. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels respectively. Standard errors in parentheses.

Of course this variability combines both actual prevalence and differences in survey techniques. However, in the countries with more than one survey (Cambodia and Jamaica) the survey with the more extensive definition of a person with a disability does not always result in the larger prevalence. The SES in Cambodia in 1999 characterizes 1.51 percent of the population as having a disability with an extensive definition, whereas the DHS in 2000 characterizes 1.57 percent of the population as having a disability with a definition restricted to physical disabilities. In Jamaica the more extensive definition in 2000 characterizes 2.77 percent as having a disability—more than the 2.09 percent identified in 1998 with a more limited definition. Clearly there is substantial variation

across surveys in how people with disabilities are identified and cross-country comparisons in prevalence can only be made with caution, if at all.[9]

Despite the lack of cross-country comparability in the definitions and measurement of disability, these surveys are still potentially useful in describing the association of disability with other characteristics. That is, conditional on a particular definition, the analysis is valid for a given survey (the definition is common to all individuals in the survey). Moreover, it is less likely that cross-country comparisons of the association between disability and other characteristics would suffer from these problems. Nevertheless, if some types of disabilities are more associated with a correlate than others, then surveys that include that type of disability will show a higher association with the correlate than those that do not. For example, say loss of a limb was typically more associated with poverty than other types of impairments, then a survey that included loss of a limb in its definition of disability would yield a higher correlation between disability and poverty. Therefore even the cross-country comparisons of the relationship between disability and correlates needs to be treated with caution.

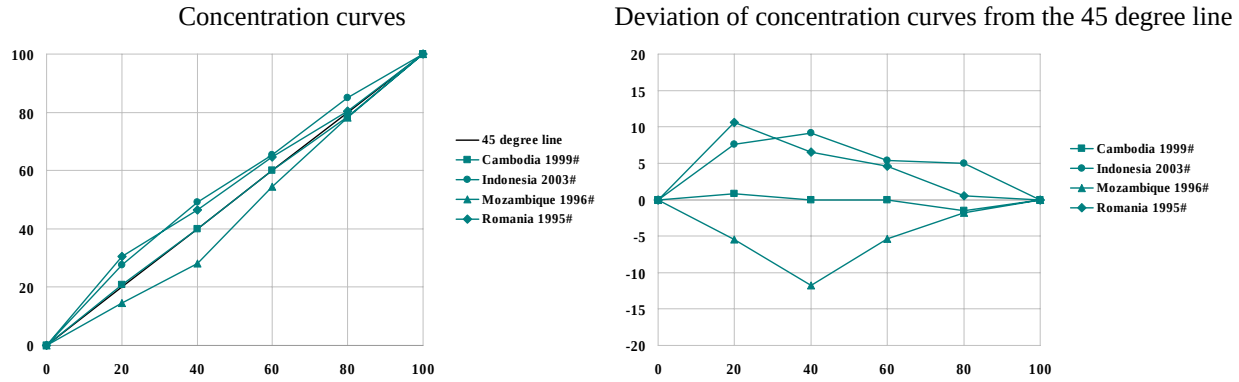
The analysis of the relationship between disability and economic status should be interpreted as an association and not necessarily a cause or consequence. Disability is both a determinant of poverty as it lowers earning power and consumption expenditures (Gertler and Gruber 2002) and a consequence of poverty as the cumulative depravations of poverty can manifest themselves in disability (e.g. infant and child development, exposure to dangerous working conditions). Moreover, the presence of a person with a disability entails direct costs which result in lower standards of living (Jones and O'Donnell 1995, Zaidi and Burchardt 2005). Indeed, Hoogeveen (2005) estimates that in Uganda, households headed by a person with a disability have substantially lower consumption—and are significantly more likely to be poor. Children in those households are also more likely to have lower education attainment for their age.[10]

Table 4 reports the percent of youth ages 6 to 17 characterized as having a disability in each economic status quintile: it is lower in the richest than in the poorest quintile in all surveys except Burundi, Cambodia 1999, Mongolia and Mozambique. But the relationship is not neatly ordered with lower prevalence in each higher quintile. A useful way of summarizing the entire distribution of a characteristic (such as disability) across the economic status distribution is through the use of concentration curves. These plot percentiles of a population ranked by economic status on the horizontal axis, against

[9] Developing good data on disability is complex, United Nations (2001) contains a guide to doing so.
[10] Disability among household heads is defined differently in the survey used in Hoogevenn (2005). A head of household is considered disabled if this "prevents him or her from being actively engaged in labour activities during the past week".

the cumulative percentage of a characteristic on the vertical axis. When the concentration curve lies above the 45 degree line this means that the characteristic is concentrated among the poor—with larger deviations indicating higher concentration among the poor. The left panel of Figure 1 shows the concentration curves for disability among youth ages 6 to 17 for the 4 surveys with an extensive definition of disability and more than 50 children identified as having a disability. The right panel of Figure 1 shows the deviation of the concentration curve from the 45 degree line—a transformation that sharpens the distinction between the lines. In this set of countries, disability is concentrated among the poor in Indonesia and Romania. It is concentrated among the wealthy in Mozambique. In Cambodia 1999 it is evenly spread across the economic distribution.

