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Analyzing Individual Disadvantages alongside Household Poverty to Illuminate Gendered and Intrahousehold Disparities

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Abstract
Most poverty measures are generated at the household level and disregard gendered and intrahousehold inequalities even if individual level data exist. This paper provides a methodology for jointly analyzing individual disadvantages alongside household poverty status and composition. The illustration analyses deprivations in child nutrition and school attendance, and achievements of first generation learners, alongside multidimensional poverty status in seven South Asian countries, and monetary poverty status in Pakistan, finding significant gender disparities in school attendance. The general methodology the paper outlines can be used to illuminate gendered and intrahousehold disparities in individual disadvantage alongside any household poverty measures.

Keywords: poverty measurement, multidimensional poverty measurement, gender, intrahousehold inequality, child poverty.

JEL classification: I32, J13, O1

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I. Introduction

In multidimensional poverty measurement, as in its monetary counterpart, most poverty measures are drawn from data compiled at the household level, which obscures individual disadvantages and analyses that can be done on these, including illuminating gendered and intrahousehold disparities.

Household poverty measures take the unit of identification to be the household, so if a household is identified as poor, all its members are identified as poor. While one person's capabilities or deprivations affects other household members (Basu and Foster 1998), intra-group and intrahousehold inequalities exist – and merit measurement. Haddad and Kanbur's 1990 paper (cf Messer 1997) catalyzed an important literature that models the intrahousehold inequalities that may be experienced (Chiappori and Meghir 2015 and the references cited therein). Afzal et al (2021) acknowledge the instrumental value of intrahousehold executive agency. But could direct measurement of disparities provide a fruitful alternative line of analysis? Brown, Ravallion and van de Walle (2019) used measures when they observed that around one half of undernourished women and children in Africa were not found in the (asset) poorest 40% of households. Similarly, Espinoza-Delgado and Klasen (2018) and Klasen and Lahoti (2021) consider intrahousehold inequalities with respect to multidimensional poverty – with the latter finding that intrahousehold inequality accounts for 30% of total inequality.

Individual multidimensional poverty indices, in which every person is individually identified as poor or non-poor, have been estimated and analyzed by many, often with a gender focus.[1] These have the advantage of being able to provide gendered information and to illuminate intrahousehold inequalities in individual functionings such as education, work, health or nutrition.[2] For example, individual child poverty measures[3] are often used in order to assess disparities across gender or age, and map deprivations across multiple children within the same household. This literature also probes which individual measures capture

1 These include Batana (2008, 2013); Ura et al. (2012); Alkire et al. (2013); Vijaya, Lahoti, and Swaminathan (2014); Bessell (2015); Pogge and Wisor (2016); Alkire and Apablaza (2017); Espinoza-Delgado and Klasen (2018); and Klasen and Lahoti (2021).

2 See Chakravarty, Chattopadhyay, and D'Ambrosio (2022), Kleven et al (2019), Muralidharan and Prakash (2017), Cunha (2014), Asher, Novosad, and Rafkin (2024).

3 An ample literature now focuses on child analyses of MPIs built at the household level (Dirksen and Alkire, 2021). Others implements individual child MPIs using counting-based methodology (Alkire and Foster, 2011) for all children (0–17 years) (CEPAL and UNICEF, 2010; Notten and Roelen, 2010, 2012; SAHRC and UNICEF, 2014; García and Ritterbusch, 2015; Alkire et al., 2016; Vasquez, 2016; Omotoso and Koch, 2018; Dirksen and Alkire, 2021), or subsets of children (Gordon et al. 2003; Roelen, Gassmann, and de Neubourg, 2009, 2010, 2011; Amarante, Arim, and Vigorito, 2010; Biggeri and Mehrota, 2011, Alkire and Roche, 2012; Callander, Schofield, and Shrestha, 2012; Roche, 2013; Trani and Cannings, 2013; Trani, Biggeri, and Mauro, 2013; Chzhen et al., 2015; De Lannoy, Frame, and Leibbrandt, 2015; Arndt et al., 2017; Chzhen and Ferrone, 2017; Roelen, 2017, 2018; Chzhen, Bruckauf, and Toczydlowska, 2018; Dickerson and Popli, 2018; Mishra, Ray, and Risse, 2018).

easy-to-understand policy relevant information.[4] Yet household measures are prevalent because of their general applicability, data availability, and policy take-up. Must one choose?

This paper proposes a powerful complementary strategy: analyzing individual disadvantages alongside a household monetary or multidimensional poverty measure built from that dataset. Our proposed methodology is general and could be applied to explore many types of disparities; we illustrate it using data for children.[5]

Our methodology re-analyses 'individual indicators' – in which individual-level data for some household members are used to identify all household members as disadvantaged or not in that indicator (note: we use the term 'disadvantage' to indicate an individual-level status while 'deprived' refers to the household status). In multidimensional poverty, individual indicators may include child school attendance, completed years of schooling, nutritional status, early marriage and childbearing, employment, and so on. In monetary poverty, the income earned by each household member is used. Monetary datasets also commonly include individual indicators such as education, which can be examined, as our example shows.

Individual-level data are ordinarily aggregated across eligible household members. In multidimensional poverty indices, the intrahousehold aggregation criterion may be defined such that all members of the household are deprived if *any* eligible household member is disadvantaged in that indicator, or *all* eligible household members, or some specified combination (which may consider gender and/or age). In monetary measures usually the aggregate income of all eligible household members is considered. After intrahousehold aggregation, all household members are identified as deprived or non-deprived in the household-level indicator.

By re-analyzing individual indicators separately, we augment the analytical power of a poverty measure that uses the household as the unit of identification, with further information on individual disadvantages. While many relationships could be studied, the following six basic comparisons are highly informative.

1. **Poverty status:** what proportion of disadvantaged individuals are poor?
2. **Gender:** what proportion of disadvantaged (and poor) individuals are female, male, or other categories? Other relevant inequalities could be considered such as disability status, age, and so on.

4 Alkire Vaz and Oldiges (2024).

5 Heckman and Masterov (2007) and Heckman and Karapakula (2019) explore the long-term benefits of addressing multiple deprivations in early childhood.

3. **Intrahousehold inequality:** what proportion of disadvantaged (and poor) individuals live in households where other eligible individuals are present but are not disadvantaged in that same indicator?
4. **Complex categories:** which households contain one group of individuals who are disadvantaged in one indicator, and another group who are not disadvantaged in the same indicator?

To see how the joint deprivations that households experience vary depending on their deprivation in a focal indicator, we further compare:

5. **Composition**: the composition of multidimensional poverty by indicator experienced by people living in households containing individuals who themselves are disadvantaged in a particular indicator (and poor), compared to households in which individuals are not disadvantaged. A related comparison could be done at the individual level.
6. Looking across households and different eligible populations we can observe:
7. **Integrated analyses:** what proportion of people live in households where eligible individuals for different individual indicators are concurrently disadvantaged in more than one individual indicator?

To illustrate this methodology, we use the global MPI and its underlying microdata in South Asia, focusing on three individual indicators: nutrition, school attendance and completed years of schooling. For a monetary poverty measure, building on Brown, Ravallion and van de Walle (2019), we use the cost of basic needs (CBN) poverty line in Pakistan to construct a parallel analysis of the relationships of poverty status, gender, and intrahousehold inequalities for two education indicators, and compare this with Pakistan's global MPI analysis from a similar year. In both cases, and in contrast to modelled methodologies, the gendered and intrahousehold relationships are measured directly. Our results illustrate how widely available variables in monetary and multidimensional poverty datasets may be re-analysed to provide powerful insights.

