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The impact of disability on school attendance in developing countries

Suguru Mizunoya, Sophie Mitra and Izumi Yamasaki

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TOWARDS INCLUSIVE EDUCATION: THE IMPACT OF DISABILITY ON SCHOOL ATTENDANCE IN DEVELOPING COUNTRIES

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Abstract: The paper aims to reduce the global knowledge gap pertaining to the impact of disability on school attendance, using cross-nationally comparable and nationally representative data from 18 surveys in 15 countries that are selected among 2,500 surveys and censuses. These selected surveys administered the Washington Group Short Set (WGSS) of disability-screening questions, covering five functional domains of seeing, hearing, mobility, self-care, and remembering, and collected information on educational status. Using both descriptive and econometric approaches, the paper finds that (i) the average disability gap in school attendance stands at 30% in primary and secondary schools in 15 countries; (ii) more than 85% of disabled primary-age children who are out of school have never attended school; (iii) the average marginal effect of disability on primary and secondary school attendance is negative and significant (-30%), and (iv) countries that have reached close to universal primary education report high ratios of disabled to non-disabled out-of-school children indicating that general education policies to improve access do not effectively mainstream disabled children in education, and (v) disabled children confront the same difficulties in participating in education, regardless of their individual and socio-economic characteristics.

Keywords: Out-of-school children, disability, Education for All, inclusive education.

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The authors are entirely responsible for all the results and the interpretations presented in the paper.

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EXECUTIVE SUMMARY

Education is considered to be a vital component in the formation of human capital. Global initiatives such as the Millennium Development Goals (MDGs) and Education For All (EFA), promoted under the aegis of the United Nations, have bolstered universal access to education since their inception in 2000. However, in 2012, 121 million primary and lower secondary aged children were still out of school. Various factors such as socio-economic status, gender and location contribute to marginalization in education, while disability plays a dominant role. The formulation of policies aiming to mitigate educational exclusion of disabled children is constrained due to the lack of standardized techniques employed in collecting data on disability across countries and surveys. In the absence of cross-nationally comparable data, stakeholders find it difficult to understand the global pattern of schooling among children with disabilities. This paper conducts a multi-level analysis of the impact of disability on school attendance. There are certain facts which emerge from this paper:

- Disability is a critical factor which influences school attendance, with its average marginal effect being -30% and the size of coefficients are larger than other individual and household factors on access to education such as sex, socio-economic status, or the place of residence.
- The disability gap in attendance measured across 15 countries[1] in primary and secondary education is statistically significant at an average of 30%, suggesting that disabled children consistently face more problems than non-disabled peers in educational participation.
- The impact of disability significantly outweighs other individual and household characteristics; disabled children confront the same difficulties in participating in education, regardless of their individual and socio-economic characteristics such as sex, age, household income and location of residence.
- Disaggregation of the disabled OOSC (Out-Of-School Children) rate by attendance history reveals that more than 85% of disabled primary-age children have never attended school i.e., addressing the initial access issue could be a key for reducing the numbers of out-of-school children.
- Countries which have reached close to universal primary education such as Indonesia, Maldives, Saint Lucia, South Africa, West Bank and Gaza report high ratios of disabled to non-disabled OOSC, hinting that general educational policies to improve overall attendance are not geared up to address the challenges faced by disabled children in attending school.
- Screening of approximately 2,500 household surveys and censuses conducted in various countries in the world found that less than 2% fulfilled the criteria of including questions

[1] The 15 countries are: Albania, Bangladesh, Ethiopia, India, Indonesia, Malawi, Maldives, Nigeria, Papua New Guinea, Saint Lucia, South Africa, Tanzania, Uganda , Viet Nam, and West Bank and Gaza.

related to disability and functioning in at least five of the six physical and mental domains as covered by the Washington City Group on Disability Statistics, with a minimum of three levels of severity response. Efforts to collect data on disability need to be mainstreamed.

- The paper makes the case that good data must be constructed to assist policy efforts to promote the inclusion of disabled children in mainstream schooling. There is a need to reduce structural failures in access to education for disabled OOSC, by bridging the gap between policy initiatives and implementation.

1. INTRODUCTION

Despite the internationally-agreed inclusion of universal primary education as the second United Nations Millennium Development Goal (MDG) and complementary endorsement of the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s Education for All (EFA) programme, both of which target achievement by 2015, out-of-school children (OOSC) remain one of the most critical issues in education today. According to the global OOSC Initiative (OOSCI) launched jointly by the United Nations Children's Fund (UNICEF), the UNESCO Institute of Statistics (UIS), and the Global Partnership for Education (GPE), a total of 122 million primary school-age children worldwide were still out-of-school in 2011.[2]

While disabled children are guaranteed equal rights to education under the 2006 United Nations Convention on the Rights of Persons with Disabilities (UN CRPD, Article 24), disability continues to be one of the most significant, challenging, and yet neglected issues in meeting the MDG and EFA objectives especially in developing countries (UNESCO, 2015, p.181). Education systems still routinely lack the specialized human and physical capital necessary to meet the specific needs of disabled children, thereby denying them the same opportunities as their non-disabled peers. Development of sound policies or programmes focused on promoting inclusion in education is hindered by a paucity of reliable information on the numbers and educational status of disabled children, due to a lack of standardized and detailed questions on disability in household surveys, as well as varying definitions of disability adopted across surveys (Mont, 2007). As follows in the absence of internationally comparable data, the efforts to evaluate the impact of disability on key educational parameters such as attendance are disrupted and governments rarely possess the necessary evidence required to design appropriate policy adaptations and enhancements to improve the situation of disabled children (UNESCO, 2014).

The limited available data on the educational status of disabled children consistently shows that they are far more likely to be out-of-school than children without disabilities. For example, Filmer (2008) finds that significant deficits exist in school attendance due to disability in thirteen developing countries over the years 1992 to 2005, ranging from 10% to 60% in younger children (ages 6-11), and 15% to 58% in older children (ages 12-17), although the precise definitions of disability varied substantially between datasets. More recently, only 55% of disabled children surveyed by UNICEF in Kyrgyzstan are found to have attended school in 2007, while the national primary and secondary gross enrolment rates were 97.9% and 86.9% respectively (UNICEF Kyrgyzstan, 2008; World Bank, 2015). Similarly, according to the Brazilian School Census (2010), 25% of children with disabilities in the primary and early secondary school age groups are out-of-school in comparison to just 2.3% and 2.5% of the children in primary and early secondary school-age groups respectively (UNICEF Brazil, 2012).

[2] http://www.uis.unesco.org/Education/Documents/fs-31-out-of-school-children-en.pdf

Yet, strikingly, the MDG framework omits any mention of the status of persons with disabilities in all eight Goals, their attendant 21 Targets, and 60 Indicators. In spite of the 2013 reaffirmation of a commitment to mainstreaming disability in the MDG Post-2015 Agenda, the previous lack of attention given to gathering data has posed difficulties for participants in the global initiative on OOSC to understand the impact of disability on educational enrolment in detail. However, the agenda of the Sustainable Development Goals (SDG) adopted in September 2015 recognizes disability as one of the factors which influence equity and inclusion in the social, economic and political dimensions of development. The SDG proposes to build and enhance existing education systems across member countries in such a way that would allow the disabled population to access educational institutions with greater ease by 2030, and to provide support to developing countries to produce reliable and high quality data on disability by 2020.

This study begins by exploring data gaps regarding the impact of disability on education; it provides initial baseline evidence for the disability gap in school attendance across countries, and conducts statistical analyses focusing on the determinants of school attendance. The study uses nationally representative data from 18 surveys in 15 low- to middle-income countries which collected information on educational status and administered the Washington Group Short Set (WGSS) of disability-screening questions introduced by the Washington City Group on Disability Statistics (WG). The minimum sample size of disabled children is set at 50. Summing up, the paper attempts to explore: How common is disability among children overall and by functional domain? How large are differences in the shares of disabled and non-disabled OOSC? Finally, what are theì key determinants of school attendance for disabled children?

Econometric analyses are performed to estimate by how much disability, sex, urban/rural residency, and socio-economic status affect the school attendance of disabled children. The regression examines whether, and to what extent, the gap in school attendance between disabled and non-disabled children results from differences in characteristics.

The rest of this paper is structured as follows. Section 2 describes the comprehensive methodology applied to select surveys which have fully incorporated the WGSS of questions, the definitions of disability and OOSC, and the empirical strategy used in this paper. Section 3 provides results in two segments: first, it reports and discusses descriptive statistics for educational status of disabled and non-disabled children, and second, it presents the results of econometric analyses of the determinants of schooling. The first part of section 3 presents disability prevalence – overall and by various functional domains – in primary, secondary and combined (primary and secondary) age groups, along with the proportions of primary- and secondary-age children currently out-of-school by disability status. Disabled OOSC in selected countries with an appreciable sample size ($n_{disabled} \geq 100$)) is further disaggregated by whether they have never attended or dropped out of school, to determine whether a pattern exists in the barriers to education faced by them. In the second part of section 3, a logistic regression model is used to estimate the marginal effect of disability on the probability of school attendance, and is compared against those obtained from a linear model

controlling for household fixed-effects. The statistical significance of interaction terms in the logistic model are also assessed to ascertain whether the disability gap in attendance varies by sex, urban/rural residency, and socio-economic status. Subsequently, the disability gap in attendance rates obtained from the logistic regression is decomposed using the non-linear extension to the Blinder-Oaxaca technique introduced by Fairlie (1999, 2005), to examine what portion cannot be explained by group differences in the observed characteristics of disabled- and non-disabled children, but may instead be attributed to differences in the returns to these independent variables. Section 4 presents concluding remarks and emphasizes critical concerns which impede the inclusion of disabled children in mainstream schooling.

2. METHODOLOGY

2.1 Definition of Disability

This study employs the definition and measure of disability recommended by the WG, which is one of the most widely accepted and internationally tested tools. Based on the integrated biopsychosocial framework for understanding disability, the International Classification of Functioning, Disability and Health (ICF), developed by the World Health Organization (WHO), the WGSS[3] uses a four-level scale (no; some; a lot of difficulty; cannot do entirely) to capture an individuals' degree of functional ability in six basic physical and mental domains (seeing, hearing, walking, remembering and concentrating, self-care, and communication) which, if limited, render them vulnerable to being excluded from independent participation in society. There are other international tools which could be used for international comparisons of disability such as ADLs and WHO-DAS 2.0 which have been widely used and other recent tools (e.g. the DSQ-34. Trani et al 2015). Compared to other tools, the WGSS has the advantage of brevity. For instance, the WGSS addresses disabilities in different functional domains including self-care in a more concise manner than the ADLs. WHO-DAS 2.0 is also longer than the WGSS, and the questions are not all internationally comparable (Mont, 2007). This paper adopts the WGSS as it is brief and internationally comparable, and it has been adopted in several general household surveys and censuses. The main disadvantage of WGSS for the purpose of this study is that it was designed for adults; a special questionnaire for children is underway, but is not available yet. A module on child functioning and disability is in the last stages of joint development by the WG and UNICEF (UNICEF and Washington Group on Disability Statistics, 2014), but the data collected on WGSS inclusion in household surveys and censuses for this paper suggest it may be several years before sufficient data is available to conduct international comparisons using children-specific disability data. As mentioned earlier, it is worth noting that disability is interpreted differently across countries and surveys, hence disability data should be compared with caution, even if it is collected using a single standard across countries (Filmer, 2008).

[3]See "Background Information" and "Short Set of Questions", Washington Group on Disability Statistics, http://www.cdc.gov/nchs/washington_group.htm.

In order to maintain consistency, the analysis is restricted to data available from nationally representative surveys that asked questions on disability in a minimum of five WGSS domains and offered respondents three or more possible levels of severity. Disability is identified by a positive response in either the top (if only three levels of severity are available in total) or one of the upper two severity categories (if three levels are available) for at least one functioning domain, following the WG's recommended cut-off (Washington Group on Disability Statistics, 2010).