Figure 1. The distribution of disability across economic quintiles among youth 6 to 17



The Concentration Index (CI) is a summary measure of the entire distribution of an indicator by the welfare ranking—in this context it is therefore a summary statistic for inequality in disability by economic status. Intuitively, the CI is defined as twice the area between the concentration curve and the 45 degree line, with area below the 45 degree line counted as positive and area above the 45 degree line as negative. Note that while Figure 1 is drawn in terms of quintiles, the CI is derived on the basis of the full (continuous) distribution of the welfare ranking variable. In all but 3 of the surveys, the CI is negative indicating a concentration of people with a disability among the poor (Table 4). In Indonesia and Romania this negative value is statistically significantly different from zero; in Mozambique the positive value is statistically significantly different from zero.[11]

It is hard to determine whether these numbers are “high” or “low”: there is no “expected” degree of concentration of disability among the poor. A comparison to a different outcome—child mortality—provides a sense of the order of magnitudes.

[11] Standard errors are obtained through bootstrapping the calculation of the concentration index 1,000 times for each survey. The standard deviation of the estimate of the CI across those replications is reported here as the standard error of the CI.

Wagstaff (2000) calculates the CI of child mortality for 9 developing countries using a similar approach to that applied here.[12] He finds that the index ranges from -0.322 in Brazil to -0.016 in Vietnam with a median value of -.132 in Nepal. In all but two of the countries he studies he finds the CI to be negative and highly significantly different from zero. The order of magnitude of the CI of disability among youth is somewhat lower than that of mortality. The median CI of child mortality across the nine developing countries in Wagstaff (2000) was -.132, while it is –0.02 for disability among youth 6 to 17 in the 8 surveys reported in Table 4. In the two surveys where the CI for disability is negative and significantly different from zero it is -0.084 (Indonesia) and –0.110 (Romania) suggesting that in these two countries the order of magnitude is similar to that for child mortality.

4. Disability and schooling

We turn now to the relationship between disability and schooling among the school-age population (defined for the purpose of this analysis as ages 6 to 17). Table 5 shows the percent of youth that are currently in school disaggregated between those who are generally of primary (6 to 11) and secondary (12 to 17) school age. Youth with a disability are almost always substantially less likely to be in school than those without. The deficit among children 6 to 11 years old ranges from a shortfall of 15 percentage points in Mozambique to 59 percentage points in Indonesia. In the latter country, whereas 89 percent of children 6 to 11 without a disability are in school, only 29 percent of those with a disability are in school. Among older children and youth the gap covers a similar range (from 15 percentage points in Cambodia to 58 percentage points in Indonesia), with the exception of Burundi where the gap is zero. On average the gaps are larger among the older group: the median is a 26 percentage point shortfall among 6 to 11 year olds, and a 31 percentage point shortfall among 12 to 17 year olds.

Table 5. Percent reported to be in school

	Ages 6-11			*Ages 12-17*[+]		
	With disability	*Without disability*	*Difference*	*With disability*	*Without disability*	*Difference*
Burundi 2000	14.6	37.2	-22.6	48.0	47.8	0.2
Cambodia 1999[#]	18.1	58.2	-40.1	30.6	68.0	-37.4
Cambodia 2000	37.8	66.8	-29.0	46.5	61.7	-15.2
Indonesia 2003[#]	29.2	88.5	-59.3	18.3	75.9	-57.6
Jamaica 1998	70.5	99.4	-28.9	50.2	85.9	-35.7
Mongolia 2000	41.0	58.0	-17.0	47.1	72.6	-25.5
Mozambique 1996[#]	34.2	49.2	-15.0	29.3	48.4	-19.1
Romania 1995[#]	57.7	79.2	-21.5	35.7	83.7	-48.0

Note: [+]Maximum age is 14 in Burundi. [#] Survey includes vision, hearing, speech, and physical disabilities.

[12] The countries included in the Wagstaff (2000) study are Brazil, Cote d'Ivoire, Ghana, Nepal, Nicaragua, Pakistan, Philippines, South Africa, Vietnam.

To the extent that disability in a given country is correlated with other factors that affect schooling, such as poverty, age, or urban/rural residence, the unadjusted difference in school participation between youth with and without a disability might give a misleading picture of the deficit. Column (i) of Table 6 reports the unadjusted percentage point deficit in current school participation among school-aged children with a disability, and column (ii) reports the deficit after adjusting for potential confounding factors (standard errors are reported in parentheses). The adjustment is carried out, for each survey, using a multivariate Probit model with school participation as the dependent variable. The independent variables include a dummy variable for whether a child has a disability as well as a set of variables capturing potentially confounding variables: age and age squared; a dummy variable for a child's gender; a dummy variable for urban residence; and dummy variables for each economic status quintile. The effect of the change in the dummy variable for disability—evaluated at the means of all the other variables—is the number reported in column (ii).

Table 6. Schooling deficits among children ages 6 to 17[+] with a disability: "raw" differential, and differential after controlling for age, gender, urban residence, and economic status quintile (percentage points).