We suggest that linked analyses of individual and household information such as that demonstrated in this paper should become a standard component of the information platform of multidimensional and monetary poverty measures that use the household as the unit of identification. This will improve the gendered and intrahousehold information available for policy responses to poverty, complement model-

based analyses, and make apt use of commonly-available individual data.[6] Such analysis will not capture all the value-added of individual poverty measures that use bespoke surveys with additional indicators. But it will greatly augment the informational power of standard household poverty analyses, and may have advantages in terms of generality.[7]

II. Data

The global MPI[8] has three dimensions and 10 indicators including three individual indicators: nutrition, years of schooling, and school attendance. It also assesses household deprivations for the six indicators of living standards: cooking fuel, sanitation, drinking water, electricity, housing, and assets and, in health, considers whether the household lost a child in the last five years. Indicator weights are equal within and across dimensions (Alkire, Kanagaratnam, and Suppa 2019).

The global MPI identifies a person as poor if they are deprived in one-third or more of the weighted indicators. All members of the same household will be deprived in the same indicators, and all will be identified as poor or non-poor. The global MPI results have been disaggregated to profile the level and composition of acute multidimensional poverty across ethnic groups disability status, age, gender of the household head, and so on. In this illustration we focus on age cohorts, as the global MPI shows that half of all poor people are children, and previous analyses have not probed the gendered and intrahousehold patterns in individual indicators.[9] Table 1 lists the global MPI datasets used in our analysis.

6 Bargain, Donni, and Kwenda (2014); Chiappori, Fortin, and Lacroix (2002); Dunbar, Lewbel, and Pendakur (2013); Browning et al. (2013); Chiappori and Meghir (2015). Surveys with more precise intrahousehold data should also be analyzed using these techniques. See de Vreyer and Lambert (2021).

7 This analysis can be complemented by other measurement strategies – such as building individual multidimensional poverty measures (for example, for children) that are structurally linked to, and extend, household measures, so that the pair of linked measures provide compact yet complementary insights (Alkire Vaz and Oldiges, 2022, 2024; Dirksen and Alkire, 2021).

8 The global MPI methodology and country details are in Alkire, Kanagaratnam, and Suppa (2018, 2019). This paper uses global MPI estimations from 2018 for India and from 2019 otherwise. Regional totals are population weighted using UNDESA population data for 2016, which is closest to the population weighted mean of the year in which South Asian data were collected.

9 Alkire, Kanagaratnam, and Suppa (2019, Table 3) presents age disaggregation.

Table 1. Data sources for the global MPI in South Asia and overall MPI statistics

Country	Survey	Year	Population (2016)[10]	Headcount ratio of MPI (H)	Intensity (A)	MPI
Afghanistan	DHS	2015/16	34,656,032	56.1%	48.7%	0.273
Bangladesh	DHS	2014	162,951,560	41.1%	47.3%	0.194
Bhutan	MICS	2010	797,765	37.3%	46.8%	0.175
India	DHS	2015/16	1,324,171,354	27.5%	43.9%	0.121
Maldives	DHS	2016/17	428,756	0.8%	34.4%	0.003
Nepal	DHS	2016	28,982,771	35.3%	43.6%	0.154
Pakistan	DHS	2017/18	193,203,476	38.3%	51.7%	0.198
Total			1,745,191,714	30.7%	45.6%	0.140

Source: Alkire Kanagaratnam and Suppa (2018, 2019).

The school attendance data are drawn from individual child data. A household is deprived if any school-age child is not attending school up to the age at which they should complete grade 8. The official school entrance age from the Institute for Statistics at UNESCO is 6–14 years old except in Pakistan it is 5–13 and in Afghanistan, 7–15. We define children who are not attending school as 'out-of-school' children.

The global MPI identifies a household as deprived in nutrition if any member under 70 years of age for whom there is nutritional data is nutritionally disadvantaged. Our analysis only focuses on children below the age of 5, who are defined as nutritionally disadvantaged if their height-for-age and/or weight-for-age are below minus two standard deviations from the median of the reference population (e.g., they are stunted and/or underweight). As the Afghanistan dataset lacks nutrition, nutrition is analyzed for six countries.

Data for first generation learners or 'pioneer children' are based on the variable years of schooling, in which a household is deprived if no person aged 10 or above completed six years of schooling.

Turning to monetary poverty, Pakistan's CBN (cost of basic needs) poverty measure is computed using the Household Integrated Survey (HIES) 2018/19 and compared to Pakistan's results in the DHS 2017/18. HIES covers 25,800 households, compared to 16,240 in the Pakistan DHS. Both samples are based on the latest 2017 census. The definitions of out-of-school and pioneer children, along with the reference population, are harmonized between the HIES and DHS to permit meaningful comparisons.

10 United Nations, Department of Economics and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision, DVD Edition [Accessed on 28 April 2019] cited by Alkire Kanagaratnam and Suppa (2019).

III. Methodology

For assessments of multidimensional poverty, we build out from the notation of Alkire and Foster (2011) to articulate the individual or intrahousehold framework underlying this analysis. Consider a population of n persons whose well-being is evaluated by d indicators. Let us denote the achievement of person i in indicator j by $x_{ij} \in \mathbb{R}$ for all $i = 1, \dots, n$ and $j = 1, \dots, d$. The achievements of n persons in d indicators are summarized by an $n \times d$ dimensional matrix X, where rows denote persons and columns denote indicators. Each indicator is assigned a weight based on the value of a deprivation in that indicator relative to other deprivations in other indicators. The deprivation value attached to each indicator j is the same across all persons and is denoted by w_j, such that $w_j > 0$ and $\sum_{j=1}^{d} w_j = 1$. The weights are summarized by vector $\boldsymbol{w}$.[11]

In a unidimensional poverty measure, persons are identified as poor if their income (for example) is less than a given poverty line. In a multidimensional counting approach using the dual-cutoff approach, a person is first identified as deprived or not in each indicator using a deprivation cutoff. We denote the *deprivation cutoff* for indicator j by z_j, and the deprivation cutoffs are summarized by vector $\boldsymbol{z}$. Any person i is deprived in any indicator j if $x_{ij} < z_j$ and non-deprived, otherwise. We assign a *deprivation status score* g_{ij} to each person in each indicator based on the deprivation status. If person i is deprived in indicator j, then $g_{ij} = 1$; and $g_{ij} = 0$, otherwise.

In the second step an overall *deprivation score* $c_i \in [0,1]$ is computed for each person by summing the deprivation status scores of all d indicators, each multiplied by their corresponding weights, such that $c_i = \sum_{j=1}^{d} w_j g_{ij}$. A person is identified as poor if $c_i \geq k$, where the poverty cutoff is denoted $k \in (0,1]$, and non-poor, otherwise. The deprivation scores of all n persons are summarized by vector $\boldsymbol{c}$. It may prove convenient to generate an n-dimensional identification (column) vector, $I(k)$, such that a typical element, $\rho_i(k)$, is defined by: $\rho_i(k) = \mathbb{I}(c_i \geq k)$.[12] The identification vector elements take two values: 0 and 1. The entry $\rho_i(k) = 1$ if and only if person i is identified as multidimensionally poor, according to deprivation cutoffs $\boldsymbol{z}$, weights $\boldsymbol{w}$ and poverty cutoff k, and $\rho_i(k) = 0$ otherwise.

After identifying the set of poor and their deprivation scores, we obtain the adjusted headcount ratio (M_0), also referred to as the MPI. It will be useful, after identification, to explore the distribution of deprivation

11 It would also be possible to generate individual MPIs from datasets that cover multiple household members, then convert the present notation to explore intrahousehold relationships.

12 $\mathbb{I}(a)$ is an indicator function whose value is 1 if and only if a is true. Otherwise, it is equal to 0.

scores. Therefore, we create the censored deprivation score vector $c(k)$ from $\boldsymbol{c}$, such that $c_i(k) = c_i$ if $c_i \geq k$ and $c_i(k) = 0$, otherwise. The M_0 is equal to the average of the censored deprivation scores, where these are distributed to each person in the household:

$$M_0 = MPI = \frac{1}{n}\sum_{i=1}^{n} c_i(k)\,.^{13} \quad (1)$$

The above is a standard presentation of a counting-based indicator, and the aggregate components M_0, H, A, h_j can be disaggregated by population subgroups such as gender or age cohort.