2.2 Data

While the WG has been advocating the use of the WGSS of questions for nearly a decade, there is no comprehensive database of surveys that have included the WGSS of questions. Hence, we examined nationally representative household surveys and censuses conducted in low- to middle-income countries (as defined by the World Bank) dating from the WGSS endorsement in 2006 for potential eligibility to be included in this analysis. These surveys and censuses were retrieved from the online International Household Survey Network (IHSN) Catalog,[4] the repository of census questionnaires maintained by the United Nations Statistics Division (UNSD),[5] or the websites of individual National Statistical Offices if missing from the UNSD archive. Additional surveys were sourced from the Demographic and Health Survey (DHS) programme funded by the United States Agency for International Development (USAID),[6] the World Bank's Living Standards Measurement Studies (LSMS),[7] and UNICEF Multiple Indicator Cluster Surveys (MICS).[8] The study was further supplemented with surveys listed in the web-based Repository of Disability Surveys and Censuses[9] created during the first development phase of the ongoing joint WHO-WB Model Disability Survey project, and those found through conducting ad-hoc searches in Google using keywords associated with disability and the WGSS.

The resulting pool of approximately 2,500 surveys was screened for the inclusion of the WGSS of questions on disability and current school attendance as described above. This process was largely facilitated by the inbuilt IHSN search filter and otherwise guided by documents reviewing the collection of disability statistics that identify censuses and surveys incorporating some variant of the WGSS, prepared and disseminated by the regional United Nations Economic Commissions for Europe (UNECE),[10] Latin America and the Caribbean (UNECLAC),[11] and the Washington Group itself.[12]

[4] IHSN Survey Catalog, http://catalog.ihsn.org/index.php/catalog
[5] Census Questionnaires, UNSD, http://unstats.un.org/unsd/demographic/sources/census/censusquest.htm
[6] Demographic and Health Surveys (DHS) program, USAID, http://www.dhsprogram.com/
[7] Living Standards Measurement Study (LSMS) program, The World Bank Group, http://go.worldbank.org/IPLXWMCNJ0
[8] Multiple Indicator Cluster Surveys, UNICEF, http://mics.unicef.org/surveys
[9] Repository of Disability Surveys and Censuses, http://disabilitysurvey.checkdesign.de/
[10] UNECE Steering Group on Population and Housing Censuses (2013). Disability and Agriculture: Key Results of the UNECE Survey on National Census Practices, and First Proposals about the CES Recommendations for the 2020 Census Round, ECE/CES/GE.41/2013/19.
[11] Task Force on Disability Measurement Statistical Conference of the Americas (2014). Regional Report on Measuring Disability: Overview of the Disability Measurement Procedures in Latin America and the Caribbean, LC/L.3860(CE.13/3).
[12] The Washington Group on Disability Statistics (2014). The Washington Group on Disability Statistics, paper presented at the United Nations Expert Group Meeting on Disability Statistics, Monitoring and Evaluation: The Way Forward, a Disability Inclusive Agenda towards 2015 and Beyond, at UNESCO Headquarters, Paris, 8-10 July 2014. http://www.un.org/disabilities/default.asp?id=1617

A total of 42 surveys in 28 countries (less than 2% of the initial collection) fulfilling the eligibility criteria for analysis were identified (Annex, Table 1), although encouragingly, 67% of these eligible datasets (28 surveys from 21 countries) were compiled in the last five years (in 2010 or thereafter). Given availability and avoiding repetition of survey instruments, this study analyzed data from a further subset of 18 eligible surveys conducted in 15 countries (Table 1, page 13), covering a broad range of regions and levels of country income.

2.3 Out-of-school Children and the Five Dimensions of Exclusion Framework

The OOSCI framework[13] designed by UNICEF and UIS aims to tease out patterns and forms of exposure (such as never attended or dropped out) to schooling, underlying in data of OOSC across countries. The framework comprises five dimensions of exclusion (5DE): dimensions 1 to 3 cover children of kindergarten, primary, and lower secondary age who are *out of school*, and dimensions 4 to 5 deal with children who are *in school* but are at risk of dropping out entirely from primary and lower secondary school respectively (UNICEF and UIS, 2011). As it is difficult to precisely ascertain the risk of dropping out of school through the questions employed in most household surveys, this paper only considers OOSC dimensions 2 and 3 (extended) of 5DE covering primary- and secondary-age children who are presently out-of-school. The study links the 5DE with disability status of primary and secondary age children, by analyzing the proportion of disabled and non-disabled OOSC by attendance history as discussed in the following section.

2.4 Analytical Methodology

2.4.1 Descriptive Analysis

The *prevalence rate* of disability was computed for primary- and secondary-age children separately, and then for the entire school-age population; and finally for the entire general population aged five and over. The primary- and secondary-age ranges in each country were sourced from official documentation and cross-referenced against the UNESCO International Bureau of Education's *World Data on Education* (7th ed., 2010-11).[14] The prevalence rate is calculated using the formula:

$$Prevalence\ rate_i = \frac{Number\ of\ disabled_i}{Total\ population_i}$$

where ***i*** denotes criteria for defining a population: primary school age, secondary school age, combined school age (primary and secondary) or overall population aged 5 and above.

Subsequently, the *share or proportion of OOSC* or *OOSC* rate in the selected dimensions in OOSCI framework, namely dimensions 2 and 3, was computed for disabled, non-disabled, and all children. The proportion of OOSC is computed using the following formula:

$$Proportion\ of\ OOSC_i = \frac{Number\ of\ OOSC_i}{Total\ number\ of\ children_i}$$

where ***i*** denotes the criteria for choosing the population: primary school age, secondary school age and combined school age (primary and secondary). Questions on current attendance were used

[13] The Operational Manual can be downloaded from http://www.uis.unesco.org/Education/Documents/oosci-operational-manual.pdf

[14] UNESCO International Bureau of Education, World Data on Education, (7th ed., 2010-11). http://www.ibe.unesco.org/en/services/online-materials/world-data-on-education/seventh-edition-2010-11.html.

Table 1 – *Detailed Information for Analyzed Survey Data*

Country [WB Income Group at survey time] L: low, LM: lower middle, UM: upper middle	Survey Name	Year(s) of Field-work	GNI per Capita in Survey Year (2015 USD), World Bank Atlas Method	Size of Sample Aged 5+ *(disabled persons)*	Primary-School Children		Secondary-School Children		Number of Washington Group Short Set Domains Covered	Number of Levels of Impairment Severity (no. of levels coded disabled)
					Age	Size of Sample (disabled persons)	Age	Size of Sample (disabled persons)		
Indonesia [LM]	Population Census (10% sample)	2010	2,500	21,312,179 *(168,328)*	7-12	2,764,413 *(8,314)*	13-18	2,546,893 *(7,179)*	5	3 (1)
Papua New Guinea [LM]	Household Income and Expenditure Survey (HIES)	2009-2011	1,310a	19,499 *(996)*	9-14	3,527 *(33)*	15-18	2,007 *(33)*	5	4 (2)
Viet Nam [L]	Household Living Standards Survey (HLSS)	2006	760	36,700 *(1,297)*	6-10	3,146 *(25)*	11-17	6,736 *(66)*	6	4 (2)
Albania [LM]	Living Standards Measurement Survey (LSMS)	2012	4,370	24,008 *(507)*	6-14	3,305 *(24)*	15-17	1,551 *(10)*	5	4 (2)
Saint Lucia [UM]	Population and Housing Census	2010	6,580	111,232 *(4,400)*	5-11	13,573 *(129)*	data unavailable for analysis		6	4 (2)
West Bank and Gaza [LM]	Disabled Individuals Survey	2011	2,560	75,425	6-15	22,476 *(337)*	16-17	4,689 *(94)*	6	4 (2)
Bangladesh [L]	Housing Income and Expenditure Survey (HIES)	2010	780	49,891 *(827)*	6-10	7,416 *(44)*	11-17	8,359 *(59)*	6	4 (2)
India [L]	Health and Development Survey (HDS)	2005	740	186,035 *(1,602)*	6-13[b] 6-12	33,597 *(141)*	14-17[b] 13-17	18,752 *(79)*	5	3 (1
Maldives [UM]	Demographic and Health Survey (DHS)	2009	5,050	36,890 *(3,560)*	6-12	5,819 *(293)*	13-17	5,190 *(280)*	6	4 (2)
Ethiopia [L]	Rural Socio-economic Survey (ERSS) *[rural and small town areas only]*	2011-2012	405[a]	15,777 *(399)*	7-14	4,637 *(36)*	15-18	1,685 *(17)*	6	4 (2)
Malawi [L]	Third Integrated Household Survey (IHS3)	2010-2011	355[a]	46,671 *(516)*	6-13	13,562 *(80)*	14-17	5,004 *(20)*	6	4 (2)
Nigeria [LM]	General Household Panel Survey (GHS-Panel), Wave 2	2012-2013	2,585[a]	23,473 *(285)*	6-11	5,052 *(23)*	12-17	3,981 *(15)*	6	4 (2)
South Africa [UM]	General Household Survey	2013	7,410	83,638 *(3,609)*	7-13	12,958 *(464)*	14-19	9,275 *(126)*	6	4 (2)
South Africa [UM]	Census (10% sample)	2011	7,050	3,450,089 *(153,708)*	7-13	434,165 *(21,443)*	14-19	456,022 *(8,508)*	6	4 (2)
Tanzania [L]	National Panel Survey (NPS)	2010-2011	720[a]	17,293(424) *(424)*	7-13	3,710(23) *(23)*	14-19	3,010(28) *(28)*	6	4 (2)
Tanzania [L]	Disability Survey	2008	530	28,303 *(632)*	7-13	6,722 *(79)*	14-19	4,756 *(51)*	6	4 (2)
Uganda [L]	Demographic and Health Survey (DHS)	2011	550	36,542 *(1,625)*	6-12	10,382 *(271)*	13-18	6,318 *(150)*	6	4 (2)
Uganda [L]	National Panel Survey, Wave 2 (NPS)	2010-2011	530[a]	12,562(342) *(342)*	6-12	3,455(36) *(36)*	13-18	2,588 *(41)*	6	4 (2)

Notes: [a] Period average taken for surveys conducted over multiple years. [b] Primary education in India lasts for seven (ages 6-12) or eight (ages 6-13) years in 12 and 23 States/Union Territories respectively; the upper primary-age bound was chosen to be 13 years in this study to reflect the system majority.
Source: World Bank (various years); UNESCO International Bureau of Education (various country profiles); authors' analysis based on data described in the text.

to identify whether a child attends school. Comparing disabled and non-disabled OOSC rates establishes the size of the attendance gap associated with disability. The disabled OOSC rate was further broken down into *dropouts*, which refers to children who studied at a school before but currently are not attending school, and those who had *never attended school,* but this was only possible if additional questions regarding attendance history were also asked, a sufficiently large number of disabled children was surveyed, and if the sample size of disabled children is more than 100.

2.4.2 Econometric Analysis

To estimate the marginal effect of disability on school attendance, a logistic regression was run on the probability of school attendance on disability and individual characteristics:

(1) $$\Pr(Y_i = 1) = \text{logit}^{-1}(\alpha_0 + \alpha_1 Age_i + \alpha_2 Age_i^2 + \alpha_3 Male_i + \alpha_4 Rural_i + \alpha_5 Socio\text{-}economic\ Status_i + \alpha_6 Disability_i)$$

where:

- Y_i is the dichotomous outcome variable of school attendance for school-age child i, in which 1 indicates they are currently in school, and 0 otherwise;
- Age_i is age, entered in linear and quadratic forms as a control variable;
- $Male_i$ is a dummy variable for sex, equaling 1 for boys, and 0 otherwise;
- $Rural_i$ is a dummy variable for residential location, equaling 1 for rural residents, and 0 otherwise; and
- $Disability_i$ is a dummy variable indicating disability status, equaling 1 for children considered disabled under the study definition, and 0 otherwise.

Individuals' socio-economic status was represented by continuous household wealth indexes, or annual household expenditure/income per household capita. Often, these aggregate measures were already computed, as with Demographic and Health (DHS) and Living Standard Measurement Surveys (LSMS); if not, they were derived from the survey microdata. For the Indonesia Census 2010, which did not provide either aggregate or itemized expenditure/income, a single "household score", intended to be reflective of household socio-economic status, was calculated, which equally weighted information on house size, scaled by construction material, and household access to facilities.[15] The socio-economic variables were standardized (subtracted by the variable sample mean and divided by the variable sample standard deviation) before being entered into the logistic model, for cross-national comparability.

After estimation of the parameters in (1), the *marginal effect (ME)* of disability on school attendance

(2) $$ME^{disability} = \Pr(Y_i = 1 | Disability_i = 1) - \Pr(Y_i = 1 | Disability_i = 0)$$

was evaluated holding the other independent variables at their sample means, and for males and females separately.