	Current school participation		*Ever attended school*	
	Unadjusted	*Deficit adjusted for other factors*	*Unadjusted*	*Deficit adjusted for other factors*
	(i)	*(ii)*	*(iii)*	*(iv)*
Burundi 2000	-12.2 (5.3) **	-15.8 (4.8) ***	-13.5 (5.5) **	-18.7 (4.9) ***
Cambodia 1999[#]	-38.8 (5.0) ***	-45.2 (5.5) ***	-45.7 (5.1) ***	-56.4 (5.7) ***
Cambodia 2000	-22.0 (3.8) ***	-26.6 (4.5) ***	-20.3 (3.9) ***	-31.6 (4.7) ***
Indonesia 2003[#]	-58.8 (2.7) ***	-67.4 (3.1) ***	-45.8 (3.3) ***	-52.9 (4.6) ***
Jamaica 1998	-32.7 (6.4) ***	-27.5 (8.0) ***	-24.6 (5.7) ***	-18.5 (5.8) ***
Mongolia 2000	-20.3 (3.2) ***	-27.9 (3.6) ***	-16.9 (3.1) ***	-36.7 (4.2) ***
Mozambique 1996[#]	-17.7 (4.5) ***	-17.5 (5.0) ***	-12.2 (5.2) **	-14.3 (5.4) ***
Romania 1995[#]	-38.9 (5.5) ***	-53.2 (6.4) ***	-30.0 (5.4) ***	-50.4 (7.1) ***

Notes: [+]Maximum age is 14 in Burundi. [#] Survey includes vision, hearing, speech, and physical disabilities. Adjusted differentials correspond to the marginal effect of disability in a probit regression of school participation that includes age, age squared, and dummy variables for sex, urban residence, and economic quintile. ***, **, * indicate statistical significance at the 1%, 5%, and 10% levels respectively. Standard errors in parentheses.

In most countries controlling for confounding factors leads to an increase in the school enrollment deficit that can be attributed to disability. This deficit is over 50 percentage points in Indonesia and Romania; between 25 and 45 percentage points in Cambodia, Jamaica, and Mongolia; and slightly less than 20 percentage points in Burundi and Mozambique. In all countries the difference is large and statistically significantly different from zero.

There is substantial heterogeneity across countries in the schooling deficit associated with disability. Part of this variation might be due to differences in the definition of disability. That is, in a survey with a more "stringent" definition of disability one would likely observe a larger deficit since this survey would identify individuals who would have to overcome bigger obstacles in order to access education. The fact that the two surveys from Cambodia yield schooling deficits among youth with disabilities that are 15 to 20 percentage points apart suggests that this is likely a part of the story.

Another part of this variation likely relates to overall enrollment. It would not be surprising to observe larger deficits in countries where enrollment among children without a disability is high: in these countries there would be more scope to observe a bigger deficit. The schooling deficit does tend to be smaller in the countries with the lowest overall enrollment (Burundi and Mozambique) and is larger in countries with higher enrollment (Romania and Indonesia). The relationship is not perfect, however: Jamaica has the highest overall enrollment, but the deficit associated with disability is about average for the surveys reviewed here.

Last, a part of the variation is likely related to differences in the social and policy environment. Countries where there is greater stigma towards a person with a disability, or where less effort has been made to ensure equal access to schooling, will undoubtedly have a larger deficit associated with schooling. But this is only a part of the cause for cross-country variation. It would therefore be beyond the reach of these data to attribute differences across countries in Table 6 entirely to differences in policies towards people with disabilities.

Patterns of school participation

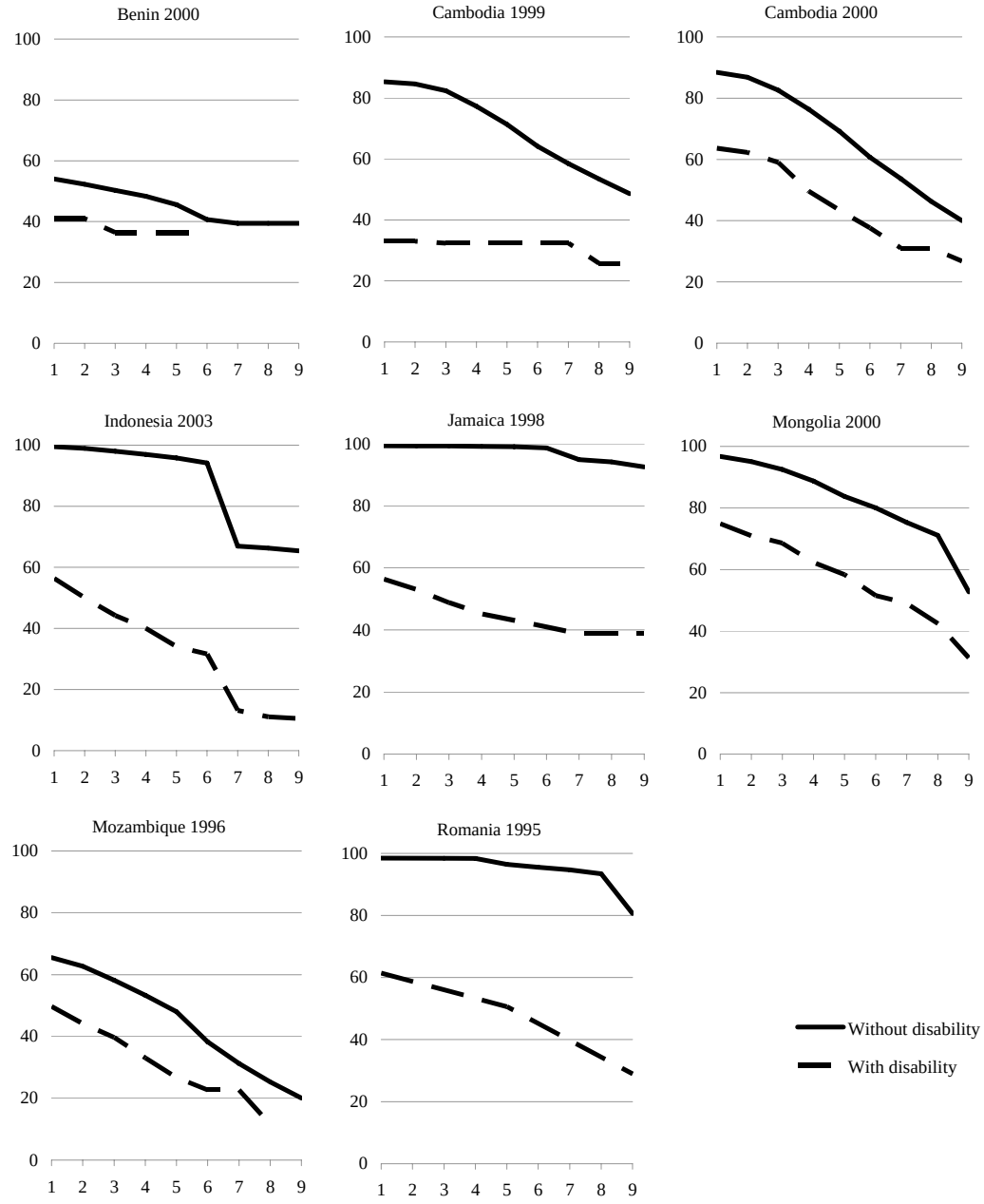
The last two columns of Table 6 show analogous results for the percentage of children who have ever attended school. The pattern of results is similar to the current school participation results, and the deficit is of a similar order of magnitude suggesting that a large part of the schooling deficit among children with disabilities comes from the fact that they never attended school at all.