Note that the conclusion that the i^{th} person is deprived in indicator j may be a function not of a simple deprivation cutoff but rather of information on any disadvantages of some eligible household members. To study individual disadvantages, we observe that each person is a member of household h. It will prove convenient to re-index each individual by assigning them to a household as follows.

Households (indexed $h = 1,2,\dots,m$) contain **individuals** (indexed within each household $i = 1,2,\dots,n_h$, where n_h is the number of individuals who live in household h). Each individual has achievements in d **indicators** (indexed $j = 1,2,\dots,d$). So x_{ij}^h is the **achievement** of individual i, residing in household h, in indicator j. The total number of individuals is $N = \sum_{h=1}^{m} n_h$. Note that we have redefined the individual index i so that it now runs **within** households, not over all individuals in all households.

The collection (over individuals, households, and indicators) of all the x_{ij}^h achievements of the population is the equivalent of the usual 'achievement matrix'. However, it is not a matrix, as its elements have three indices, whereas the elements of a matrix have two indices. But it can be configured in various ways, to create matrices that summarize achievement information usefully.

For example, fixing h (that is, looking at a particular household, h), X^h is an $(n_h \times d)$ matrix with elements x_{ij}^h, which summarizes the achievements of the n_h members of the household (rows) in each of the d indicators (columns). There are m such matrices, one for each household. Depending on their characteristics, for example, age, some individuals are not eligible for certain indicators. So, some elements of the matrix X^h will be blank.

13 Alternatively, we can express M_0 as a product of two components: the share of the population who are multidimensionally poor (the headcount ratio (H)), and the intensity, or average deprivation score among poor people (A). M_0 can also be expressed as an average of the censored headcount ratios of indicators weighted by their deprivation value. The censored headcount ratio of an indicator is the proportion of the population that is multidimensionally poor and is simultaneously deprived in that indicator.

To clarify **eligibility**, let $e_{ij}^h \in \{0,1\}$ be a zero-one indicator for whether individual i, residing in household h, is eligible to provide information for indicator j. For certain indicators, such as nutrition, the definition of disadvantage may also depend on the individual's characteristics (for example, in the global MPI, children under 5 are disadvantaged if they are either underweight or stunted, people aged 5–19 are disadvantaged if their Body Mass Index (BMI) is below the age-specific standard, and people aged 20 and above are disadvantaged if their BMI is less than 18.5). In that case, we could expand the possible values of the eligibility indicator, $e_{ij}^h \in \{0,1,2,\dots\}$ to identify the relevant **group** that individual i in household h belongs to (child under 5, person 5–19, etc.).

To further elaborate the deprivation cutoff in the case of individual indicators, considering **individual disadvantages**, let $g_{ij}^h \in \{0,1\}$ be a zero-one indicator of individual disadvantage status. We set $g_{ij}^h = 1$ if eligible individual i, residing in household h, is disadvantaged in indicator j. We set $g_{ij}^h = 0$ if individual i, residing in household h, is non-disadvantaged or not eligible for indicator j. Typically, an (eligible) individual i in household h will be disadvantaged in indicator j if their achievement in that indicator x_{ij}^h falls below its deprivation cutoff u_j, so $g_{ij}^h = e_{ij}^h \mathbb{I}(x_{ij}^h < u_j)$. For an indicator j with group-specific definitions, the cutoff u_j will depend on group e, so $g_{ij}^h = \mathbb{I}\left(x_{ij}^h < u_j\left(e_{ij}^h\right)\right)$.[14]

The **deprivation status of household** h in indicator j, denoted s_{hj}, will be some function of the household members' disadvantage status, $s_{hj} = f_j\left(g_{1j}^h, \dots, g_{n_h j}^h\right)$. For an indicator j with group-specific definitions of disadvantage, we can also evaluate household deprivation status separately for each group, $s_{hj}(e) = f_j\left(g_{1j}^h, \dots, g_{n_h j}^h, e_{1j}^h, \dots, e_{n_h j}^h\right)$. For example, if j is nutrition and $e = 1$ identifies children under 5, then $s_{hj}(1)$ could be defined to represent child undernutrition.

The **poverty status of household** h is $s_h(k)$. As before, an overall household *deprivation score* $c_h \in [0,1]$ is computed for each household by summing the household deprivation status scores of all d indicators, each multiplied by their corresponding weights, such that $c_h = \sum_{j=1}^d w_j s_{hj}$. A household and all its members are identified as poor if $c_h \geq k$, where $k \in (0,1]$, and non-poor, otherwise. Note that any individual-specific attribute will be indexed by h, so we assign their household's deprivation score c_h to each individual i living in household h.

14 The use of more than one deprivation cutoff only applies to the indicator nutrition in the global MPI, which uses: (1) two indicators and deprivation cutoffs combined using union for stunting and underweight for children aged 0–4; (2) age-specific cutoffs used for Body Mass Index (BMI) for people aged 5-19; and (3) one BMI cutoff of 18.5 otherwise.

We can now consider how to scrutinize the status of individual-level disadvantages alongside other information (data permitting) such as the person's gender or age cohort, or the joint deprivations of that person across other indicators.[15]

A. Identifying Individual disadvantages

This section provides convenient statistics for the individual analyses that link to household poverty status, primarily by identifying individuals as individually disadvantaged or not in a given indicator. If indicator $j =$ an individual indicator such as nutrition or school attendance, and e identifies the relevant (eligible) group of individuals for that indicator, then individual i, residing in household h, is disadvantaged if $e_{ij}^h = 1$ and $x_{ij}^h < u_j(e)$. As above, $g_{ij}^h = \mathbb{I}\left(x_{ij}^h < u_j\left(e_{ij}^h\right)\right)$. It is convenient to define $b_{ij}^h = \mathbb{I}\left(e_{ij}^h = 1\right)$, so b_{ij}^h is a zero-one indicator for membership of any household member in any eligibility group for indicator j.

For each indicator j, the:

- number of eligible individuals in each household h is
  $v_{hj}^e = \sum_{i=1}^{n_h} b_{ij}^h$ (2)
- total number of eligible individuals is $v_j^e = \sum_{h=1}^{m} v_{hj}^e$ (3)
- total number of disadvantaged individuals is $q_j^e = \sum_{h=1}^{m} \sum_{i=1}^{n_h} g_{ij}^h b_{ij}^h$ (4)
- total number of eligible individuals who are MPI poor is $q^e(k) = \sum_{h=1}^{m} \sum_{i=1}^{n_h} b_{ij}^h s_h(k)$ (5)
- total number of individuals who are MPI poor and disadvantaged in the focal indicator is
  $q_j^e(k) = \sum_{h=1}^{m} \sum_{i=1}^{n_h} g_{ij}^h \, b_{ij}^h s_h(k)$ (6)
- headcount ratio of individuals who are poor and disadvantaged in the focal indicator is
  $H_j^e = \frac{q_j^e(k)}{v_j^e}$. (7)

All (eligible) individuals in household h are disadvantaged if $\sum_{i=1}^{n_h} g_{ij}^h b_{ij}^h = v_{hj}^e$.

15 As disaggregation, data permitting, by population subgroups is elementary and valid for headcount ratios or numbers of deprived or pioneer children, further notation is not provided.

B. Complex Categories: The Case of Pioneer Children

Additional situations might be defined by combining information on individual disadvantages from household members in different categories. For example, let us define pioneer children as children aged 10–17 who have completed at least six years of schooling, but live in a household where no adults aged 18 and above have completed six years of schooling.

Let indicator j be completed years of schooling and let $e_{ij}^h = 1$ for children aged 10–17 and $e_{ij}^h = 2$ for adults aged 18 or above ($e_{ij}^h = 0$ for all children under 10).