[15] The quality of the constructed "household score" was tested by estimating (1) using the household score, and comparing the outcome to those estimated when categorical and dummy variables for each individual housing characteristic were included in lieu of a single SES variable. The results were similar, showing those obtained using the "household score" to be robust.

To further examine whether the disabled OOSC rate varies depending on the other individual characteristics previously included in (1), a second logistic model was estimated for attendance that included interaction terms of these variables with disability:

(3) $\Pr(Y_i = 1) = \text{logit}^{-1}[\beta^0 + \beta_1 Age_i + \beta_2 Age_i^2 + \beta_3 Male_i + \beta_5 Rural_i + \beta_5 Socio\text{-}economic\ Status_i + \beta_6 Disability_i + \beta_7(Disability_i \times Male_i) + \beta_8(Disability_i \times Rural_i) + \beta_9(Disability_i \times Socio\text{-}economic\ Quintile_i)]$

The statistical significance of the sums of coefficients $(\beta_3 + \beta_1)$, $(\beta_4 + \beta_8)$, and $(\beta_5 + \beta_9)$ were T-tested to determine whether the probability of disabled attendance differs by sex, residential location, and socio-economic status respectively.

However, the logistic model (1) does not account for unobserved variables which also influence the probability of attendance (e.g., parental education), nor endogeneity (e.g., parental neglect of general investment in their children) that simultaneously affects the probability of being disabled and attending school. To control for all household-level characteristics, a household fixed-effects model was introduced that compares the educational outcomes for disabled and non-disabled children living in the same household, allowing the marginal effect of disability to be estimated directly (Filmer, 2008). This entailed estimating a linear probability regression on only the subsample of school-age children living in households with at least one disabled and one non-disabled child, in which the urban/rural residency and socio-economic status variables in (1) were replaced with dummies for household membership in all but one household within the fixed-effects subsample:

(4) $$Y_i = \gamma_0 + \gamma_1 Age_i + \gamma_2 Age_i^2 + \gamma_3 Male_i + \gamma_4 Disability_i + \delta\{household\ dummies\}$$

and for which $ME_{disability}$ is simply γ_4.

Fixed-effects subsamples with enough disabled children were additionally ranked and divided into quartiles by household socio-economic status (requiring, as before, a minimum of $n_{disabled} \geq 50$ in each quartile), and the fixed-effects equation (4) estimated for children in each quartile. This quantile regression permits the marginal effect of disability to be compared across increasing socio-economic status.

To conclude, the disability gap in attendance is decomposed using the non-linear Blinder-Oaxaca decomposition suggested by Fairlie (1998, 2005) to investigate what proportion of the disability gap in attendance rates is explained by differences in the observed characteristics of disabled and non-disabled children. Writing the logistic equation for attendance as $Y = F(X\hat{\beta})$, where F is the cumulative distribution function of the logistic distribution, the decomposition of the difference in attendance between non-disabled and disabled children is given by:

(5) $$\bar{Y}^{ND} - \bar{Y}^{D} = \left[\sum_{i=1}^{N^{ND}} \frac{F(X_i^{ND}\hat{\beta}^{ND})}{N^{ND}} - \sum_{i=1}^{N^{D}} \frac{F(X_i^{D}\hat{\beta}^{ND})}{N^{D}}\right] + \left[\sum_{i=1}^{N^{D}} \frac{F(X_i^{D}\hat{\beta}^{ND})}{N^{D}} - \sum_{i=1}^{N^{D}} \frac{F(X_i^{D}\hat{\beta}^{D})}{N^{D}}\right]$$

where:

$\hat{\beta}^{ND}$ and $\hat{\beta}^{D}$ are the estimated coefficients from the logistic regressions for attendance among non-disabled (ND) and disabled (D) children, and

X_i^{ND} and X_i^{D} represent observed characteristics in each group.

The first component in (5) is the 'explained' portion of the disability gap in attendance, arising from differences in the group distributions of X_i. The second component is the 'unexplained' portion of the disability gap, which reflects differences in the distributions of the independent variables, or in the returns to the independent variables arising from structural or systemic factors.

3. RESULTS

3.1 Disability Prevalence

Disability prevalence is generally low across across countries; disability prevalence in primary-age children (Table 2, column 1, page 17) did not exceed 1.5% in 13 of 18 surveys, although it is considerably higher in the outlier countries (e.g., 2.9% in Uganda (2011) 3.3% and 4.5% in South Africa for 2011 and 2013 respectively, and 5.0% in Maldives). Similarly, disability prevalence rates in secondary-age children (Table 2, column 2) is capped at 2.0% in 15 of 17 surveys, except in Uganda and the Maldives again. The disability prevalence rates in primary- and secondary-age children combined (Table 2, column 3) are approximately one-third to one-half of the disability prevalence rates estimated for the general population aged five and above (Table 2, columns 4 and 5). The average disability prevalence, which is calculated as the simple mean for all the countries listed, computed for the overall population aged five and above, is approximately twice the prevalence rate of the combined school-age population. As noted previously, the WGSS of questions was developed for adults and may not be capable of identifying children with learning or mental health related disabilities, leading to probable underestimation of the overall prevalence of child disability.

A WHO and World Bank report (2011) previously estimated a much higher world prevalence of moderate and severe disability at 5.1% in children aged 0-14 years, based on data from the Global Burden of Disease Study: 2004 update (GBD,2004). The Global Burden of Disease (2004) conceptualization of health state extends to a number of additional domains such as pain and discomfort, anxiety and depression, cognition and social participation (Mathers, Lopez, and Murray, 2006) which lie outside the scope of the WGSS. Furthermore, the GBD calculations for disability prevalence are unusually derived from estimations of injury and disease prevalence, each of which is associated with an estimated distribution of disability severity. Consequently, the GBD estimates of disability prevalence are associated with three sources of major uncertainty. First, its figures for injury and disease prevalence are necessarily drawn from data sources of widely varying coverage and quality, especially in developing countries and regions. Second, the disability prevalence associated with individual injuries and diseases cannot be simply aggregated, but must be adjusted to account for comorbidity (i.e., double-counting of individuals with two related disabling conditions occurring simultaneously), for which data is also limited. Third, the disability severity assessment of the injuries and diseases included in the GBD are far from conclusive (WHO, 2008; WHO and World Bank, 2011). All the above factors suggest that the discrepancy between disability prevalence in children estimated by the current study and GBD can be attributed to differences in the definition of disability and methodology (see Table 3 page 18).

Table 2 – ***Disability Prevalence by Age Group***

Country	Primary-Age Children (1)	Secondary-Age Children (2)	Primary- and Secondary-Age Children Combined (3)	Overall Population Aged 5+ (4)	Ratio of Disability Prevalence in Overall Population to that in School Age Children (5) = (4) / (3)
Indonesia	0.3% (0.00%)	0.3% (0.00%)	0.3% (0.00%)	0.8% (0.00%)	2.7
Papua New Guinea	0.8% (0.15%)	1.5% (0.27%)	1.0% (0.14%)	6.3% (0.17%)	6.3
Vietnam	0.8% (0.16%)	1.0% (0.12%)	0.9% (0.10%)	3.6% (0.10%)	4.0
Albania	0.8% (0.14%)	0.8% (0.23%)	0.8% (0.12%)	1.8% (0.09%)	2.3
Saint Lucia[a]	1.0%	data unavailable for analysis		3.9%	/
West Bank and Gaza	1.5% (0.08%)	2.0% (0.21%)	1.6% (0.08%)	2.7% (0.06%)	1.7
Bangladesh	0.6% (0.09%)	0.6% (0.09%)	0.6% (0.06%)	1.6% (0.06%)	2.7
India[b]	0.4%b (0.03%)	0.4% (0.05%)	0.4%b (0.03%)	0.9%b (0.02%)	2.3
Maldives	5.0% (0.29%)	5.5% (0.32%)	5.2% (0.22%)	9.7% (0.15%)	1.9
Ethiopia, rural	0.9% (0.14%)	0.8% (0.22%)	0.9% (0.12%)	2.5% (0.12%)	2.8
Malawi	0.6% (0.06%)	0.4% (0.09%)	0.5% (0.05%)	1.1% (0.05%)	2.2
Nigeria	0.4% (0.09%)	0.4% (0.10%)	0.4% (0.07%)	1.2% (0.07%)	3.0
South Africa (2013)	3.3% (0.16%)	1.1% (0.11%)	2.4% (0.10%)	3.5% (0.06%)	1.5
South Africa (2011)	4.5% (0.03%)	1.8% (0.02%)	3.3% (0.02%)	4.4% (0.01%)	1.3
Tanzania (2010-11)	0.8% (0.14%)	1.0% (0.18%)	0.9% (0.11%)	2.6% (0.12%)	2.9
Tanzania (2008)	1.1% (0.13%)	1.2% (0.16%)	1.1% (0.10%)	2.2% (0.09%)	2.0
Uganda (2011)	2.9% (0.16%)	2.4% (0.19%)	2.7% (0.12%)	4.9% (0.11%)	1.8
Uganda(2010-11)	1.3% (0.19%)	1.3% (0.23%)	1.3% (0.15%)	2.6% (0.14%)	2.0
Mean	**1.4%**	**1.3%**	**1.4%**	**3.1%**	**2.6**

Notes: Estimated standard errors of proportions in parentheses. [a]Standard errors were not estimated for disability prevalence in Saint Lucia as microdata is unavailable and results were obtained through the online REDATAM analysis portal. [b]In the India Human Development Survey 2005, disability data was collected for individuals aged 7 and above only; the lower bound of the overall, primary-age, and combined school-age populations are constrained accordingly.
Source: authors' analysis based on data described in the text.

Table 3 – ***Comparison of Disability Prevalence Estimates***

This Study	2011 World Report on Disability
Mean disability prevalence	
1.4% (Based on 2005-2013 data, prevalence in primary- and secondary-age children combined)	5.1% World 6.4% Africa 4.5% Americas 5.2% South-East Asia 5.3%, Western Pacific (Based on 2004 data, prevalence in all children aged 0-14 years)
Conceptual definition of disability	
Loss of functioning in one or more of at least 5 of 6 physical and mental domains (seeing, hearing, walking, remembering/concentrating, self-care, communication).	Loss of functioning in 7 health and mental health domains (mobility, self-care, participation in usual activities, pain and discomfort, anxiety and depression cognition, and social participation).
Methodology for estimating disability prevalence	
Direct estimation of disability prevalence by measuring disability severity in each domain on a spectrum of severity of 3 or 4 levels.	Indirect estimation of disability prevalence derived from the estimated prevalence of 632 diseases and injuries, combined with an estimated disability severity distribution for each one.
Disability threshold	
Disability cut-off is a positive response in either the top (if only 3 severity levels are available in total) or one of the upper two severity categories (if 4 severity levels are available).	Moderate and severe disability defined as equivalent or exceeding the average disability severity of class III diseases and injuries (e.g., angina, arthritis, low vision, or alcohol dependence). Low vision and arthritis considered broadly comparable to experiencing "lots of difficulty" with seeing and mobility as measured by the WGSS of questions.

Cross-nationally, neither primary nor secondary-age children exhibit a high incidence of difficulty in any particular domain (Table 4). Variation in disability prevalence across functioning areas is usually half a per cent or less (Table 4, column 'Range', page 20) in 12 of 14 countries for primary and secondary-age children. Substantial differences are seen only in the Maldives, where difficulties in seeing (2.1% [primary]/2.6% [secondary]) and remembering/concentrating (2.0% [primary]/1.9% [secondary]) are around two times as prevalent as difficulty in communicating, while over 2% of primary-age children in South Africa report severe or worse difficulty in self-care compared to less than 1.0% in other domains.

In contrast, disability in vision and mobility is far more frequently reported by the population aged 5 and above (Table 5 page 21), with the prevalence rates in these two domains being reported highest or second-highest across a large number of countries. As an example, in Papua New Guinea, difficulties with vision and walking are reported as 2.2% and 3.5% of the general population, compared to a disability prevalence of 0.5% to 1.3% in hearing, cognition, and self-care.

Finally, before moving onto the analysis of out-of-school children, it should be noted that if the WGSS is likely to underestimate disability prevalence among children due to hidden and mild disability (UNESCO 2009), this will lead to underestimates of the gap in schooling attendance as children who are not identified as having a disability but actually have one (e.g. learning disability) may be disproportionately out of school.