Figure 2 illustrates this issue by showing the grade "survival" profile of the cohort of 10 to 17 year olds. Each line shows the percentage of children of this cohort who have completed each grade—allowing for the fact that some of the cohort are still in school—as derived by the Kaplan-Meier survivor function.[13] There are clearly large differences in the patterns of attainment between youth with and without disabilities. In all countries the

[13] A similar approach which doesn't adjust for right-censoring was used in Filmer and Pritchett (1999). This model allows all children to be "at risk," i.e. even those who have never attended school. Because of the computations of the survival estimation, children who have never attended school enter into the calculation of the probability at grade 1, and implicitly assumes that they will not attend school in the future. The lower age bound of 10 allows for late starting. Results for Jamaica 2000 and Myanmar are not available because sample sizes are too small.

difference exists in the probability of ever attending school. In some counties, these differences are exacerbated as children progress through the school system. In particular, in Indonesia, Jamaica, and Romania, where the gap at the start of schooling is on the order of 30 to 45 percentage points, the shortfall in grade completion increases to about 60 or 70 percentage points by grade 8.

Figure 2. Grade "survival" profiles for ages 10 to 17: Kaplan-Meier estimates of the probability of completing a grade.

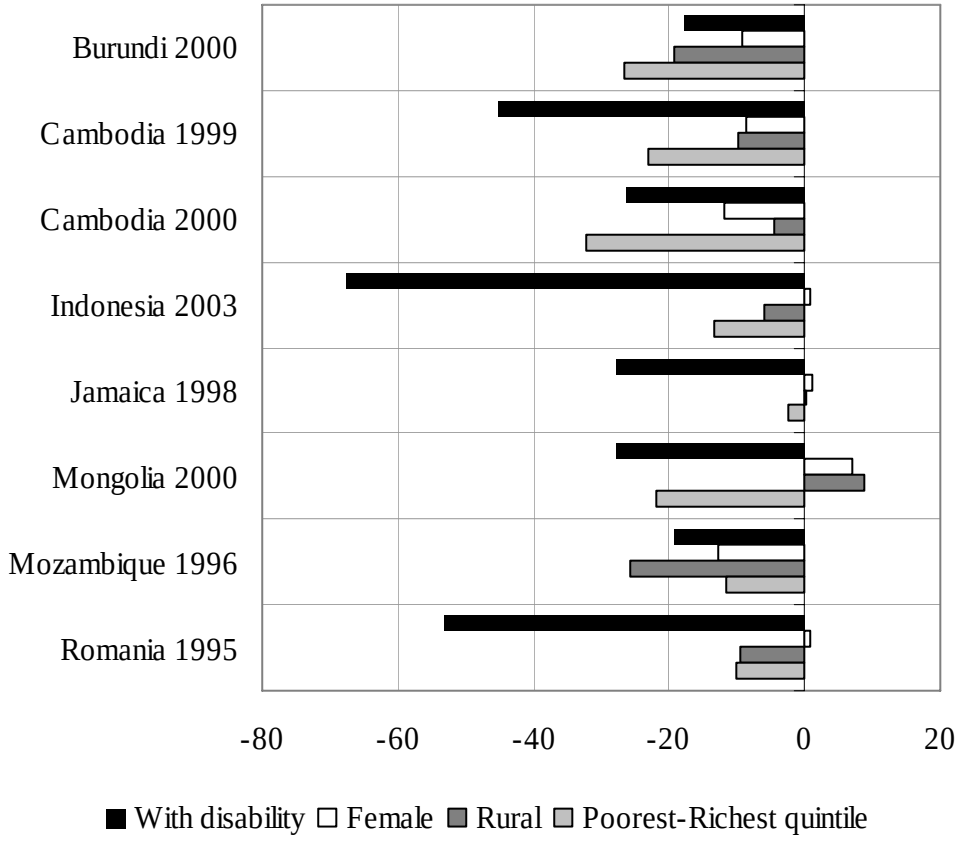


Note: Estimates account for right hand censoring. Jamaica 2000 and Myanmar are not reported because there are too few observations to estimate survival profiles.