A child i living in household h is a pioneer child if he or she is aged 10–17 and has completed at least six years of schooling, $x_{ij}^h \mathbb{I}\left(e_{ij}^h = 1\right) \geq 6$ and no adults in the household have completed six years of schooling, $\max_{l=1,\ldots,n_h} x_{lj}^h \mathbb{I}\left(e_{lj}^h = 2\right) < 6$.

In this case, as pioneer status is a specially defined non-disadvantaged status, let us define a particular pioneer status indicator, p_i^h. Household h contains a pioneer child if it contains at least one eligible child who has completed at least six years of schooling, $\max_{i=1,\ldots,n_h} x_{ij}^h \mathbb{I}\left(e_{ij}^h = 1\right) \geq 6$, and none of its adults have completed six years of schooling, $\max_{l=1,\ldots,n_h} x_{lj}^h \mathbb{I}\left(e_{lj}^h = 2\right) < 6$,. This can be represented by

$$p_h = \mathbb{I}\left(\max_{i=1,\ldots,n_h} x_{ij}^h \mathbb{I}\left(e_{ij}^h = 1\right) \geq 6\right) \mathbb{I}\left(\max_{l=1,\ldots,n_h} x_{lj}^h \mathbb{I}\left(e_{lj}^h = 2\right) < 6\right) \quad (8)$$

C. Composition of the MPI for Eligible Groups

One can also disaggregate the MPI by eligible poor individuals, then compare the contributions of each indicator to MPI for eligible poor individuals who are, and are not, disadvantaged in a particular indicator j' (for example, out-of-school children). The absolute contribution of indicator j to the MPI for groups of poor eligible disadvantaged individuals is

$$D_j^e = \frac{1}{N} \sum_{h=1}^{m} \sum_{i=1}^{n_h} w_j s_{hj}\, \mathbb{I}(c_h \geq k) \mathbb{I}\left(e_{ij'}^h = 1\right) \mathbb{I}\left(g_{ij'}^h = 1\right) \quad (9)$$

The comparison with non-disadvantaged poor individuals is obtained by the absolute contribution of each indicator j to the MPI for non-disadvantaged eligible individuals,

$$N_j^e = \frac{1}{N} \sum_{h=1}^{m} \sum_{i=1}^{n_h} w_j s_{hj}\, \mathbb{I}(c_h \geq k) \mathbb{I}\left(e_{ij'}^h = 1\right) \mathbb{I}\left(g_{ij'}^h = 0\right) \quad (10)$$

D. Integrated Analysis

It may also be convenient to explore the joint distribution of deprivations across households for a set of individual indicators such as i) undernutrition, ii) out-of-school child(ren), and iii) pioneer children.

Let l o and p be three individual indicators. A household h contains a person disadvantaged according to p if ($f_{hp} = 1$); a person disadvantaged in l if $f_{hl} = 1$; and a person disadvantaged in o if $f_{ho} = 1$.

- A household h contains at least person disadvantaged in p and l if $f_{hp}f_{hl} = 1$.
- A household h contains at least one person disadvantaged in p and o if $f_{hp}f_{ho} = 1$.
- A household h contains at least one person disadvantaged in o and l if $f_{ho}f_{hl} = 1$.
- A household h contains at least one person disadvantaged in each of the three indicators if $f_{hp}f_{hl}f_{ho} = 1$.

IV. Results

Individual disadvantage headcount ratios (H_j) using child-level data for eligible children show that out of roughly 330 million school-age children in the countries covered, 36.7 million (11.1%) are out-of-school.[16]

A. Individual Child Disadvantages in Nutrition and School Attendance

Around 163 million children under 5 years of age reside in 6 South Asian countries with nutrition data, and 42.8% of these children are stunted or underweight, or both. This is a total of 69.7 million nutritionally disadvantaged children (Table 2).

Table 2. Children deprived in the school attendance and nutrition indicators in South Asia

	School attendance			Nutrition	
Country	**School-age children not attending school (%)**	**No. of school-age children not attending school *(thousands)***	**Population living with a child who is not attending school (%)[a]**	**Children (aged 0–4) who are individually deprived in nutrition (%)**	**No. of nutritionally deprived children (aged 0–4) *(thousands)***
Afghanistan	37.7	3,455	48.7	–	–
Bangladesh	11.4	3,922	11.2	39.7	6,539
Bhutan	10.1	16	10.8	33.5	25.8
India	7.4	17,429	6.4	44.2	51,502
Maldives	1.0	0.8	1.3	18.6	8
Nepal	5.0	320	5.5	37.9	1,143
Pakistan	26.3	11,591	28.5	39.1	10,480
South Asia	**11.1**	**36,734**	**10.1**	**42.8**	**69,698**

Notes: [a] This is the uncensored headcount ratio for school attendance.
Source: Authors' calculations based on surveys listed in Table 1.

16 A survey of the South Asian and UNICEF-related literature on child poverty is presented in Alkire, Alim and Ul Haq 2019. Note that empirical comparisons need to consider the demographic structures of the comparator populations and the sample design, missing values, and unweighted observations used for each cell, as well as cross-check figures such as the sex ratio against other demographic data. Due to space constraints, this paper assumes that demographic verification has been completed.

B. Disadvantaged Individuals Living in Multidimensionally Poor Households

The global MPI shows that over one in ten people in South Asia share their household with a child who is not attending school. Considering MPI poverty status and disadvantages in school attendance shows that 32.3 million out-of-school children, or 88% of all out-of-school children, live in MPI-poor households.[17]

More than 45% (over 74 million) of children under 5 years of age are multidimensionally poor. This is similar to the number of children who are nutritionally disadvantaged (42.8%), so one might imagine that they were mainly the same children. However, only two-thirds (65%) of nutritionally disadvantaged children (45 million out of 69.7 million) live in an MPI-poor household (Table 3).

Table 3. MPI poor Children disadvantaged in school attendance and nutrition

	School-age children who are MPI poor and not attending school		**Share of out-of-school school-age children who live in MPI-poor households**	**Children aged 0–4 who are MPI poor and nutritionally deprived**		**Share of nutritionally deprived children 0–4 who live in MPI-poor households**
	(%)	(*thousands*)	(%)	(%)	(*thousands*)	(%)
Afghanistan	34.0	3,111	90.1	–	–	–
Bangladesh	9.7	3,334	85.0	30.8	5,070	77.5
Bhutan	8.2	13.5	81.7	24.2	19	72.2
India	6.5	15,246	87.5	27.7	32,247	62.6
Maldives	0.1	0.1	12.3	0.6	0.3	3.5
Nepal	4.5	287	89.7	26.3	792	69.3
Pakistan	23.4	10,338	89.2	27.2	7,296	69.6
South Asia	**9.8**	**32,330**	**88.0**	**27.9**	**45,423**	**65.2**

Source: Authors' calculations based on surveys listed in Table 1.

C. Gender Inequalities in Individual Indicators of poor Individuals

Of the out-of-school children identified, 17.4 million are boys and 19.3 million are girls, so 52.6% of out-of-school children are girls. Overall, 9% of boys and 10.7% of girls are MPI poor and out of school. Country patterns vary considerably. In Afghanistan, 24.9% of boys aged 7–15 are multidimensionally poor and out of school, compared to 44% of girls. The gender pattern is reversed in Bangladesh: 12.1% of boys are multidimensionally poor and out of school, compared to 7.2% of girls. All these differences are statistically significant (Table 4).

17 Indicator definitions have data limitations in matching school start dates and child birth dates, which create errors of inclusion.