3.2 Disability and Out-of-school Children

3.2.1 Disability Gap in Attendance for Primary and Secondary Age Children

Net overall attendance rates in primary and secondary education, i.e. the share of all children of official primary and secondary school-age currently attending school, is equivalent to 100% minus the combined overall OOSC rate (Table 6, column 1, page 22); these vary widely across the 17 sampled surveys (14 countries).[16] Combined overall attendance rates tend to increase linearly with country Gross National Income (GNI) per capita,[17] from as low as 62.6% (rural Ethiopia, GNI per capita $405), to a middling 81.4% (Nigeria, GNI per capita $2,585), and reaching as high as 96.1% (Maldives, GNI per capita $5,050).

Regardless, the disabled OOSC rate is always statistically significantly greater than that of non-disabled school-age children, with difference ranging from 3.1% (South Africa [2011], GNI per capita $7,050) to 55.1% (Albania, GNI per capita $4,370). The average gap in attendance is 30.2% (Table 6, column 4). The results clearly show that disabled children consistently encounter significantly more barriers to educational participation relative to their non-disabled counterparts. As the disability gap in middle income countries such as Indonesia and Vietnam are high (i.e., 49.2% and 44.1%, respectively), this disability gap in OOSC rates seems to follow an inverse quadratic relationship with GNI per capita, analogous to a Kuznets curve (inverted U): as GNI per capita increases, more non-disabled children are able to attend school, while disabled children lag in catching up. It is also observed that there is a wide disparity in the OOSC rate between children with and without disabilities among lower income countries. For example, the gap in OOSC proportion for disabled and non-disabled children in primary and secondary schools combined ranges from as low as 9.8% in Uganda (2011) to as high as 47% in Bangladesh (2010). Although it would go beyond the scope of this study, it is worth investigating the causes for attainment of higher enrolment of children with disabilities in some lower income countries.

On the other hand, the ratio of disabled to non-disabled OOSC rates does not vary substantially with country's GNI per capita (Table 6, column 5). This indicates that countries which are able to allocate more resources towards the restructuring of their educational system to reduce the overall OOSC rate see no progressive improvement in the situation of disabled children.

[16] The table does not include Saint Lucia due to unavailability of data.

[17] All instances of GNI per capita are quoted for the country in the survey year; GNI per capita for countries in which survey fieldwork was conducted over multiple years is the averaged value.

Table 4 – ***Disability Prevalence in Primary and Secondary-Age Populations by Domain***

Country	Primary-Age Children							Secondary-Age Children						
	Seeing	Hear.	Walk.	Rem.	Self.	Com.	Range	Seeing	Hear.	Walk.	Rem.	Self.	Com.	Range
East Asia and the Pacific														
Indonesia	0.0%	0.1%	0.1%	**0.2%**	**0.2%**	/	*0.2%*	0.0%	0.1%	0.1%	**0.2%**	0.1%	/	*0.2%*
Papua New Guinea	0.1%	**0.4%**	0.2%	0.1%	0.2%	/	*0.4%*	0.4%	0.5%	**0.7%**	**0.7%**	0.3%	/	*0.4%*
Viet Nam	0.1%	0.1%	0.2%	**0.3%**	**0.3%**	**0.3%**	*0.2%*	0.2%	0.2%	0.3%	0.5%	0.3%	0.4%	*0.3%*
Europe and Central Asia														
Albania	**0.4%**	0.1%	0.2%	0.2%	/	0.3%	*0.3%*	0.0%	0.1%	**0.8%**	0.2%	/	0.1%	*0.7%*
Middle East and North Africa														
West Bank and Gaza	0.3%	0.2%	0.5%	0.6%	0.3%	**0.6%**	*0.3%*	0.4%	0.4%	0.5%	**0.7%**	0.6%	**0.7%**	*0.3%*
South Asia														
Bangladesh	0.2%	0.2%	**0.3%**	0.2%	0.2%	**0.3%**	*0.1%*	0.1%	0.2%	**0.3%**	0.2%	0.1%	**0.3%**	*0.2%*
India	0.1% (far)	**0.2%**	**0.2%**	/	**0.2%** (dress)	**0.2%**	*0.1%*	0.2% (far)	0.2%	0.2%	/	0.2% (dress)	**0.3%**	*0.1%*
	0.1% (near)				**0.2%** (toilet)			0.2% (near)				0.2% (toilet)		
Maldives	**2.1%**	0.7%	0.8%	2.0%	0.7%	1.1%	*1.4%*	**2.6%**	0.8%	0.5%	1.9%	0.4%	1.1%	*2.2%*
Sub-Saharan Africa														
Ethiopia, rural	**0.3%**	0.2%	**0.3%**	0.2%	0.2%	0.2%	*0.1%*	0.2%	0.3%	**0.5%**	0.4%	0.1%	0.1%	*0.4%*
Malawi	0.1%	**0.2%**	**0.2%**	0.1%	**0.2%**	0.1%	*0.1%*	0.0%	**0.3%**	0.1%	0.1%	0.1%	0.1%	*0.3%*
Nigeria	0.0%	0.0%	0.1%	0.1%	**0.2%**	0.1%	*0.2%*	**0.1%**	0.0%	**0.1%**	**0.1%**	**0.1%**	**0.1%**	*0.1%*
South Africa (2013)	0.3%	0.2%	0.4%	0.8%	**2.2%**	0.4%	*2.0%*	0.4%	0.1%	0.3%	**0.5%**	0.4%	0.3%	*0.4%*
South Africa (2011)	0.6%	0.4%	0.4%	0.9%	3.2%	0.6%	*2.8%*	0.6%	0.4%	0.3%	0.4%	0.5%	0.3%	*0.3%*
Tanzania (2010-11)	0.2%	**0.3%**	0.1%	0.1%	0.2%	0.1%	*0.2%*	0.1%	0.4%	0.1%	0.3%	0.1%	0.2%	0.3%
Tanzania (2008)	0.1%	0.2%	0.3%	**0.5%**	0.3%	**0.5%**	*0.4%*	0.1%	0.3%	**0.5%**	**0.5%**	0.2%	0.2%	*0.4%*
Uganda (2011)	0.4%	0.8%	0.4%	**1.0%**	0.8%	0.4%	*0.6%*	0.6%	0.6%	0.6%	**0.9%**	0.5%	0.3%	*0.6%*
Uganda (2010-11)	0.2%	**0.5%**	0.3%	**0.5%**	0.3%	**0.5%**	*0.3%*	0.0%	0.4%	**0.5%**	**0.5%**	0.2%	**0.5%**	*0.5%*

Notes: Range is the range of prevalence rates across domains. Bold prevalence rates indicate the most commonly-impaired domains respectively in each country and age group. The WGSS terms are Seeing, Hearing, Walking or climbing steps, Remembering and concentrating, Self-care, Communicating.
Source: authors' analysis based on data described in the text.

Table 5 – ***Disability Prevalence in Combined School-Age and Overall Populations by Domain***

Country	Primary- and Secondary-Age Children							Overall Population Aged 5+						
	Seeing	Hear.	Walk.	Rem.	Self.	Com.	Range	Seeing	Hear.	Walk.	Rem.	Self.	Com.	Range
East Asia and the Pacific														
Indonesia	0.0%	0.1%	0.1%	**0.2%**	**0.2%**	/	*0.2%*	0.2%	0.2%	**0.3%**	**0.3%**	**0.3%**	/	*0.1%*
Papua New Guinea	0.2%	**0.4%**	0.3%	0.3%	0.2%	/	*0.2%*	2.2%	1.3%	**3.5%**	1.2%	0.5%	/	*3.0%*
Viet Nam	0.1%	0.2%	**0.5%**	0.3%	0.3%	0.4%	*0.4%*	1.4%	0.7%	**1.8%**	1.2%	0.9%	1.0%	*1.1%*
Europe and Central Asia														
Albania	0.3%	0.1%	0.4%	0.2%	/	0.3%	*0.3%*	0.5%	0.4%	**1.0%**	0.6%	/	0.4%	*0.6%*
Latin America and the Caribbean														
Saint Lucia	/	/	/	/	/	/	/	1.6%	0.5%	**2.1%**	1.0%	0.9%	0.7%	*1.6%*
Middle East and North Africa														
West Bank and Gaza	0.3%	0.3%	0.5%	**0.6%**	0.4%	**0.6%**	*0.3%*	0.7%	0.4%	**1.3%**	0.7%	0.6%	0.6%	*0.7%*
South Asia														
Bangladesh	0.1%	0.2%	**0.3%**	0.2%	0.2%	**0.3%**	*0.2%*	**0.7%**	0.4%	0.6%	0.3%	0.4%	0.3%	*0.4%*
India	**0.2%** (far)	**0.2%**	**0.2%**	/	**0.2%** (dress)	**0.2%**	*0.0%*	**0.4%** (far)	0.3%	**0.4%**	/	0.3% (dress)	0.3%	*0.1%*
	0.2% (near)				**0.2%** (toilet)			0.3% (near)				0.3% (toilet)		
Maldives	**2.1%**	0.7%	0.8%	2.0%	0.7%	1.1%	*1.4%*	**2.6%**	0.8%	0.5%	1.9%	0.4%	1.1%	*2.2%*
Sub-Saharan Africa														
Ethiopia, rural	**0.3%**	0.2%	**0.3%**	0.2%	0.2%	0.2%	*0.1%*	**1.3%**	0.6%	0.8%	0.5%	0.4%	0.2%	*3.7%*
Malawi	0.1%	**0.2%**	**0.2%**	0.1%	**0.2%**	0.1%	*0.1%*	0.4%	0.3%	**0.5%**	0.1%	0.1%	0.1%	*0.4%*
Nigeria	0.1%	0.0%	0.1%	**0.2%**	0.1%	0.1%	*0.2%*	0.3%	0.1%	**0.6%**	0.2%	0.3%	0.2%	*0.5%*
South Africa (2013)	0.3%	0.2%	0.4%	0.7%	**1.5%**	0.4%	*1.3%*	1.0%	0.4%	1.0%	0.8%	**1.3%**	0.3%	*1.0%*
South Africa (2011)	0.6%	0.4%	0.3%	0.7%	**2.0%**	0.5%	*1.7%*	1.7%	0.7%	1.0%	1.0%	**1.4%**	0.4%	*1.0%*
Tanzania (2010-11)	0.1%	**0.3%**	0.1%	0.2%	0.1%	0.1%	*0.2%*	**1.1%**	0.5%	1.0%	0.5%	0.5%	0.2%	*0.9%*
Tanzania (2008)	0.1%	0.2%	0.4%	**0.5%**	0.3%	0.4%	*0.4%*	0.5%	0.4%	**1.0%**	0.6%	0.4%	0.4%	*0.6%*
Uganda (2011)	0.5%	0.7%	0.5%	**1.0%**	0.4%	0.6%	*0.6%*	1.7%	1.0%	**1.8%**	1.4%	0.8%	0.5%	*1.3%*
Uganda (2010-11)	0.1%	0.4%	0.4%	**0.5%**	0.3%	**0.5%**	*0.4%*	0.8%	0.5%	**1.2%**	0.5%	0.4%	0.4%	*0.8%*

Notes: Range is the range of prevalence rates across domains. Bold prevalence rates indicate the most commonly-impaired domains respectively in each country and age group. The WGSS terms are Seeing, Hearing, Walking or climbing steps, Remembering and concentrating, Self-care, Communicating. Disability prevalence was not computed for school-age children in Saint Lucia due to data unavailability.
Source: authors' analysis based on data described in the text.