Relative magnitude of school participation deficits

How large is the deficit in school participation relative to other sources of inequality? The multivariate models can be used to compare school participation gaps associated with disability, gender, urban/rural residence, as well as economic status. Figure 3 shows, for each survey, the school participation deficit among children with disabilities (relative to those without disability); girls (relative to boys), children in rural areas (relative to those in urban areas), and children in households in the poorest quintile (relative to the richest quintile).[14]

Figure 3. Magnitudes of school participation deficits associated with: having a disability, being a girl, living in a rural area, and being in the poorest relative to the richest quintile. Percentage point differences for children ages 6 to 17



Note: Deficits shown are the marginal effects of dummy variables for each characteristic in multivariate probit models.

[14] In each case the deficit is estimated at the means of the other variables.

Clearly the deficits associated with disability are large compared to other sources of inequality. In all these countries the gender gap in enrollment is small relative to that associated with disability. Perhaps more surprising, the gaps associated with rural residence, and the large gap between rich and poor, are usually substantially smaller than that associated with disability. The exceptions are Burundi where wealth gaps dominate the gaps associated with disability, and Mozambique where rural/urban differences dominate. Typically, however, the gap in school participation between children with and without a disability is on the order of twice as large as those associated with rural residence or wealth.

The interaction of disability with other characteristics in the association with schooling

Comparing the magnitudes of the schooling gaps associated with disability and other characteristics helps to get a sense for orders of magnitude. But an interesting additional question is whether disability interacts with other characteristics in a way that reduces or exacerbates inequalities. A straightforward way to investigate this hypothesis is to estimate the multivariate model of school participation and include interaction terms between disability and each of the other covariates. In Romania, the disability deficit in school participation among boys is about 9 percentage points smaller than that among girls. In Mongolia the school participation deficit associated with disability is about 17 percentage points larger in rural areas than in urban areas. In Cambodia, the school participation deficit associated with disability is smaller in the poorer quintiles (largely because overall school participation is lower in those quintiles).

But other than these specific cases, there are no statistically significant interactions. There is an important caveat to this finding, however: small sample sizes make it hard to estimate these effects with much precision. Not only does one need enough observations to estimate average differences, one needs enough cases of the various combinations of characteristics in order to identify their association with enrollment. Given the small numbers overall (see Table 3) it is perhaps unsurprising that the models do not yield significant estimates.[15]

5. Conclusions

This analysis of data from 11 nationally representative surveys has confirmed the many data problems that earlier discussions have identified as hampering the establishment of a broad empirical base for developing policies targeted to people with disabilities in poor countries. The fundamental variation across surveys in the definition of "disability" makes cross-country comparisons difficult. The small number of people identified as

[15] In order to increase the power of these tests, the models were also run separately for each interaction. The pattern of statistically significant results is not affected under this alternative approach.

having a disability makes it hard to precisely estimate patterns in the data beyond simple correlations.

Despite these limitations, but keeping them in mind, the data are nevertheless revealing. Consistent with other similar surveys, the 11 surveys analyzed here identify on the order of 1 to 2 percent of the population as having a disability. Countries with two surveys and varying definitions suggest that the percentage is not always sensitive to the exact definition (e.g. different definitions can give similar prevalence rates, and *vice versa*). In addition, other aspects of the surveys, such as the training of enumerators or the use that interviewees expect the survey to be put, might affect the overall estimated rates.

Youth with disabilities sometimes live in poorer households—but the extent of this concentration is typically neither large nor statistically significant. On the other hand, youth with disabilities are almost always substantially less likely to participate in schooling—and significantly so. Children with disabilities are less likely to start school, and in some countries have lower transition rates resulting in lower schooling attainment. The order of magnitude of the school participation disability deficit is often larger than those associated with other characteristics such as gender, rural residence, or economic status differentials. The data do not suggest that there are typically interactive effects—although the small number of disabled youth in these surveys makes hard to identify those effects.

This analysis suggests that, in developing countries, disability is associated with long-run poverty in the sense that children with disabilities are less likely to acquire the human capital that will allow them to earn higher incomes. However, the results should be treated as tentative at best. Establishing clear and consistent measures of disability for use in household surveys, and implementing these in the context of samples that are large enough to identify sufficient observations to allow detailed analysis (perhaps in the context of a census), will be a pre-requisite for further work on the relationship between disability and poverty. This should be a high priority for building empirically grounded policies to address the issue of disability, poverty and schooling.

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Annex Table 1. Defining a person as having a disability in the covered surveys

Country and year	*Type of survey*	*Definition used in survey*	*Question from survey instrument*
Burundi 2000	MICS2	Presence of a physical handicap (missing upper or lower limbs, or other body part).	Specific wording not available.
Cambodia 1999	SES	Amputation of one or more limbs; inability to use one or more limbs; blind; deaf; mute; mentally disturbed; permanent disfigurement; other.	"Does X have a disability?"; "If 'yes', what type of disability does X have?" [with pre-coded answers]; "What was the cause of the disability?" [with pre-coded answers].
Cambodia 2000	DHS	Physical impairment.	"Is there a person who usually lives in your household who has any type of physical impairment?"; "Please give the name of each individual who has a physical impairment"; For each individual, then ask: "Has X been physically impaired since birth, or was X's impairment due to an accident?" [with pre-coded answers].
Indonesia 2003	SES	Blind; deaf; mute; physical disability; mental disability.	"Have a disability?". If yes: "Type of disability" [with pre-coded answers]; "Cause of disability" [with pre-coded answers].
Jamaica 1998	LSMS	Physical or mental disability.	"Is X physically or mentally disabled?"
Jamaica 2000	LSMS	Sight; hearing; speech; physical (legs and arms); multiple disability; mental retardation.	"Is X physically or mentally disabled?" [with pre-coded answers that include types of disabilities]; "If yes, when did this disability occur?" [with pre-coded answers such as "since birth," "In child under 5 years," …].
Mongolia 2000	MICS2	Difficulty seeing; difficulty hearing.	Specific wording not available.
Myanmar 2000	MICS2	Visual problem; hearing problem.	Specific wording not available.
Romania 1995	LSMS	Amputation of limb(s); Paralysis of limb(s); ankylosis of limb(s) or column; physical deformation(s); unilateral or bilateral cecity; deaf; mute; epilepsy; mental retardation; mental disorder.	"Do you suffer from a handicap?"; If yes: "Type of handicap" [with pre-coded answers].
Sierra Leone 2000	MICS2	Blindness; crippled; lost limbs; deafness; mute.	Specific wording not available.