Table 4. MPI poor Children who are disadvantaged in school attendance and nutrition in South Asia, by gender

Country	School-age boys/girls who are MPI poor and not attending school (%)			Gender ratio	*Boys/girls under 5 years of age who are MPI poor and nutritionally deprived (%)*			Gender ratio
	Boys	***Girls***	***P value***	***Boys/Girls***	***Boys***	***Girls***	***P value***	***Boys/Girls***
Afghanistan	24.9	44.0	0.000	111	-	-	-	-
Bangladesh	12.1	7.2	0.000	103	30.6	31.0	0.751	108
Bhutan	8.7	7.8	0.140	95	24.2	24.3	0.989	102
India	6.1	6.8	0.000	108	27.6	27.8	0.470	109
Maldives	0.1	0.1	0.935	108	0.6	0.7	0.687	103
Nepal	3.1	6.0	0.000	105	25.5	27.0	0.453	110
Pakistan	19.7	27.2	0.000	99	26.6	27.8	0.557	103
South Asia	**9.0**	**10.7**		**106**	**27.7**	**28.1**		**108**
Number of children *(thousands)*	15,229	17,104			84,514	78,452		

Source: Authors' calculations based on surveys listed in Table 1.

In contrast, gender-disaggregated data on child nutrition reveal that 3.7 million fewer South Asian girls under 5 are disadvantaged in nutrition, compared to boys in the same age range (36.7 million boys and 33 million girls). The same pattern is observed among poor children: 23.4 million poor boys are nutritionally disadvantaged, compared to 22 million girls. The population shares are roughly equal, with a marginally higher incidence of disadvantage in Nepal and Pakistan, but no nutritional disparities are statistically significant (Table 4).

D. Intrahousehold Inequalities

Table 5 depicts measured intrahousehold patterns, using the harmonized database for the global MPI. Considering both poor and non-poor children, a striking 22.7% of children aged 0–4 in South Asia live in a household riven by intrahousehold inequality in nutrition– in which at least one child is nutritionally disadvantaged, and one child is not (= 14.1%+8.6% using Columns 4 of Tables 5 and 6). Over 60% of these, 14.1% of eligible children, live in a poor household with intrahousehold inequality. This inequality is by far the highest in Pakistan, where over one-fifth of children live in a poor household with intrahousehold inequality in child nutrition, followed by India, at 13.1% of children.

Overall, 11.2% of poor school-age children live in an MPI-poor household with intrahousehold inequality in school attendance, meaning that at least one school-age child is attending school, but at least one other

school-age child is not – as do 2.1% of non-poor school-age chidren. Table 5 shows there are either similar populations of boys and girls in households with inequality, or more boys.[18]

Intrahousehold inequalities are by far the highest in Afghanistan and Pakistan, followed by Bangladesh. As intrahousehold inequality in both indicators is high in Pakistan, where over one-fifth of children (9.9 million for schooling; 5.9 million for nutrition) live in a poor household with intrahousehold inequality, we further investigated the gender patterns. Among poor children, 32% of boys (1.7 million) and 58% of girls (2.7 million) have intrahousehold inequality in schooling and are themselves out of school, and the differences are statistically significant. For nutrition, 46.8% of eligible boys (1.4 million) and 47.6% of girls (1.4 million) are nutritionally disadvantaged and there is no significant difference. Turning to non-poor children who experience intrahousehold inequality in schooling, 34.9% of boys (417,000) and 37.3% of girls (440,000) are out of school but the differences are not statistically significant. Among the non-poor children who experience intrahousehold inequality in nutrition, 46.8% of boys (792,000) and 38.5% of girls (556,000) are nutritionally disadvantaged, but there is no statistically significant difference. Hence, we find no significant gender disparity among non-poor children for the sample size.

Thus, among poor Pakistani children living in households with intrahousehold inequality there is a large disparity in school attendance for girls, suggesting boy-children are preferentially sent to school, while in nutrition there is gender parity.

Table 5. Percentage of poor children experiencing intrahousehold equality or inequality and poverty in South Asia

	The only eligible child is disadvantaged	**All eligible children are disadvantaged**	**Eligible children with intrahousehold inequality**	**The only eligible child is not disadvantaged**	**All eligible children are non-disadvantged**
Nutritionally disadvantaged (cells show percentage of children 0–4 in each category)					
Bangladesh	21.2	5.2	**8.7**	13.0	3.3
Bhutan	14.7	4.4	**10.5**	11.3	5.7
India	11.6	9.4	**13.1**	5.7	3.9
Maldives	0.4	0.0	**0.4**	0.1	0.2
Nepal	13.3	7.1	**11.5**	9.6	5.2
Pakistan	7.3	9.5	**22.0**	4.5	5.2
– Boys	7.2	9.2	**21.9**	4.3	6.0
– Girls	7.5	9.8	**22.0**	4.7	4.4
South Asia	**11.9**	**9.0**	**14.1**	**6.3**	**4.1**
Out of school (cells show percentage of school-aged children in each category)					
Afghanistan	2.7	15.8	**34.3**	1.4	6.6
Bangladesh	2.4	1.8	**12.7**	11.6	19.6
Bhutan	2.9	1.2	**9.9**	7.1	18.6
India	1.3	1.8	**8.1**	5.7	16.2
Maldives	0.0	0.0	**0.3**	0.2	0.3

18 Gendered analysis will also be shaped by the share of households with children of both genders, which is very data demanding, hence further demographic analysis should accompany this analysis.

Nepal	0.8	0.9	**7.0**	8.2	22.8
Pakistan	2.1	11.4	**22.4**	1.8	8.8
– Boys	1.8	10.4	**23.5**	2.3	9.6
– Girls	2.5	12.3	**21.3**	1.2	8.0
South Asia	**1.6**	**3.5**	**11.2**	**5.7**	**15.4**

Source: Authors' calculations based on surveys listed in Table 1.

Table 6. Percentage of non-poor children experiencing intrahousehold equality or inequality and poverty in South Asia

	The only eligible child is disadvantaged	**All eligible children are disadvantaged**	**Eligible children with intrahousehold inequality**	**The only eligible child is not disadvantaged**	**All eligible children are not disadvantaged**
Nutritionally disadvantaged (cells show percentage of children 0–4 in each category)					
Bangladesh	6.3	1.0	3.3	29.3	8.6
Bhutan	6.6	0.7	4.2	29.5	12.4
India	8.5	3.8	8.7	22.6	12.6
Maldives	8.4	2.4	15.7	42.9	29.5
Nepal	6.9	1.9	5.9	28.3	10.3
Pakistan	4.2	2.7	11.7	13.4	19.6
– Boys	4.1	3.0	12.4	14.0	17.9
– Girls	4.3	2.4	10.9	12.8	21.3
South Asia	**7.5**	**3.3**	**8.6**	**21.9**	**13.3**
Out of school (cells show percentage of school-aged children in each category)					
Afghanistan	0.4	0.6	7.3	3.2	27.7
Bangladesh	0.8	0.3	1.4	20.6	28.8
Bhutan	0.7	0.1	2.7	16.2	40.6
India	0.3	0.1	1.4	19.3	45.8
Maldives	0.2	0.0	1.6	35.1	62.3
Nepal	0.3	0.0	0.6	19.0	40.4
Pakistan	0.4	0.5	5.4	7.9	39.4
– Boys	0.3	0.5	5.4	7.5	38.7
– Girls	0.5	0.6	5.3	8.2	40.2
South Asia	**0.3**	**0.2**	**2.1**	**17.5**	**42.6**

Note: The respective Rows of Tables 5 and 6 taken together sum horizontally to 100% of the population of eligible children.

Source: Authors' calculations based on surveys listed in Table 1.

E. Complex Categories: Pioneer Children

We define pioneer children as children between 10 and 17 years of age who have completed six years of education and live in a household that is not deprived in years of schooling (because of the pioneer child(ren)), although none of the adult members (people aged 18 and above) have completed six years of schooling.[19]

19 From 2020 the global MPI uses country-specific lower age bounds for new datasets, because normally 10-year-old children would not have completed six years of schooling, so the percentage of eligible children who are pioneers is a lower bound in this study as the population of eligible children is probably smaller.

Focusing first on adult deprivations, 436 million South Asians – one in four – live in a household in which no adult has completed six years of schooling. Introducing children's attainments within these households shows that of those 436 million people, 135 million live with a pioneer child. In total 37.5 million children aged 10–17 in South Asia are pioneer children – one in eight. So there are more pioneer children than out-of-school children in South Asia.