Table 6 – ***Combined Primary- and Secondary-Age OOSC by Disability Status***

Country	Size of Primary-Aged Sample *(disabled persons)*	Proportion of OOSC			Difference in OOSC Proportions by Disability Status (4) = (3) – (2)	Ratio of OOSC Proportions by Disability Status (5) = (3) / (2)
		Overall (1)	*Non-Disabled (2)*	*Disabled (3)*		
East Asia and the Pacific						
Indonesia	5,311,306 *(15,493)*	17.5% *(0.02%)*	17.3% *(0.02%)*	66.5% *(0.38%)*	49.2%*** *(0.38%)*	3.8
Papua New Guinea	5,533 *(66)*	36.8% *(0.65%)*	36.5% *(0.65%)*	67.9% *(6.23%)*	31.5%*** *(6.26%)*	1.9
Viet Nam	9,882 *(91)*	14.5% *(0.36%)*	14.1% *(0.36%)*	58.1% *(5.23%)*	44.1%*** *(5.24%)*	4.1
Europe and Central Asia						
Albania	4,85 *(34)*	12.3% *(0.44%)*	11.8% *(0.44%)*	67.0% *(7.21%)*	55.1%*** *(7.22%)*	5.7
Europe and Central Asia						
West Bank and Gaza	27,165 *(431)*	4.9% *(0.13%)*	4.4% *(0.13%)*	35.8% *(2.33%)*	31.5%*** *(2.33%)*	8.1
South Asia						
Bangladesh	15,772 *(102)*	22.0% *(0.33%)*	21.7% *(0.33%)*	68.9% *(4.79%)*	47.2%*** *(4.80%)*	3.2
India	52,199 *(217)*	21.5% *(0.18%)*	21.4% *(0.18%)*	51.7% *(3.52%)*	30.4%*** *(3.52%)*	2.4
Maldives	10,932 *(562)*	3.9% *(0.19%)*	3.4% *(0.18%)*	12.3% *(1.41%)*	8.9%*** *(1.42%)*	3.6
Sub-Saharan Africa						
Ethiopia, rural	6,292 *(53)*	37.8% *(0.60%)*	37.5% *(0.60%)*	72.8% *(5.93%)*	35.3%*** *(0.96%)*	1.9
Malawi	18,542 *(100)*	15.6% *(0.27%)*	15.4% *(0.27%)*	49.1% *(5.02%)*	33.7%*** *(5.03%)*	3.2
Nigeria	8,657 *(32)*	18.6% *(0.43%)*	18.5% *(0.43%)*	50.0% *(9.45%)*	31.5%*** *(9.46%)*	2.7
South Africa (2013)	21,753 *(574)*	4.5% *(0.14%)*	4.3% *(0.14%)*	12.1%(*(1.47%)*	7.8%*** *(1.48%)*	2.8
South Africa (2011)	875,679 *(29,004)*	7.2% *(0.03%)*	7.1% *(0.03%)*	10.1% *(0.18%)*	3.1%*** *(0.18%)*	1.4
Tanzania (2010-11)	6,713 *(51)*	29.5% *(0.55%)*	29.2% *(0.55%)*	58.0% *(6.54%)*	28.8%*** *(6.56%)*	2.0
Tanzania (2008)	11,466 *(130)*	28.3% *(0.43%)*	27.9% *(0.43%)*	69.5% *(4.10%)*	41.6%*** *(4.12%)*	2.5
Uganda (2011)	16,685 *(421)*	14.3% *(0.27%)*	14.0% *(0.27%)*	23.8% *(2.01%)*	9.8%*** *(2.02%)*	1.7
Uganda (2010-11)	5,963 *(77)*	16.6% *(0.49%)*	16.3%(*(0.49%)*	40.8% *(5.68%)*	24.5%*** *(5.70%)*	2.5
Mean		**18.0%**	**17.7%**	**47.9%**	**30.2%**	**2.7**

*** $p < 0.01$, ** $p < 0.05$.

Notes: Estimated standard errors of proportions and differences between proportions in parentheses.

Source: authors' analysis based on data described in the text.

3.2.2 Disability Gap for Primary School Age Population

Overall attendance in primary education (Table 7, column 1, page 24) also rises linearly with GNI per capita and is moderately higher (mean 88.0%) than overall attendance in primary and secondary education combined (mean 82.0%). Again, the size of the disability gap in OOSC rates follows an inverted U-shape curve-like relationship with the country income, such that the difference between disabled and non-disabled OOSC rates rises with country income before it falls.

Some countries, especially at the richer end of the GNI per capita distribution, have remarkably attained very low non-disabled primary OOSC rates (South Africa, 0.5% [2013]; the Maldives, 0.9%; Saint Lucia, 1.7%; West Bank and Gaza, 2.0% and Indonesia, 5.0%) (Table 7, column 2).[18] However, the ratios of disabled to non-disabled primary OOSC rates become very large (South Africa, 13.8 [2013]; Maldives, 11.1; Saint Lucia, 15.1, West Bank and Gaza, 16.0; Indonesia, 10.9) (Table 7, column 5). This indicates that while the OOSC rate has plummeted as a result of overhauling education policies to improve primary attendance, and increased investment in the primary education sector, the resulting benefits are disproportionately enjoyed by non-disabled children. In other words, educational inequalities due to disability are structural failures that will stubbornly persist unless targeted by specific policy intervention.

3.2.3 Secondary School Age Population

Net overall attendance rates (i.e., 1-OOSC rate) in secondary education (Table 8, column 1, page 25) is lower (mean 74.0%) than primary and combined school-age attendance rates, from just over 50% in Tanzania (2010-11) to 93.4% in the Maldives. Moreover, the proportion of disabled secondary-age OOSC (Table 8, column 3) is approximately 56% which is also invariably higher than the proportion of primary-age disabled OOSC (Table 8, column 3). The disability gap in secondary-age OOSC rates (Table 8, column 4) ranges from 8.4% (Maldives) to 51.0% (Ethiopia, rural). Unlike in primary education, the disability gap in secondary OOSC rates does not follow an inverted-U shape curve style relationship with GNI per capita, since non-disabled children in many developing countries also have a higher chance of dropping out of school before or during secondary education. Similarly, the ratio of disabled to non-disabled OOSC rates exhibits a marginal increase with GNI per capita and the relation fails to capture the inverted U-shape curve plot.

The comparison of the out-of-school ratio of children with and without disabilities in primary and secondary education hints at certain policy implications. The ratio of OOSC proportions by disability status (Table 7, Table 8, column 5) for primary education is on average higher than that of secondary, and the inverted U-shape curve is only observed for primary education. This is primarily due to the fact that some countries such as Saint Lucia, Maldives, South Africa, and Indonesia achieved universal education at the primary level, whereas the enrolment in secondary education has not yet been universalized in most of the countries. High levels of attendance at primary education inflates the out-of-school ratio between children with and without disability.

[18] Countries are listed in decreasing order of GNI per capita ranging from $ 2500 to $ 7,410.

Table 7 – *Primary-Age OOSC by Disability Status*

Country	Size of Primary-Aged Sample *(disabled persons)*	Proportion of OOSC			Difference in OOSC Proportions by Disability Status (4) = (3) – (2)	Ratio of OOSC Proportions by Disability Status (5) = (3) / (2)
		Overall (1)	*Non-Disabled (2)*	*Disabled (3)*		
East Asia and the Pacific						
Indonesia	2,764,413(*(8,314)*	5.1% *(0.01%)*	5.0% *(0.01%)*	54.1% *(0.55%)*	49.2%*** *(9.38%)*	10.9
Papua New Guinea	3,527) *(33)*	33.7% *(0.79%)*	33.6% *(0.79%)*	51.6% *(9.47%)*	18.0%*(*(9.51%)*	1.5
Viet Nam	3,146 *(25)*	4.5% *(0.37%)*	4.3% *(0.37%)*	29.2% *(9.38%)*	25.0%** *(9.38%)*	6.8
Europe and Central Asia						
Albania	3,305 *(24)*	10.6% *(0.49%)*	10.1% *(0.48%)*	72.4% *(8.18%)*	62.3%*** *(8.19%)*	7.2
Latin America and the Caribbean						
Saint Lucia[a]	13,253 *(128)*	1.9%[a]	1.7%[a]	25.6%[a]	23.9%[a]	15.1[a]
Middle East and North Africa						
West Bank and Gaza	22,476 *(337)*	2.5% *(0.10%)*	2.0% *(0.09%)*	32.0% *(2.55%)*	30.0% *(2.55%)*	16.0
South Asia						
Bangladesh	7,413 *(43)*	15.2% *(0.42%)*	14.9% *(0.41%)*	63.1% *(7.39%)*	48.1%*** *7.40%)*	4.2
India	33,515 *(138)*	11.8% *(0.17%)*	11.6% *(0.17%)*	45.1% *(4.58%)*	33.5%*** *(4.58%)*	3.9
Maldives	5,786 *(291)*	1.3% *(0.15%)*	0.9% *(0.13%)*	10.0% *(1.82%)*	9.2%*** *(1.83%)*	11.1
Sub-Saharan Africa						
Ethiopia, rural	4,611 *(36)*	34.4% *(0.69%)*	34.1% *(0.69%)*	64.4% *(7.39%)*	30.3%*** *(7.42%)*	1.9
Malawi	13,542(80) *(80)*	13.4% *(0.29%)*	13.2% *(0.29 %)*	44.0% *(5.63%)*	30.8%*** *(5.63%)*	3.3
Nigeria	4,818 *(19)*	18.8% *(0.58%)*	18.6% *(0.58%)*	69.1% *(12.07%)*	50.4%*** *(12.09%)*	3.7
South Africa (2013)	12,679 *(454)*	0.7% *(0.08%)*	0.5% *(0.08%)*	6.9% *(1.28%)*	6.4%*** *(1.28%)*	13.8
South Africa (2011)	497,142 *(22,305)*	3.4% *(0.03%)*	3.2% *(0.03%)*	7.0% *(0.17%)*	3.7%*** *(0.18%)*	2.2
Tanzania (2010-11)	3,704 *(23)*	14.0%(*(0.56%)*	13.7% *(0.56%)*	56.6% *(9.30%)*	42.9%*** *(9.32%)*	4.1
Tanzania (2008)	6,712 *(79)*	19.3% *(0.49%)*	18.8% *(0.49%)*	58.4% *(5.86%)*	39.6%*** *5.88%)*	3.1
Uganda (2011)	10,376 *(271)*	10.5% *(0.30%)*	10.3% *(0.30%)*	17.8% *(2.21%)*	7.5%*** *(2.23 %)*	1.7
Uganda (2010-11)	3,410 *(36)*	14.0% *(0.60%)*	13.7% *(0.60%)*	39.7% *(7.57%)*	25.9%*** *(7.59 %)*	2.9
Mean		**12.0%**	**11.7%**	**41.5%**	**29.8%**	**3.5**

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

Notes: Estimated standard errors of proportions and differences between proportions in parentheses.

[a]Standard errors and statistical significance not estimated for OOSC proportions and differences between proportions in Saint Lucia as actual microdata are unavailable and results were obtained through the online REDATAM analysis portal.

Source: authors' analysis based on data described in the text.

Table 8 – Secondary-Age OOSC by Disability Status

Country	Size of Primary-Aged Sample *(disabled persons)*	Proportion of OOSC			Difference in OOSC Proportions by Disability Status (4) = (3) – (2)	Ratio of OOSC Proportions by Disability Status (5) = (3) / (2)
		Overall (1)	*Non-Disabled (2)*	*Disabled (3)*		
East Asia and the Pacific						
Indonesia	2,546,893 *(7,179)*	30.9% *(0.03%)*	30.8% *(0.03%)*	80.9% *(0.46%)*	50.1%*** *(0.47%)*	2.6
Papua New Guinea	2,006 *(33)*	42.5% *(1.13%)*	41.8% *(1.13%)*	84.5%(*(6.92%)*	42.6%*** *(7.01%)*	2.0
Viet Nam	6,736 *(66)*	19.1% *(0.48%)*	18.6% *(0.48%)*	68.9% *(5.76%)*	50.3%*** *(5.78%)*	3.6
Europe and Central Asia						
Albania	1,551 *(10)*	16.5% *(0.95%)*	16.2% *(0.95%)*	53.6% *(14.6%)*	37.5%** *(14.6%)*	3.3
Middle East and North Africa						
West Bank and Gaza	4,689 *(94)*	17.6% *0.58%)*	16.9% *(0.58%)*	50.6% *(5.36%)*	33.7% *(5.39%)*	3.0
South Asia						
Bangladesh	8,359 *(59)*	28.2% *(0.50%)*	27.9% *(0.50%)*	74.0% *(6.22%)*	46.1%*** *(6.24%)*	2.7
India	18,684 *(79)*	39.3% *(0.36%)*	39.2% *(0.36%)*	61.2% *(5.37%)*	22.0%*** *(5.38%)*	1.6
Maldives	5,161 *(272)*	6.6% *(0.35%)*	6.2% *(0.35%)*	14.6% *(2.16%)*	8.4%*** *(2.18%)*	2.4
Sub-Saharan Africa						
Ethiopia, rural	1,681 *(17)*	47.5% *(1.21%)*	47.0% *(1.21%)*	98.0% *(3.82%)*	51.0%*** *(4.00%)*	2.1
Malawi	5,000 *(20)*	21.8% *(0.59%)*	21.6% *(0.59%)*	68.0% *(10.39%)*	46.5%*** *(10.41%)*	3.1
Nigeria	3,839 *(13)*	18.4% *(0.64%)*	18.3% *(0.64%)*	27.6% *(12.73%)*	9.3% *(12.74%)*	1.5
South Africa (2013)	9,074 *(120)*	9.8% *(0.32%)*	9.5% *(0.32%)*	33.3% *(4.80%)*	23.8%*** *(4.81%)*	3.5
South Africa (2011)	378,537 *(6,699)*	12.1% *(0.05%)*	11.9% *(0.05%)*	20.7% *(0.50%)*	8.7%*** *(0.50%)*	1.7
Tanzania (2010-11)	3,009 *(28)*	49.7% *(0.92%)*	49.6% *(0.93%)*	59.3% *(9.35%)*	9.7% *(9.40%)*	1.2
Tanzania (2008)	4,754 *(51)*	41.5% *(0.73%)*	40.9% *(0.74%)*	84.0% *(4.99%)*	43.1%*** *(5.04%)*	2.1
Uganda (2011)	6,309 *(150)*	20.6% *(0.51%)*	20.2% *(0.51%)*	35.8% *(3.94%)*	15.6%*** *(3.98%)*	1.8
Uganda (2010-11)	2,553 *(41)*	20.1% *(0.80%)*	19.8% *(0.80%)*	42.4% *(8.72%)*	22.6%** *(8.76%)*	2.1
Mean		**26.0%**	**25.7%**	**56.3%**	**30.6%**	**2.4**

*** $p < 0.01$, ** $p < 0.05$.

Notes: Estimated standard errors of proportions and differences between proportions in parentheses.