Annex Table 2. Number of people defined as having a disability in each survey

Country and year	*Type of survey*	*Age range considered*	*Number of people*	*Number of people with a disability*
Burundi 2000	MICS2	0 to 14	9,925	103
Cambodia 1999	SES	all	32,348	504
Cambodia 2000	DHS	all	66105	1017
Indonesia 2000	SES	all	259,237	1,720
Jamaica 1998	LSMS	all	26,458	558
Jamaica 2000	LSMS	all	6,304	175
Mongolia 2000	MICS2	0 to 18	15,025	330
Myanmar 2000	MICS2	0 to 14	43,363	66
Romania 1995	LSMS	all	72,726	962
Sierra Leone 2000	MICS2	all	24,254	131

Note: Data are unweighted in order to show the actual number of observations underlying the analysis.

Annex Table 3. Summary estimates of disability prevalence from the UN's DISTAT database

Country / Year	*Source*	*Population disabled (%)*	*Population 0-14 disabled (%)*	*Definition*
Algeria 1992	survey	1.2		anyone in hh: impairment types
Bangladesh 1982	survey	0.8		impairment types
Benin 1991	survey	1.3		"handicap"
Bermuda 1991	census	7.6	2.0	chronic condition that affects activities of daily life
Botswana 1991	census	2.2	0.9	impairment types
Brazil 1981	survey	1.7	0.9	
Brazil 1991	census	0.9	0.4	impairment types
CAR 1988	census	1.5	0.7	impairment types
Chile 1992	census	2.2		impairment types
China 1983	survey	1.4	1.4	
China 1987	survey	5.0	2.8	
Colombia 1991	survey	5.6	2.9	
Colombia 1993	census	1.8	0.7	impairment types
Comoros 1980	census	1.7	0.9	impairment types
Congo 1974	census	1.1		impairment types
Egypt 1976	census	0.3	0.1	
Egypt 1981	census	1.6	0.7	impairment types + activities
Egypt 1996	survey	4.4		impairment types + activities
El Salvador 1992	census	1.6	0.6	"disability" types
India 1981	census	0.2		impairment types
Iraq 1977	census	0.9	0.3	impairment types
Jamaica 1991	census	4.8	1.3	impairment types
Jordan 1991	survey	2.6		impairment types
Jordan 1994	census	1.2	0.9	
Kenya 1989	census	0.7	0.6	impairment types
Kuwait 1980	census	0.4	0.4	
Lebanon 1994	survey	1.0	0.5	
Malawi 1983	survey	2.9		impairment types
Mali 1987	census	2.7	0.8	"handicap"
Mauritania 1988	census	1.5		impairment types
Morocco 1982	census	1.1	0.1	
Namibia 1991	census	3.1	1.0	impairment types
Niger 1988	census	1.3	0.6	impairment types
Nigeria 1991	census	0.5	0.3	impairment types
Oman 1993	census	1.9	0.6	impairment types
Pakistan 1981	census	0.5	0.1	impairment types
Panama 1980	census	0.7		impairment types
Panama 1990	census	1.3	0.7	impairment types
Peru 1981	census	0.2		impairment types
Peru 1993	census	1.3	0.7	impairment types
Philippines 1980	survey	4.3	2.2	impairment types + activities
Philippines 1990	census	1.1	0.7	impairment types
Philippines 1995	census	1.3	0.4	
Poland 1988	census	9.9	0.5	
Senegal 1988	census	1.1	0.4	impairment types
South Africa 1980	survey	0.5	0.2	
Sri Lanka 1981	census	0.5	0.3	impairment types
Sri Lanka 1986	survey	2.0		
Sudan 1992	survey	1.1	0.7	long-term condition that affects normal activities

Sudan 1993	census	1.6	0.7	impairment types
Swaziland 1986	census	2.2	0.9	impairment types
Syria 1970	census	1.0		
Syria 1981	census	1.0	0.7	
Syria 1993	survey	0.8	0.6	long-term condition that affects normal activities
Thailand 1986	survey	0.7	0.5	
Thailand 1990	census	0.3	0.7	impairment types
Togo 1970	census	0.6	0.1	
Tunisia 1984	census	0.9	0.3	
Tunisia 1989	survey	0.9		
Tunisia 1994	census	1.2	0.6	
Turkey 1985	census	1.4	0.6	
Uganda 1991	census	1.2	0.7	impairment types
Yemen 1994	census	0.5	0.1	
Zambia 1980	census	1.6	0.7	
Zambia 1990	census	0.9	0.6	impairment types