Of these, 10.6 million (28.4% of all pioneer children) live in an MPI-poor household. Locating these children in households, we observe that 46 million poor people are not deprived in years of schooling precisely because they share their household with a pioneer child (or children). In Nepal and India, one in ten poor people has a pioneer child in their household.

Table 7. Pioneer children in South Asia: MPI-poor status and their households

Country	Percentage of pioneer children among all children (10–17)	Total number of pioneer children (*thousands)*	Percentage of pioneer children who are MPI poor	Percentage of the population who are not deprived in years of schooling due to pioneer children	Number of people who are not deprived in years of schooling due to pioneer children (*thousands)*
Afghanistan	7.1	519	42.0	9.0	3,127
Bangladesh	14.4	4,283	27.8	10.5	17,032
Bhutan	13.3	19	16.8	10.5	84
India	14.2	29,737	29.0	7.7	101,488
Maldives	5.0	3	0.4	2.2	9
Nepal	20.6	1,122	23.4	13.0	3,778
Pakistan	5.1	1,788	19.6	4.7	9,155
South Asia	13.0	37,471	28.4	7.7	134,673

Source: Authors' calculations based on surveys listed in Table 1.

Table 8. Pioneer children in South Asia: gender, and the intrahousehold inequality

Country	Percentage of pioneer boys/girls among all boys/girls (10–17)			Percentage of pioneer children living with at least one other child aged 10–17 who has not completed six years of schooling and is out of school	
	Boys	*Girls*	*P value*	*Non-poor*	*Poor*
Afghanistan	9.3	4.7	0.000	8.1	23.4
Bangladesh	12.8	16.0	0.000	3.8	6.3
Bhutan	13.8	12.9	0.221	4.4	4.4
India	13.9	14.4	0.001	2.8	4.3
Maldives	5.3	4.6	0.370	1.4	0.0
Nepal	18.7	22.4	0.007	2.2	2.6
Pakistan	5.7	4.6	0.180	21.5	12.7
South Asia	12.8	13.3		3.8	5.1

Source: Authors' calculations based on surveys listed in Table 1.

A gendered analysis finds that roughly half of all pioneer children are girls. Overall, in South Asia, 12.8% of boys are pioneer children (18.8 million) and 13.3% of girls (18.7 million). In Afghanistan and Pakistan, girls' educational disadvantages are markedly higher. But in Nepal, Bangladesh, and India, a higher

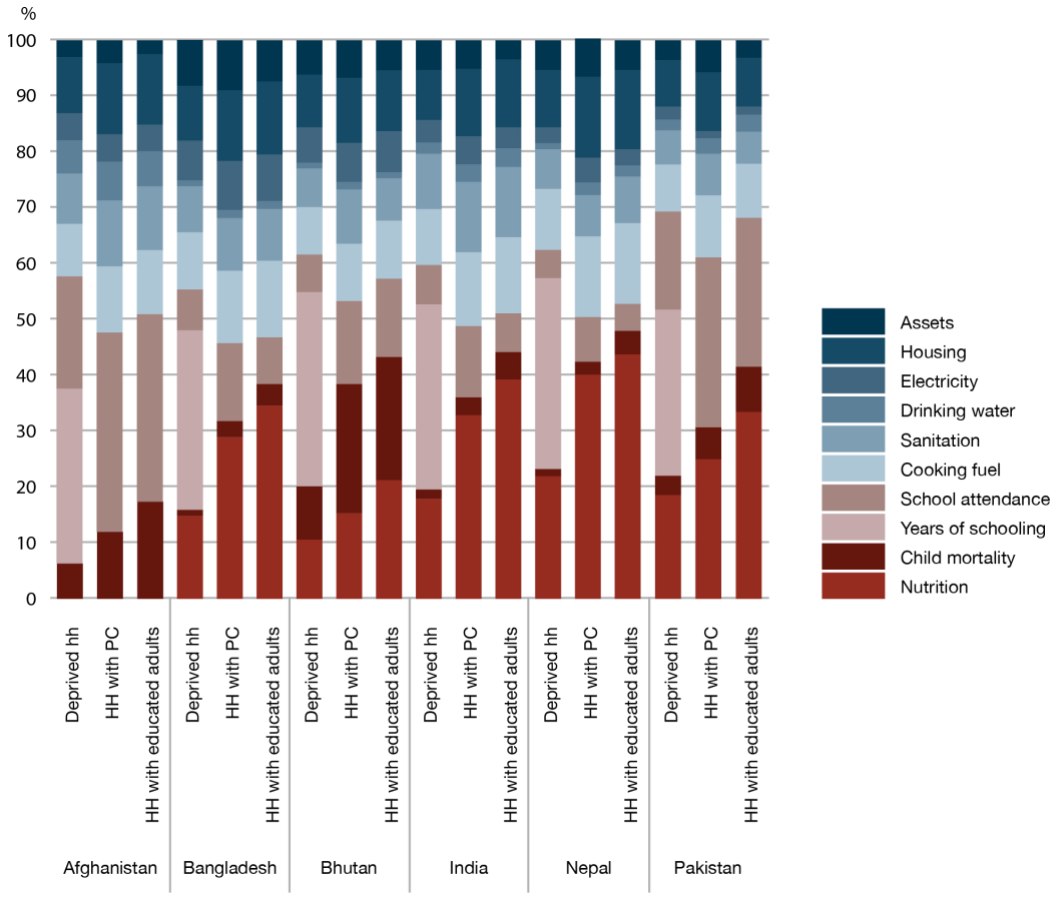
percentage of girls are pioneer children than boys – which could bring intergenerational changes of other kinds.

Intrahousehold inequalities are pivotal. For instance, almost one-third of pioneer children in Pakistan and Afghanistan live with at least one other child aged 10–17 who has not completed six years of schooling and is already out of school. Table 7 and 8 present key gendered and intrahousehold statistics associated with pioneer children.

The incidence of MPI among households with a pioneer child ranges from 0.6% in Maldives to 48.9% in Afghanistan. In every country except India, households with pioneer children have lower incidence and MPI than the national average. The two least-poor groups in every country except Maldives are those in which either at least one adult and one child has six years of schooling, or there are no eligible children and at least one adult is educated.

Due to sample size limitations, to investigate the contributions to poverty we compare three groups of poor people: pioneer children, and those who are disadvantaged or not disadvantaged in years of schooling due, at least in part, to adult attainments.

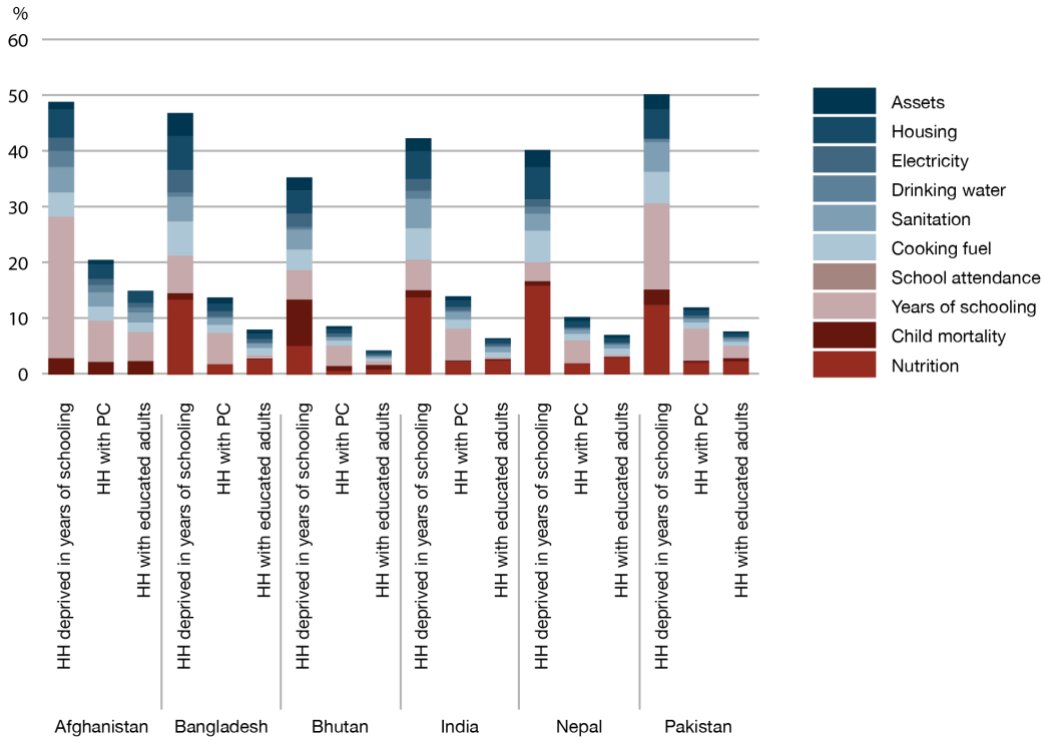
Figure 1. Percentage contribution of indicators to MPI for people with pioneer child, and with/without an adult who has completed six years of schooling