Source: authors' analysis based on data described in the text.

As universalization of secondary education is not a priority in MDG or EFA, attendance in this sector has lagged, and hence the out-of-school ratio tends to be smaller in comparison to primary school education. It is expected that, in the post-2015 era, the universalization of secondary education would be facilitated, which would increase the out-of-school ratio between children with and without disabilities, as registered in primary education. The results in this paper also corroborate the fact that policy interventions to improve education systems across nations do not accommodate disabled children and thus specific international commitments for the provision of education for children with disabilities are imperative.

3.3 The Nature of Out of School – Never Attended School vs. Dropout

The barriers to education which cause children to drop out of school differ from those that preclude them from ever attending school. Hence, disaggregating the disabled OOSC rate by attendance history uncovers whether any pattern exists in the educational bottlenecks faced by disabled children. This breakdown was solely done for school-age groups with a sufficient number of disabled children ($n_{disabled} \geq 100$) in datasets and had collected additional information on their prior educational attendance.

The results overwhelmingly show primary-age disabled children struggle to merely obtain initial access to education: in seven of the eight surveys for which the disabled primary OOSC rate was disaggregated, more than 85% of disabled primary-age OOSC had never attended school (Table 9, column 4, page 28). Conversely, amongst older children a greater number of disabled OOSC are naturally dropouts, with only 32% to 68% of disabled secondary-age OOSC being never-attendees (Table 10, column 4, page 28). Nonetheless, across 10 of 18 surveys, 62% to 87% of the combined primary- and secondary-age disabled OOSC population in total has never attended school (Table 11, column 4, page 28). The results imply that there are possibly several "pull" factors, which draw disabled children away from attending schools. Presumably parents might believe that there are no perceived benefits to educating a disabled child and also sending disabled children to school might not be part of social norms in the community to which they belong. Additionally, parents might have safety and security concerns for their disabled children at and while travelling to school. A further investigation to identify such pull factors in terms of initial access to education would be worthwhile, to gain meaningful insights into the complexities of initial access to education for disabled children.

3.4 Econometric Analysis to Determine Marginal Effects of Disability

The objective of the econometric analysis is to ascertain the key factors which influence schooling for disabled children, as well as to determine the marginal effect of disability on attendance. A logistic regression for the probability of school attendance given age and age squared (control variables), sex, urban/rural residency, socio-economic status, and disability status was estimated for the combined primary- and secondary-age samples by country, in order to compute the marginal effect of disability. Disability is observed to be a powerful predictor of a child's school attendance as the coefficients of disability status are found to be universally statistically significant (Table 12, columns 1 to 3, page 29). Using these regression results, the marginal effect of disability

on the probability of attendance evaluated at the sample means of the other independent variables (Table 12, column 4) varied from -5.3% (South Africa) to -61.0% (Indonesia), with an average marginal effect of -32.8%. The marginal effects of disability for boys and girls were very similar to the marginal effects at means (Table 12, columns 5 and 6).

A second logistic model was subsequently estimated for attendance including interaction terms of the other explanatory variables with disability, to assess whether the marginal effect of disability varies according to sex, urban/rural residency, and socio-economic status. Apart from Indonesia, for which the very large sample size allows estimation of the logistic parameters with an extremely small standard error, there is otherwise no discernible pattern for any of the factors (Table 13, column 7 to 9, page 30) in creating a systematic influence on the probability of a disabled child attending school, and data must be analyzed on a country-by-country basis. In general, disabled children confront the same difficulties in participating in education, regardless of their individual and socio-economic characteristics.

The estimates of marginal effects of disability on attendance obtained from the first logistic model are also in fairly good agreement with those computed by using a linear probability regression for attendance with household-fixed effects (Table 14, column 1, page 31). This controls for both observed (urban/rural residency, socio-economic status), unobserved (e.g., parental education), and endogenous household variables that influence children's health and educational outcomes simultaneously. Similarly, the quantile regression of sufficiently large fixed-effects subsamples found the marginal effect of disability to be relatively constant across socio-economic quartiles, resulting in the quantile regression curves being generally fairly flat (Table 15, page 32 and Figure 1, page 34). It may be construed that the effect of SES on attendance for children with disability across countries seems to be marginal. The standard error bars overlap in all quartiles and reiterate that disabled children are equally likely to be out of school whether they are born into a poorer or richer household. As such, the issue of disabled OOSC cannot simply be resolved by conducting wealth transfers to the families of disabled children.

Finally, the non-linear Blinder-Oaxaca decomposition found the disability gap in attendance rates to be almost entirely unexplained by differences in the distributions of the observed characteristics of disabled and non-disabled children (Table 16, page 33), with the unexplained proportion exceeding 100% in several countries (Maldives, 103.5%; Malawi, 103.9%; Uganda [2011], 108.6%; Ethiopia [rural] 109.0%; South Africa [2011] 159.2% and South Africa [2013] 364.3%). The finding from the non-linear decomposition reflects the findings from regression analyses, as it hints that the bottlenecks seem to be created by the supply side rather than demand side.

Table 9 – ***Disabled Primary-Age OOSC Disaggregated by Attendance History, Selected Countries***

Country (disabled persons in primary-age sample)	Disabled OOSC Rate			
	Never Attended School (1)	Dropped Out from School (2)	Total (3) = (1) + (2)	Proportion of OOSC who never attended school (4) = (1) / (3)
Indonesia (8,314)	48.7%	5.4%	54.1%	0.90
India (138)	38.2%	6.9%	45.1%	0.85
Saint Lucia (129)	22.5%	3.1%	25.6%	0.88
West Bank and Gaza (337)	28.1%	3.9%	32.0%	0.88
Maldives (294)	10.0%	0.0%	10.0%	1.00
Uganda (272)	16.9%	2.2%	19.1%	0.88
South Africa, 2013 (464)	6.1%	0.9%	6.9%	0.88
South Africa, 2011 (22,305)	3.4%	3.6%	7.0%	0.49

Source: authors' analysis based on data described in the text.

Table 10 – ***Disabled Secondary-Age OOSC Disaggregated by Attendance History, Selected Countries***

Country (disabled persons in primary-age sample)	Disabled OOSC Rate			
	Never Attended School (1)	Dropped Out from School (2)	Total (3) = (1) + (2)	Proportion of OOSC who never attended school (4) = (1) / (3)
Indonesia (7,179)	55.3%	25.5%	80.9%	0.68
Maldives (272)	5.2%	9.4%	14.6%	0.36
Uganda (421)	15.5%	20.3%	35.8%	0.43
South Africa, 2013 (120)	18.2%	15.1%	33.3%	0.55
South Africa, 2011 (6,699)	6.8%	13.9%	20.7%	0.32

Source: authors' analysis based on data described in the text.

Table 11 – ***Disabled Primary- and Secondary-Age OOSC Disaggregated by Attendance History, Selected Countries***

Country (disabled persons in primary-age sample)	Disabled OOSC Rate			
	Never Attended School (1)	Dropped Out from School (2)	Total (3) = (1) + (2)	Proportion of OOSC who never attended school (4) = (1) / (3)
Indonesia (15,493)	51.8%	14.8%	66.5%	0.79
India (217)	40.3%	11.5%	51.7%	0.78
West Bank and Gaza (431)	27.5%	8.3%	35.8%	0.77
Bangladesh (102)	60.1%	8.8%	68.9%	0.87
Maldives (562)	7.6%	4.7%	12.3%	0.62
Uganda (421)	15.0%	8.7%	23.8%	0.63
Malawi (100)	41.4%	7.7%	49.1%	0.84
Tanzania, 2008 (130)	48.5%	21.0%	69.5%	0.70
South Africa, 2013 (574)	8.4%	3.7%	12.1%	0.69
South Africa, 2011 (29,004)	4.2%	6.0%	10.1%	0.41

Source: authors' analysis based on data described in the text.

Table 12 – ***Coefficients of Non-Linear Regression and Marginal Effects of Disability for School-Age Children***

Country (no. of disabled school-age children)	α_6 [disability] (1)	Standard Errors (2)	Wald statistics (3)	Marginal Effect at Mean(4)	Marginal Effect for Males (5)	Marginal Effect for Females (6)
East Asia and the Pacific						
Indonesia[a] (15,493)	-3.032	0.019	24972.545	-61.0%	-61.2%	-60.9%
Papua New Guinea (66)	-1.562	0.280	31.113	-36.5%	-36.0%	-36.9%
Viet Nam (91)	-2.443	0.245	99.317	-45.6%	-46.5%	-44.5%
Europe and Central Asia						
Albania (34)	-3.157	0.390	65.466	-55.0%	-55.7%	-54.3%
South Asia						
Bangladesh (102)	-2.338	0.234	100.200	-51.4%	-52.4%	-49.3%
India (217)	-1.547	0.153	101.691	-29.7%	-27.5%	-31.8%
Maldives (562)	-1.930	0.151	163.049	-7.7%	-8.8%	-6.6%
Sub-Saharan Africa						
Ethiopia (rural) (53)	-1.767	0.323	29.968	-41.0%	-40.8%	-41.1%
Malawi (100)	-1.738	0.215	65.346	-31.2%	-31.1%	-31.4%
Nigeria (32)	-1.744	0.397	19.342	-36.1%	-34.9%	-37.2%
South Africa, 2013 (574)	-2.422	0.161	225.147	-13.1%	-12.5%	-13.8%
South Africa, 2011 (28,581)	-0.786	0.021	1341.500	-5.3%	-5.1%	-5.5%
Tanzania, 2010-2011 (50)	-1.694	0.318	28.342	-39.6%	-39.3%	-39.7%
Uganda, 2011 (424)	-0.648	0.126	26.604	-9.1%	-7.9%	-10.4%
Uganda, 2010-2011 (76)	-1.686	0.265	40.506	-29.9%	-29.5%	-30.4%
Mean				**-32.8%**	**-32.6%**	**-32.9%**

Notes: Logistic models not estimated for Saint Lucia, and West Bank and Gaza and Tanzania, 2008 datasets, for which microdata and a measure of household socio-economic status were unavailable respectively.

[a] Constructed "household score" used as proxy for socio-economic status in the Indonesia dataset.

Source: authors' analysis based on data described in the text.