Note: The UN warns against simple comparisons across countries since the data and definitions are not strictly comparable

Annex Table 4. Percent distribution of types of disabilities among those with a disability

	Visual	Hearing and/or Speech	Physical	Mental	Multiple/ Other	Total
Burundi 2000			100			100
Cambodia 1999	12	7	55	7	19	100
Cambodia 2000			100			100
Indonesia 2003	16	22	40	23		100
Jamaica 1998				100		100
Jamaica 2000	27	21	14	23	15	100
Mongolia 2000	63	37				100
Myanmar 2000	28	72				100
Romania 1995	15	7	47	27	4	100
Sierra Leone 2000	31	33	36			100

Annex Table 5. Marginal Effects from probit regressions. Dependent variable: Participating in school, ages 6 to 17

	Burundi 2000	Cambodia 1999	Cambodia 2000	Indonesia 2003	Jamaica 1998	Jamaica 2000	Mongolia 2000	Myanmar 2000	Romania 1995	Sierra Leone 2000
Disabled (0,1)	-0.179	-0.452	-0.263	-0.675	-0.279	-0.294	-0.279	0.014	-0.533	-0.108
	(3.19)***	(6.27)***	(5.91)***	(18.73)***	(6.79)***	(3.13)***	(7.68)***	(0.17)	(9.56)***	(0.96)
Age (years)	0.509	0.457	0.507	0.269	0.036	0.003	0.548	0.237	0.340	0.104
	(20.98)***	(32.72)***	(59.36)***	(75.51)***	(11.89)***	(1.64)*	(38.25)***	(21.20)***	(51.76)***	(7.32)***
Age (years) squared	-0.023	-0.019	-0.023	-0.012	-0.002	-0.000	-0.023	-0.012	-0.014	-0.005
	(19.22)***	(31.98)***	(60.33)***	(80.30)***	(15.55)***	(3.26)***	(36.61)***	(21.56)***	(51.43)***	(8.31)***
Male (0,1)	0.092	0.085	0.120	-0.007	-0.012	-0.004	-0.071	-0.001	-0.007	0.099
	(6.70)***	(6.91)***	(15.76)***	(2.30)**	(4.93)***	(3.56)***	(5.94)***	(0.18)	(1.31)	(7.84)***
Urban (0,1)	0.191	0.098	0.044	0.059	-0.001	0.001	-0.087	0.123	0.095	0.073
	(4.40)***	(7.59)***	(3.19)***	(16.25)***	(0.27)	(0.97)	(5.29)***	(13.74)***	(15.68)***	(3.80)***
Quintile 2	0.006	-0.044	0.034	0.044	0.014	0.003	0.056	-0.000	0.068	0.022
	(0.24)	(2.23)**	(3.09)***	(11.52)***	(4.90)***	(2.51)**	(3.09)***	(0.01)	(10.73)***	(1.08)
Quintile 3	0.126	-0.009	0.093	0.077	0.018	0.003	0.145	0.019	0.091	0.093
	(5.54)***	(0.44)	(8.37)***	(19.89)***	(6.52)***	(2.61)***	(8.19)***	(1.90)*	(14.65)***	(4.49)***
Quintile 4	0.164	0.065	0.196	0.103	0.021	0.003	0.198	-0.010	0.091	0.172
	(7.27)***	(3.36)***	(17.83)***	(25.83)***	(7.66)***	(3.43)***	(10.73)***	(0.98)	(14.14)***	(8.10)***
Quintile 5	0.266	0.232	0.321	0.134	0.023	0.004	0.219	0.002	0.101	0.271
	(10.91)***	(10.61)***	(25.50)***	(30.42)***	(9.13)***	(3.60)***	(10.33)***	(0.13)	(15.21)***	(11.19)***
Observations	5834	10880	23719	64136	6952	1547	7593	25796	13777	7339

Absolute value of t statistics in parentheses. *, **, *** indicates significant at 10%, 5%; and 1% levels.

Models include region dummies

Annex Table 6. Marginal Effects from probit regressions. Dependent variable: Ever attended school, ages 6 to 17

	Burundi 2000	Cambodia 1999	Cambodia 2000	Indonesia 2003	Jamaica 1998	Mongolia 2000	Myanmar 2000	Romania 1995	Sierra Leone 2000
Disabled (0,1)	-0.189	-0.565	-0.314	-0.529	-0.185	-0.367	-0.002	-0.503	-0.035
	(3.36)***	(7.84)***	(7.50)***	(22.39)***	(9.26)***	(11.01)***	(0.03)	(11.26)***	(0.34)
Age (years)	0.495	0.281	0.308	0.024	0.004	0.317	0.135	0.103	0.094
	(19.89)***	(23.27)***	(45.00)***	(41.25)***	(6.04)***	(34.48)***	(14.92)***	(31.88)***	(6.69)***
Age-Squared	-0.021	-0.010	-0.012	-0.001	-0.000	-0.012	-0.006	-0.004	-0.004
	(17.58)***	(19.44)***	(38.98)***	(38.75)***	(6.50)***	(30.38)***	(12.35)***	(29.38)***	(7.21)***
Male (0,1)	0.107	0.022	0.038	-0.001	-0.001	-0.015	-0.000	0.000	0.103
	(7.58)***	(1.99)**	(5.92)***	(2.55)**	(1.32)	(1.82)*	(0.09)	(0.03)	(8.13)***
Urban (0,1)	0.198	0.078	0.057	0.002	0.001	0.019	0.083	0.004	0.094
	(4.40)***	(6.67)***	(5.11)***	(5.66)***	(1.06)	(1.66)*	(11.13)***	(1.70)*	(4.93)***
Quintile 2	0.010	-0.053	0.035	0.002	0.002	0.026	0.002	0.017	0.010
	(0.42)	(3.02)***	(3.94)***	(6.05)***	(2.50)**	(2.28)**	(0.23)	(7.08)***	(0.50)
Quintile 3	0.127	-0.018	0.075	0.003	0.001	0.061	0.015	0.021	0.088
	(5.49)***	(1.01)	(8.42)***	(8.19)***	(0.96)	(5.85)***	(1.88)*	(9.58)***	(4.35)***
Quintile 4	0.151	0.052	0.154	0.004	0.002	0.066	0.002	0.022	0.162
	(6.67)***	(3.12)***	(17.73)***	(11.37)***	(1.95)*	(5.74)***	(0.18)	(10.60)***	(7.81)***
Quintile 5	0.261	0.183	0.228	0.005	0.001	0.107	0.005	0.019	0.243
	(10.65)***	(9.41)***	(22.74)***	(13.32)***	(1.62)	(9.18)***	(0.47)	(7.64)***	(10.22)***
Observations	5838	10880	23737	64136	6952	7619	26317	13776	7448