Source: Authors' calculations based on surveys in Table 1.

Figure 1 presents the percentage contribution of MPI by indicator, and Figure 2 presents the absolute contribution of each indicator for the three groups. The height of the bar in Fig 2 is the MPI level, so the level of MPI is strikingly higher among the population that is deprived in years of schooling, compared to households with pioneer children or with educated adults (and, perhaps, educated children).

Figure 2. Absolute contribution of indicators to MPI for households with pioneer child, and with/without an adult who has completed six years of schooling



Source: Authors' calculations based on surveys in Table 1.

A clear pattern can be seen if we compare three types of poor households: those deprived in years of schooling; those with pioneer children; and those where at least one adult has minimum years of schooling.[20] Except for child mortality, households with adult education deprivations are significantly poorer than the households with pioneer children or educated adults in every indicator in every country (Table 9). Households with pioneer children are significantly less poor than households where no one has completed six years of schooling. In Afghanistan and India, households with educated adults have significantly lower censored headcount ratios in every indicator than households with pioneer children. But Nepal and Pakistan have no significant difference between deprivations in censored headcount ratios

20 Maldives is omitted from this figure due to having a small number of observations.

for both household types across health and education indicators, electricity and sanitation (plus water, in Pakistan).

Table 9. Significant differences in censored headcount ratios between households with pioneer children, households deprived in schooling, and those with at least one educated adult

Panel A: Afghanistan, Bangladesh and Bhutan

	Afghanistan			**Bangladesh**			**Bhutan**		
	PC vs Dep	Non vs Dep	PC vs Non	PC vs Dep	Non vs Dep	PC vs Non	PC vs Dep	Non vs Dep	PC vs Non
Child mortality	0	0	0	0	0	0	1	1	1
Nutrition	.	.	.	1	1	1	1	1	0
School attendance	1	1	1	1	1	1	1	1	1
Electricity	1	1	1	1	1	1	1	1	1
Sanitation	1	1	1	1	1	1	1	1	1
Water	1	1	1	1	1	0	1	1	0
Housing	1	1	1	1	1	1	1	1	1
Cooking fuel	1	1	1	1	1	1	1	1	1
Assets	1	1	1	1	1	1	1	1	1

Panel B: India, Nepal and Pakistan

	India			**Nepal**			**Pakistan**		
	PC vs Dep	Non vs Dep	PC vs Non	PC vs Dep	Non vs Dep	PC vs Non	PC vs Dep	Non vs Dep	PC vs Non
Child mortality	1	1	1	0	0	0	1	1	0
Nutrition	1	1	1	1	1	0	1	1	0
School attendance	1	1	1	1	1	0	1	1	0
Electricity	1	1	1	1	1	0	1	1	0
Sanitation	1	1	1	1	1	0	1	1	0
Water	1	1	1	0	1	1	1	1	0
Housing	1	1	1	1	1	1	1	1	1
Cooking fuel	1	1	1	1	1	1	1	1	1
Assets	1	1	1	1	1	1	1	1	1

Source: Authors' computations based on surveys in Table 1.

G. Relationship of the MPI and Consumption-based Poverty with Out-of-school Children and Pioneer Children – Example from Pakistan

A natural question is whether and how these kinds of analyses might apply to monetary poverty. When income data are individual indicators, with information from all contributing household members, as well as their actual and desired percentage of working time, it would be possible to explore gendered and intrahousehold patterns of monetary poverty. Similarly, when consumption data (for example, on food items) are present for each household member, a parallel analysis could be applied (Oldiges 2017). But

even in the absence of such data, useful intrahousehold and gendered analyses can often be implemented. Nearly all household surveys used to generate monetary poverty have variables on completed years of schooling and school attendance (World Bank 2018). These are the same variables used to construct the out-of-school and pioneer child assessments presented here. It is elementary and useful to explore parallel patterns among monetary poor and non-poor children.

Table 10 compares the results of out-of-school and pioneer children for Pakistan with their poverty status computed from the CBN consumption poverty measure.

Using the CBN approach, the incidence of monetary poverty for Pakistan was 21.9% (Government of Pakistan 2021), while the incidence of the global MPI was 38.3%. The household-level distribution of out-of-school children is quite similar according to both surveys, as are the percentages of out-of-school children (see bold figures in Table 8). The percentage of pioneer children among children 10–17 is slightly higher in the HIES (7.1% from HIES 2018/19, compared to 5.1% from Pakistan DHS 2017/18). Similarly, in both datasets 28% to 29% of out-of-school children experience intrahousehold inequalities, and over 30% of pioneer children share their household with an out-of-school child, so both datasets provide congruent descriptive information. As expected, there are differences in the estimates among the poor children because the incidence of monetary poverty (21.9%) is over 16 percentage points lower than that of the MPI (38.3%).

Table 10. Out-of-school and pioneer children: monetary poverty and MPI in Pakistan

		MPI (Pakistan DHS 2017/18)		**Monetary (HIES 2018/19)**	
Headcount ratio of MPI or monetary poverty (Incidence, %)		38.3		21.9	
School-age children not attending school (%)		26.3		26.2	
Percentage of the population living with a school-aged child who is not attending school		28.5		28.9	
School-age children who are poor and not attending school (%)		23.4		12.5	
Share of school-age children not attending school who live in MPI/monetary-poor households (%)		89.2		47.7	
Poor school-age boys/girls who are not attending school (%)	Boys	19.7	P value	10.5	P value
	Girls	27.2	0,000	14.7	0.000
Non-poor school-age boys/girls who are not attending school (%)	Boys	2.6	P value	11.4	P value
	Girls	3.0	0.445	16.1	0,000
The only school-age child in the household is out of school	Non-poor	0.4		2.3	
	Poor	2.1		0.8	
All school-age children in the household are out of school	Non-poor	0.5		4.4	
	Poor	11.4		6.2	
All school-age children in the household are out of school, irrespective of number of		**14.4**		**13.7**	

children and household poverty status (sum of above four rows)					
School-age children experience intrahousehold inequality	Non-poor	5.4		17.1	
	Poor	22.4		**12.0**	
All school-age children show intrahousehold inequality, irrespective of household poverty status (sum of above two rows)		**27.8**		**29.1**	
The only school-age child goes to school	Non-poor	7.9		9.8	
	Poor	1.8		1.0	
All school-age children go to school	Non-poor	39.4		38.8	
	Poor	8.8		7.7	
All children go to school, irrespective of number of children and household poverty status (sum of above four rows)		**57.9**		**57.3**	
Percentage of pioneer children among all children (10–17)		5.1		7.1	
Percentage of pioneer children who are MPI or monetary poor		19.6		18.7	
Percentage of pioneer boys/girls among all boys/girls (10–17)	Boys	5.7	P value	8.5	P value
	Girls	4.6	0.180	5.6	0.000
Percentage of pioneer children living with at least one other child aged 10–17 who has not completed six years of schooling and is out of school	Non-poor	21.5		22.1	
	Poor	12.7		7.9	
Percentage of the population who are not deprived in years of schooling due to pioneer children		4.7		6.5	

Source: Authors' computations from HIES 2018/19 and Pakistan DHS 2017/18 surveys.