Table 13 – ***Coefficients of Non-Linear Regression for Attendance with Disability Interaction Terms***

Country	b_3 [male] (1)	b_4 [rural] (2)	b_5 [socio-economic status] (3)	b_7 [disability x male] (4)	b_8 [disability x rural] (5)	b_9 [disability socio-economic status] (6)	$b_3 + b_7$ effect of being male on attendance for disabled] (7)	$b_4 + b_8$ [effect of rural residency on attendance for disabled] (8)	$b_5 + b_9$ [effect of SES on attendance for disabled] (9)
Indonesia[a] (15,493)	-0.026*** *(0.003)*	-0.014*** *(0.003)*	0.588*** *(0.002)*	-0.069* *(0.038)*	-0.307*** *(0.042)*	-0.246*** *(0.021)*	-0.094*** *(0.038)*	-0.321*** *(0.042)*	0.343*** *(0.021)*
Papua New Guinea (66)	0.226*** *(0.062)*	-0.495*** *(0.069)*	1.598*** *(0.170)*	-0.644 *(0.574)*	-0.534 *(0.638)*	-1.851*** *(0.484)*	-0.418 *(0.571)*	-1.029 *(-0.634)*	-0.253 *(0.453)*
Viet Nam (91)	-0.116* *(0.064)*	-0.278*** *(0.096)*	0.794*** *(0.063)*	-0.625 *(0.484)*	-0.031 *(0.720)*	-0.227 *(0.408)*	-0.741 *(0.480)*	-0.309 *(0.714)*	-0.567 *(0.403)*
Albania (34)	-0.072 *(0.101)*	-0.600 *(0.104)*	0.675*** *(0.085)*	-0.296 *(0.900)*	-0.057 *(0.824)*	0.059 *(0.812)*	-0.368 *(0.894)*	-0.657 *(0.817)*	0.734 *(0.808)*
Bangladesh (102)	-0.475*** *(0.043)*	0.011 *(0.047)*	0.866*** *(0.046)*	0.376 *(0.481)*	1.155** *(0.541)*	-0.058 *(0.297)*	-0.099 *(0.479)*	1.166** *(0.539)*	0.808*** *(0.294)*
India (217)	0.354*** *(0.024)*	-0.132*** *(0.029)*	1.317*** *(0.032)*	0.201 *(0.306)*	-0.097 *(0.311)*	-0.914*** *(0.243)*	0.555* *(0.305)*	-0.229 *(0.309)*	0.402* *(0.241)*
Maldives (562)	-0.283** *(0.118)*	1.272*** *(0.232)*	0.499*** *(0.089)*	-0.297 *(0.301)*	-2.943*** *(0.897)*	-0.446** *(0.215)*	-0.580** *(0.278)*	-1.671* *(0.867)*	0.053 *(0.196)*
Ethiopia (rural) (53)	-0.077 *(0.055)*	-0.974*** *(0.107)*	0.052 *(0.045)*	0.759 *(0.732)*	0.511 *(1.038)*	1.496 *(2.690)*	0.682 *(0.730)*	-0.463 *(1.032)*	1.548 *(2.690)*
Malawi (100)	0.016 *(0.044)*	-0.452*** *(0.076)*	0.544*** *(0.060)*	0.326 *(0.435)*	0.633 *(0.665)*	-0.670** *(0.336)*	0.342 *(0.433)*	0.182 *(0.660)*	-0.126 *(0.330)*
Nigeria (32)	0.206*** *(0.056)*	-1.094*** *(0.097)*	1.774*** *(0.129)*	-0.127 *(0.779)*	2.108** *(0.986)*	-1.434*** *(0.452)*	0.079 *(0.777)*	1.014 *(0.981)*	0.340 *(0.433)*
South Africa, 2013 (574)	0.127* *(0.074*	0.383*** *(0.075)*	0.008 *(0.059)*	-0.274 *(0.299)*	-1.251*** *(0.326)*	78.014 *(81.213)*	-0.148 *(0.290)*	-0.868*** *(0.318)*	78.022 *(81.213)*
South Africa, 2011 (28,581)	0.105*** *(0.009)*	0.265*** *(0.009)*	0.609*** *(0.019)*	-0.125*** *(0.042)*	-0.254*** *(0.043)*	-0.427*** *(0.075)*	-0.713*** *(0.039)*	-0.020 *0.043)*	0.011 *(0.043)*
Tanzania, 2010-11 (50)	0.115* *(0.062*	-0.410*** *(0.079)*	0.366 *(0.049)*	-1.169* *(0.688)*	1.708 *(1.125)*	0.238 *(0.470)*	-1.054 *(0.685)*	1.297 *(1.122)*	0.604 *(0.467)*
Uganda, 2011 (424)	0.409*** *(0.046)*	0.556*** *(0.074)*	0.904*** *(0.037)*	0.015 *(0.250)*	-0.781* *(0.438)*	-0.283 *(0.195)*	0.424* *(0.246)*	-0.225 *(0.432)*	0.622*** *(0.192)*
Uganda,2010-11 (76)	0.052 *(0.078)*	-0.244** *(0.110)*	0.684*** *(0.103)*	0.652 *(0.543)*	-0.900 *(0.840)*	-0.464 *(0.450)*	0.704 *(0.538)*	-1.144 *(0.833)*	0.220 *(0.438)*

No. stat. sig. atp < 0.05 /Total no. 3 / 15 3 / 15 3 / 15

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1; standard errors for coefficients in parentheses.

Logistic models not estimated for Saint Lucia, and West Bank and Gaza and Tanzania, 2008 datasets, for which microdata and a measure of household socio-economic status were unavailable respectively.

[a] Constructed "household score" used as proxy for socio-economic status in Indonesia dataset.

Source: authors' analysis based on data described in the text.

Table 14 – ***Coefficients of Linear Probability Models for School-Age Children with Household Fixed Effects***

Country	y_4 (1)	Standard Errors (2)	T-statistics (3)	Disabled Individuals in Subsample	Total No. of Individuals in Subsample
East Asia and the Pacific					
Indonesia[a]	-0.491***	0.017	-29.381	888	2244
Papua New Guinea	-0.352***	0.074	-4.786	50	141
Viet Nam	-0.404***	0.069	-5.890	56	148
Europe and Central Asia					
Albania	-0.563***	0.083	-6.767	28	73
Middle East and North Africa					
West Bank and Gaza	-0.277***	0.019	-14.218	374	1330
South Asia					
Bangladesh	-0.414***	0.068	-6.069	69	188
India	-0.219***	0.037	-5.970	177	552
Maldives	-0.106***	0.014	-7.376	473	1333
Sub-Saharan Africa					
Ethiopia, rural	-0.267***	0.086	-3.092	40	136
Malawi	-0.279***	0.053	-5.281	100	265
Nigeria	-0.517***	0.088	-5.889	20	72
South Africa, 2013	-0.158***	0.019	-8.427	412	1075
South Africa, 2011	-0.045***	0.008	-5.447	1700	4398
Tanzania, 2010-11	-0.281***	0.078	-3.610	40	131
Tanzania, 2008	-0.338***	0.047	-7.207	110	396
Uganda, 2011	-0.133***	0.022	-6.146	354	1154
Uganda, 2010-11	-0.260***	0.057	-4.553	69	246
Mean	**-0.285**				

Notes: *** p < 0.01, ** p < 0.05, * p < 0.1; standard errors for coefficients in parentheses.
[a] Estimated using a 10% sample of the original dataset, as it was otherwise too large to compute parameters for the fixed-effects linear probability regression.
Source: authors' analysis based on data described in the text.

Table 15 – ***Coefficients of Quantile Regression (Linear Probability Models) for School-Age Children for Attendance with Household Fixed Effects***

Country	y_4 [disability]				Total No. of Individuals in Subsample [no. disabled]
	Quartile 1 (Poorest) [no. disabled]	Quartile 2 [no. disabled]	Quartile 3 [no. disabled]	Quartile 4 (Richest) [no. disabled]	
East Asia and the Pacific					
Indonesia[a]	-0.455*** (0.034) [219]	-0.511*** (0.034) [217]	-0.485*** (0.032) [222]	-0.515*** (0.033) [230]	2,244 [888]
South Asia					
Maldives	-0.098*** (0.033) [110]	-0.061** (0.024) [114]	-0.148*** (0.029) [120]	-0.115*** (0.029) [118]	1,313 [462]
Sub-Saharan Africa					
South Africa, 2013	-0.109*** (0.038) [101]	-0.178*** (0.039) [96]	-0.158*** (0.031) [96]	-0.177*** (0.043) [109]	1,049 [402]
South Africa[a], 2011	-0.031* (0.017) [440]	-0.073*** (0.019) [373]	-0.063*** (0.016) [453]	-0.021 (0.015) [434]	4,398 [1,700]
Uganda, 2011	-0.165*** (0.046) [97]	-0.116*** (0.043))[84]	-0.212*** (0.042) [81]	-0.075** (0.039) [92]	1,154 [354]

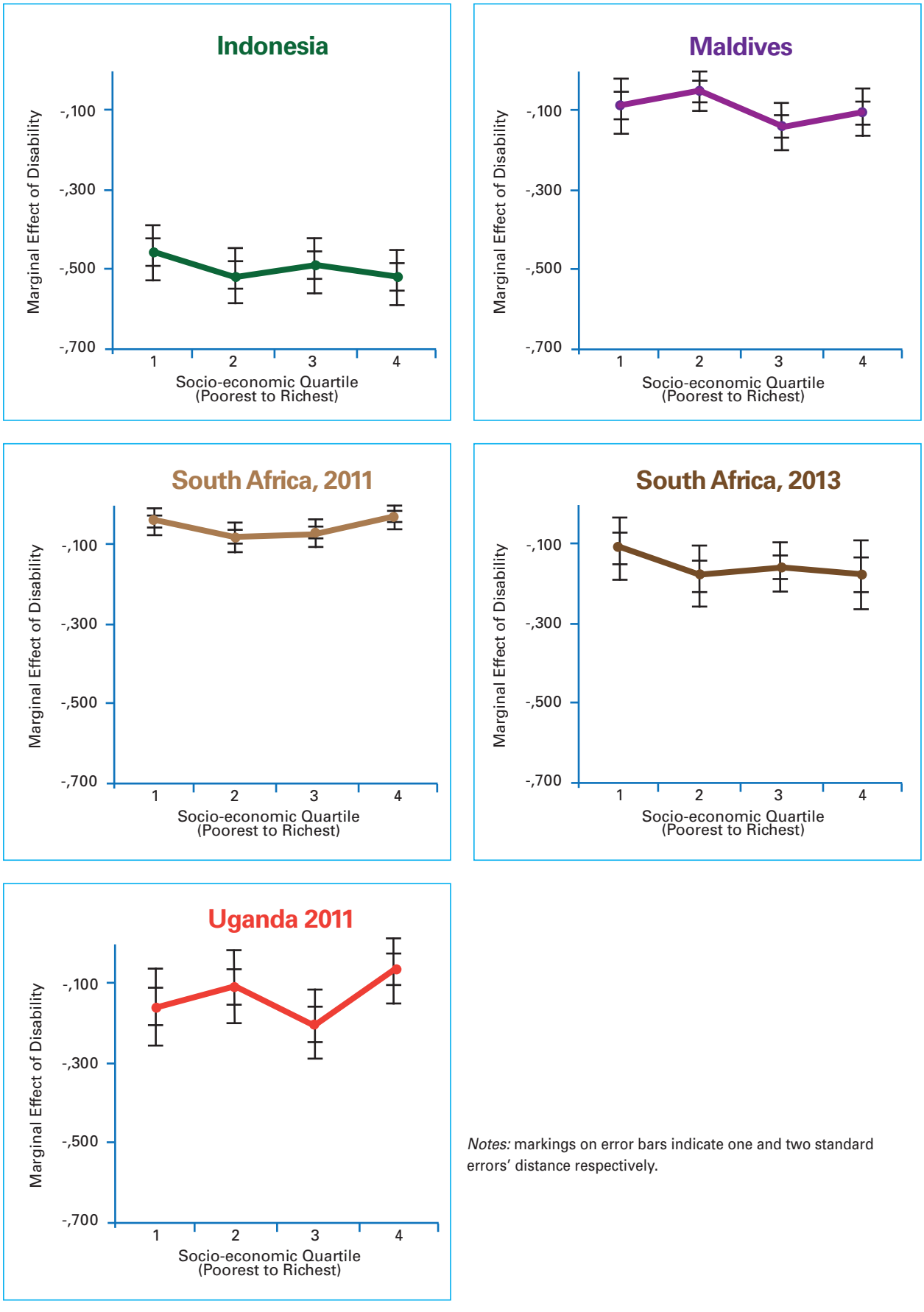
Notes: [a] Estimated using a 10% sample of the original dataset, as it was otherwise too large to compute parameters for the fixed-effects linear probability regression. Quantile fixed-effects regression not estimated for West Bank and Gaza, as socio-economic status information was not available.
Source: authors' analysis based on data described in the text.