Absolute value of t statistics in parentheses. *, **, *** indicates significant at 10%, 5%; and 1% levels.

Models include region dummies

Annex Table 7. Marginal Effects from probit regressions. Dependent variable: Participating in school, ages 6 to 17

	Burundi 2000	Cambodia 1999	Cambodia 2000	Indonesia 2003	Jamaica 1998	Jamaica 2000	Mongolia 2000	Myanmar 2000	Romania 1995	Sierra Leone 2000
Disabled (0,1)	-0.163	-0.581	-0.414	-0.620	-0.363	-0.632	-0.449	0.069	-0.682	0.131
	(1.49)	(5.85)***	(5.20)***	(6.89)***	(4.32)***	(3.65)***	(5.57)***	(0.50)	(5.17)***	(0.61)
Age (years)	0.510	0.457	0.507	0.269	0.036	0.002	0.549	0.237	0.340	0.104
	(21.00)***	(32.69)***	(59.38)***	(75.49)***	(11.94)***	(0.85)	(38.25)***	(21.20)***	(51.76)***	(7.33)***
Age - squared	-0.023	-0.019	-0.023	-0.012	-0.002	-0.000	-0.023	-0.012	-0.014	-0.005
	(19.25)***	(31.95)***	(60.35)***	(80.28)***	(15.60)***	(2.10)**	(36.61)***	(21.55)***	(51.43)***	(8.32)***
Male (0,1)	0.091	0.083	0.119	-0.007	-0.012	-0.003	-0.074	-0.001	-0.008	0.101
	(6.65)***	(6.77)***	(15.56)***	(2.28)**	(4.87)***	(3.42)***	(6.08)***	(0.17)	(1.55)	(7.91)***
Urban (0,1)	0.189	0.097	0.043	0.059	-0.001	0.001	-0.094	0.123	0.095	0.074
	(4.33)***	(7.48)***	(3.06)***	(16.34)***	(0.38)	(1.21)	(5.62)***	(13.77)***	(15.66)***	(3.83)***
Quintile 2	0.005	-0.044	0.034	0.044	0.013	0.002	0.055	-0.000	0.068	0.022
	(0.24)	(2.24)**	(3.11)***	(11.52)***	(4.92)***	(2.30)**	(3.07)***	(0.01)	(10.75)***	(1.06)
Quintile 3	0.125	-0.007	0.094	0.077	0.018	0.002	0.146	0.019	0.091	0.093
	(5.46)***	(0.35)	(8.50)***	(19.87)***	(6.58)***	(2.70)***	(8.20)***	(1.90)*	(14.61)***	(4.46)***
Quintile 4	0.162	0.067	0.198	0.103	0.021	0.002	0.201	-0.010	0.092	0.172
	(7.18)***	(3.44)***	(17.95)***	(25.81)***	(7.76)***	(3.54)***	(10.79)***	(0.98)	(14.12)***	(8.10)***
Quintile 5	0.263	0.234	0.323	0.134	0.024	0.002	0.221	0.002	0.101	0.271
	(10.80)***	(10.67)***	(25.60)***	(30.40)***	(9.22)***	(3.60)***	(10.37)***	(0.16)	(15.15)***	(11.17)***
Disability*Male	0.025	0.179	0.096	-0.008	-0.011	0.001	0.094	0.031	0.086	-0.270
	(0.17)	(1.47)	(1.26)	(0.18)	(0.45)	(0.46)	(1.47)	(0.20)	(2.35)**	(1.47)
Disability*Urban	0.291	0.056	0.131	-0.092	0.009	-0.001	0.171	-0.651	-0.034	-0.301
	(1.03)	(0.45)	(1.29)	(1.53)	(0.58)	(0.26)	(2.54)**	(2.13)**	(0.50)	(1.39)
Disability*(Quint. 1 or 2)	-0.167	0.196	0.153	0.005	0.012		0.091	-0.018	0.008	0.001
	(1.17)	(1.59)	(2.18)**	(0.10)	(1.07)		(1.23)	(0.10)	(0.13)	(0.00)
Observations	5834	10880	23719	64136	6952	1543	7593	25796	13777	7339

Absolute value of t statistics in parentheses. *, **, *** indicates significant at 10%, 5%; and 1% levels.

Models include region dummies