Table 16 – ***Non-Linear Blinder-Oaxaca Decomposition of Disability Gap in Attendance***

	Attendance Rate			Decomposition (reference group: children without disability)			Decomposition (reference group: pooled sample)		
	Not Disabled	Disabled	Difference (1)	Total Explained (2)	% Explained (2) / (1)	% Unexplained	Total Explained (3)	% Explained (3) / (1)	% Unexplained
East Asia and the Pacific									
Indonesia[a]	79.0%	30.0%	49.0%	0.1%	0.2%	99.8%	-0.1%	-0.2%	100.2%
Papua New Guinea	63.5%	32.1%	31.5%	3.1%	9.8%	90.2%	3.1%	10.0%	90.0%
Viet Nam	85.9%	41.9%	44.1%	5.0%	11.3%	88.7%	5.0%	11.5%	88.5%
Europe and Central Asia									
Albania	88.2%	33.0%	55.1%	8.0%	14.4%	85.6%	8.2%	14.9%	85.1%
South Asia									
Bangladesh	78.3%	31.1%	47.2%	2.4%	5.2%	94.8%	2.4%	5.2%	94.8%
India	78.7%	48.3%	30.4%	3.0%	9.8%	90.2%	3.0%	9.9%	90.1%
Maldives	96.6%	87.7%	8.9%	-0.3%	-3.5%	103.5%	-0.2%	-2.1%	102.1%
Sub-Saharan Africa									
Ethiopia, rural	62.5%	27.2%	35.4%	-3.2%	-9.0%	109.0%	-3.1%	-8.8%	108.8%
Malawi	84.6%	50.9%	33.7%	-1.3%	-3.9%	103.9%	-1.2%	-3.7%	103.7%
Nigeria	81.5%	50.0%	31.5%	4.0%	12.8%	87.2%	4.0%	12.8%	87.2%
South Africa, 2013	95.7%	87.9%	7.8%	-20.5%	-264.3%	364.3%	-19.9%	-256.5%	356.5%
South Africa, 2011	93.0%	89.9%	3.1%	-1.8%	-59.2%	159.2%	-1.8%	-59.2%	159.2%
Tanzania	70.8%	42.0%	28.7%	0.8%	2.8%	97.2%	0.8%	2.8%	97.2%
Uganda, 2011	86.0%	76.2%	9.7%	-0.8%	-8.6%	108.6%	-0.8%	-8.5%	108.5%
Uganda, 2010-2011	83.7%	58.6%	25.1%	3.4%	13.6%	86.4%	3.3%	13.3%	86.7%
Mean						**117.9%**			**117.2%**

Notes: [a] Estimated using a 10% sample of the original dataset, as it was otherwise too large to compute parameters for the fixed-effects linear probability regression.
Source: authors' analysis based on data described in the text.

Figure 1 – ***Quantile Regression for Attendance with Household Fixed Effects, Selected Countries***



Notes: markings on error bars indicate one and two standard errors' distance respectively.

4. CONCLUSION AND IMPLICATIONS

This study sheds light on the knowledge deficit regarding the educational experience of disabled children. It is a pioneering effort to produce global evidence for the disability gap in school attendance in 15 low- to middle-income countries, using nationally representative data that crucially include a standardized disability measure, the WGSS of disability screening questions and response severity scale. Cross-nationally comparable proportions of disabled and non-disabled children who are out of school are computed for the first time, and econometric analyses undertaken to examine whether the difference in attendance rates between disabled and non-disabled children is determined by individual and socio-economic characteristics. The major findings and their implications are summarized below.

4.1 Disability Data Issues

Pre-screening of approximately 2,500 household surveys and censuses for analytical eligibility found that less than 2% fulfilled the criteria of including questions on educational attendance, and included functioning in at least five of the six physical and mental domains as covered by the WGSS, with a minimum of three levels of severity response. Two-thirds of the surveys fulfilling the study criteria were conducted within the last five years, demonstrating that efforts to mainstream data collection on disability are clearly beginning to bear fruit, but must be sustained in order to achieve a fuller picture of the educational restraints confronted by disabled children, in order to properly engage disability data within the post 2015-Agenda. Nonetheless only two countries, namely Indonesia and South Africa, have incorporated standards as stipulated by the WG in their census which suggest that WGSS has still to gain a wider acceptance by the state authorities in collecting data on disability. It is also recommended that a short set of disability questions should be included in the core questionnaire of the household surveys that are key to global data collection such as Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys (DHS), and Living Standards Measurement Surveys (LSMS).

Low disability prevalence rates are registered in primary- and secondary-age children (with prevalence in most countries falling below 1.5% and 2.0% in these two age groups respectively). Cross-nationally, primary- and secondary-age children do not experience particularly high levels of severe difficulty in any specific disability domain. It should be restated that the WGSS of questions were primarily developed to measure adult disability; hence the prevalence estimates in this paper may have some underestimation bias as some disabilities related to behavioral and neurological disorders are not captured through the WGSS. Currently, the WG is testing a new survey module on child functioning and disability. These new tools should be employed for future measures for children's disability. Further the discrepancy observed in the estimates of prevalence rates across surveys may be attributed to differences in the definitions of disability adopted by surveys, even though they adhere to internationally comparable standards such as WG.

4.2 Disability Gap in School Attendance

Although net attendance rates vary widely across the 15 sampled countries, the descriptive statistics show a universal and statistically significant disability gap in attendance, with the

difference between disabled and non-disabled OOSC rates in primary and secondary education averaging 30%. In other words, disabled children encounter significantly more barriers to educational participation relative to their non-disabled counterparts. Concurrently the size of the disability gap in OOSC for primary and combined (primary and secondary) education level follow an inverted U-shape relationship with country income suggesting that as GNI per capita rises and more resources become available for improving the education system such as primary education, non-disabled children are increasingly able to attend school, whereas the situation of disabled children is much slower to improve. This hints at the inefficient implementation of policies formulated for the improvement of primary education systems under the MDGs and EFA which have failed to promote access of education to children with disabilities. There is indeed a pressing need for concerted international commitments in the post 2015 regime to focus on improving access to quality education for children with disabilities while continuing efforts to promote inclusiveness and equity in education as promulgated by the MDGs. For example, national education sector plans need to specifically include children with disabilities; professional development of teachers needs to be reformed for delivering inclusive and equitable education; and parents and community members need to be sensitized to create enabling environments at home and in the community to promote access to education.

Furthermore, in countries which achieved close to universal primary school-age attendance, the ratio of disabled- to non-disabled primary-age OOSC rates becomes extremely large, indicating that traditional education policies that increase general attendance do little to benefit disabled children. In contrast, the ratio of disabled- to non-disabled OOSC in secondary education and combined schooling (primary and secondary education) has a much smaller value, hinting at the indifferent approach of educational policies across developing countries which foster attendance in primary schools, but do little to promote post-primary education.

Disaggregation of the disabled OOSC rate by attendance history reveals that attainment of initial access to education for disabled children is a significant challenge, as over 85% of disabled primary-age OOSC have never attended school. This should therefore be a major priority for the international community, who must make special efforts to improve educational accommodations for disabled children, and resolve the access bottleneck which currently prevents disabled children from going to school at all.

4.3 Marginal Effect of Disability on School Attendance

Disability emerges as a prominent factor influencing school attendance, and its marginal effect on the probability of attendance, estimated using a logistic model for attendance, is on average -33%, assuming mean values of other socio-economic characteristics; this is roughly equivalent to the average disability gap in OOSC rates. On the other hand, there was no systematic statistically significant effect of sex, urban/rural residency, or socio-economic status on the disabled attendance rate, indicating that disabled children suffer from comparatively greater limitations in education than their non-disabled peers, regardless of country of origin, sex, or family background.

The marginal effect of disability, directly obtained from linear probability household fixed-effect regressions after controlling for unobserved or potential endogeneity of variables, was reasonably

consistent with that estimated using the logistic model. Socio-economic quantile regression on fixed-effect subsamples of sufficient size showed the marginal effect of disability to be fairly constant across socio-economic quartiles, further supporting the finding that the probability of a disabled child attending school is largely invariant to SES. The results hint that there are specific hurdles across the countries for children with disabilities which cannot be solved even for households with higher SES. The non-linear Blinder-Oaxaca decomposition of the disability gap in attendance rates suggests supply side constraints, i.e. the differences in the observed characteristics between disabled and non-disabled children cannot explain the gap in attendance rate. Rather it hints that the current inequality between educational outcomes of non-disabled and disabled children fundamentally arises due to the structural failure of education systems to provide sufficient support for disabled children to attend school. Initial access to primary education should be promoted through policies which address bottlenecks that prevent disabled children from attending school. To address the shortcomings in the current education systems which ignore the structural constraints that result in marginalization of the disabled OOSC, it is pertinent that the policy framing and its subsequent implementation is buttressed by robust data on disability. The effect of such policies and initiatives at global and national levels would be more profound and far-reaching, thereby fulfilling the overarching mission to achieve universal education in the post 2015 era.

This study exclusively analyzed how children with disabilities are often not included in education in 15 developing countries. The findings suggest strong and persistent patterns of marginalization in the countries studied in this paper and point out that research and policy on how to increase initial access to education for children with disabilities are a priority. Attendance is the minimal measure of education achievement i.e., even if a child with disability attends school, it does not mean that education is delivered and the child learns. In this sense, this study is only the first step towards measuring inclusion. Qualitative research to assess the bottlenecks for children with disability to receive quality education is much needed. Finally and more broadly, disability in the household could also affect children, irrespective of their disability status. As Mont & Nguyen (2013) found for Vietnam, the disability of a parent may have a significant negative effect on their children's attendance rates. Clearly, attention to disability is needed on many issues in education policy and research if education is to become universal.

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ANNEX

Table 1 – ***Eligible Surveys Identified Fulfilling Analysis Criteria by World Bank Region and from Most to Least Recent***

Country	Survey Name	Year(s)
East Asia and the Pacific		
Thailand	National Disability Survey	2012
Indonesia	Population Census	2010
Papua New Guinea	Household Income and Expenditure Survey (HIES)	2009-11
Viet Nam	Household Living Standards Survey (VHLSS)	2006
Europe and Central Asia		
Republic of Moldova	Population and Housing Census	2014
Bosnia and Herzegovina	Census of Population, Households, and Dwellings	2013
Albania	Living Standards Measurement Survey (LSMS)	2012
Romania	Population and Housing Census	2011
Latin America and the Caribbean		
Jamaica	Population and Housing Census	2011
Belize	Population and Housing Census	2010
Saint Lucia	Population and Housing Census	2010
Middle East and North Africa		
Tunisia	Population and Housing Census	2014
West Bank and Gaza	Disabled Individuals Survey	2011
West Bank and Gaza	Expenditure and Consumption Survey	2011
West Bank and Gaza	Expenditure and Consumption Survey	2010
West Bank and Gaza	Expenditure and Consumption Survey	2009
South Asia		
Sri Lanka	Census of Population and Housing	2012
Bangladesh	Household Income and Expenditure Survey	2010
Maldives	Demographic and Health Survey (DHS)	2009
Afghanistan	National Risk and Vulnerability Assessment (NRVA)	2007-08
India	Health and Development Survey (HDS)	2005
Sub-Saharan Africa		
South Africa	General Household Survey	2013
South Africa	Household Travel Survey	2013
Nigeria	General Household Survey Panel (GHS-Panel), Wave 2	2012-13
Zambia	Labor Force Survey	2012
Ethiopia	Rural Socioeconomic Survey (ERSS)	2011-12

South Africa	Census 2011	2011
Uganda	Demographic and Health Survey (DHS)	2011
Malawi	Third Integrated Household Survey (IHS3)	2010-11
Nigeria	General Household Survey Panel (GHS-Panel), Wave 1	2010-11
Tanzania	National Panel Survey (NPS), Wave 2	2010-11
South Africa	General Household Survey	2010
Liberia	Core Welfare Indicators Questionnaire Survey	2010
Uganda	National Panel Survey, Wave 2 (LSMS)	2010
Lesotho	SINTEF Study on Living Conditions Among People with Activity Limitations	2009-10
Uganda	National Household Survey (UNHS)	2009-10
Uganda	National Panel Survey, Wave 1 (LSMS)	2009-10
South Africa	General Household Survey	2009
Tanzania	Disability Survey	2008
Mozambique	SINTEF Study on Living Conditions Among People with Activity Limitations	2007-08
Uganda	Demographic and Health Survey (DHS)	2006
Zambia	SINTEF Study on Living Conditions Among People with Activity Limitations	2005-06

Source: collected by authors as described in the text.