But monetary comparisons do not always duplicate the MPI results. For example, 21.9% of people are monetary poor and 26.2% of children are out of school, so it would be possible for 89% of out-of-school children to be in monetary-poor households, as in the case of multidimensional poverty. In fact, fewer than half (12.5%/21.9%) of out-of-school children live in monetary-poor households. But in the case of pioneer children, a similar percentage are MPI and monetary poor. Implementing such measured rather than modelled analyses triangulates across datasets and identifies comparisons that merit further exploration.

H. An Integrated Child Analysis

According to the surveys analyzed, there are roughly 37.5 million pioneer children (aged 10–17), 36.7 million out-of-school children (aged around 6–14), and 70 million nutritionally deprived children (aged 0–4) in South Asia. We can observe how many people live in households that experience only one, two, or all three of these conditions. Such analysis, using household-level information to measure the conditions of children of different ages, is also affected by differences in household size and compositions, as many households do not have a child in each age category. Hence these results need to be complemented by demographic analysis.

Table 11. Levels of deprivation in the school attendance and nutrition and overlap with pioneer children, by household (thousands)

Household has:	**Bangladesh**	**Bhutan**	**India**	**Maldives**	**Nepal**	**Pakistan**	**South Asia**
Nutritionally Disadvantaged Child(ren) **only**	32,908	139	256,392	54	5,745	67,848	**363,086**
Out of School Child(ren) **only**	18,222	87	84,416	6	1,591	54,967	**159,287**
Pioneer Child(ren)**only**	17,032	84	101,488	9	3,778	9,155	**131,547**
Out of School Child(ren) **+** Pioneer Child(ren)	2,484	9	13,305	0.4	239	3,005	**19,043**
Nutritionally Disadvantaged Child(ren **+** Pioneer Child(ren)	2,425	11	13,025	0.4	439	2,388	**18,289**
All three	573	2	2,804	-	22	1,095	**4,497**

Source: Authors' calculations based on surveys listed in Table 1.

A total of 759 million South Asians share their household with a child in one or more of the three conditions studied. Most of these – 363 million – only have a nutritionally disadvantaged child at home (Table 11); 159 million only have an out-of-school child and nearly 132 million only have a pioneer child. So, 86% of the people living in households with one of these conditions, do not experience either of the others. However, overlaps are important. For example, across South Asia, 63 million people live in a household where one child (aged 6–14 or so) is out of school and a different child (aged 0–4) is nutritionally disadvantaged. Most of these people live in Pakistan (30.4 million) and India (27.3 million). The incongruity of a household that has a pioneer child – a sign of hope – and disadvantaged child is also evident. India has 13.3 million people who live with a pioneer child and an out-of-school child, and another 13 million who live with a pioneer child and at least one nutritionally disadvantaged child. Across South Asia, 4.5 million people have the striking incongruity of experiencing all three conditions in their household at the same time. This integrated analysis enables identification of households with different child profiles.

V. Concluding Remarks

In *The Great Escape,* Deaton observes that "Averages are no consolation to those who have been left behind." This is true not merely within nations but also within households (Deaton 2013; cf Sen 2016; Penglase 2021). This paper presents a general methodology by which the information platform of consistent sub-and partial-indices accompanying a MPI that uses the household as the unit of identification

can be extended through gendered and intrahousehold analysis of individual disadvantages using individual indicators. It narrows the widely recognized gap between household averages and individual disadvantages, by outlining a methodology that can – and, when the data are appropriate and demographic analyses permit, should – be mainstreamed in the analyses of poverty indices that use households as their unit of identification.

Methodologically, we define the individual nested within the household, and define the eligible individuals for each indicator, in order to establish a framework to analyze six gendered and intrahousehold relationships for the poor and non-poor using data on individual disadvantages. Using the global MPI in South Asia, we illustrate the methodology using three indicators that pertain to different stages of childhood – school attendance, nutrition, and completed years of schooling – and provide examples of topics that could be further studied. We find, for example, that 88% of out-of-school children are multidimensionally poor, compared to 65% of nutritionally deprived children under 5 years of age, so the proportion of deprived children who are poor, varies. While there is no significant difference between boys and girls at the regional level in either school attendance or nutrition, and none by any country for nutrition, individual countries do show gender disparity in school attendance – with a higher percentage of girls out of school than boys in Afghanistan, Pakistan, Nepal, and India, but significantly more girls in school in Bangladesh. Overall, 11.2% of school-age children (one in 9) are poor and experience intrahousehold inequalities in school attendance – where one child is out of school but another attends school – and 14.1% (one in 7) experience intrahousehold inequalities in nutrition. Combining intrahousehold and gender analysis in Pakistan, we find significantlymore girls than boys not attending school in these households; whereas there is no significant gender disparity for nutrition.

In the case of pioneer children, while one-quarter of households in South Asia (436 million people) live in households in which no adults have completed six years of schooling, 135 million of these have a first-generation pioneer child who has completed six years of schooling. One in eight children (37.5 million) are pioneer children in South Asia – more than the number of out-of-school children (32.3 million) – and half of all pioneer children are girls. The indicator composition of poverty is illustrated for pioneer children, and shows that households with pioneer child have significantly lower censored headcount ratios in every indicator except child mortality, in every country with one exception (water, for Nepal). This is a springboard for further study.

We then compare the poverty status, gender, and intrahousehold patterns of out-of-school children and pioneer children in relation to the CBN monetary poverty measure in Pakistan alongside its global MPI, and find sometimes converging and sometimes diverging results. For example, less than half of out-of-school children live in monetary-poor households – while this is 88% for the MPI. This demonstrates the

value-added of undertaking parallel analyses using readily available education data in income and expenditure surveys, as well as of triangulating different datasets and definitions of poverty.

Naturally research questions arise from such a study. Methodologically, many additional relationships beyond gender can be estimated using the general framework, including disparities based on ethnicity or disability status. Studies of demographic changes and household composition are essential complements to this analysis. Empirically, while this South Asia focus on child indicators could be extended globally, applications should also be extended to gendered analysis among other age cohorts, or other individual attributes. Similarly, a disadvantage density measure for multi-individual households should be constructed, to bring into view 'intrahousehold monotonicity' – when some disadvantages are reduced, but not enough for that household to be considered non-deprived. Turning to composition, it is essential to relate multiple individual conditions at the household level to measure relationships directly, such as how many undernourished (or out of school) children live in a poor (or non-poor) household in which no female has completed primary school, for example.

Research could also study the determinants of disadvantages and of complex conditions such as pioneer children – individuals nested within their respective households – using multiple multilevel models including hierarchical statistical models to compare outcomes and extract unbiased and reliable results (Woodhouse and Goldstein 1988, Nuttall et al. 1989).

Empirically, all analyses should be extended to track changes over time. Data permitting, disaggregation by additional variables (ethnicity, subnational region) or characteristics could uncover additional policy salient information. The gendered and intrahousehold analyses of multidimensional poverty should be appropriately complemented by mixed-method and longitudinal studies.

The measurement methodology proposed and implemented in this paper augments household monetary or multidimensional poverty measures with consistent analyses of individual disadvantage. To our knowledge this is the first such systematic exposition of this methodology.

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Appendix

Appendix Table A1.

Incidence of poverty H

		Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan
Intergenerational progress	Household with a Pioneer child: Only child(ren) have six years of schooling	48.9%	32.8%	20.8%	34.6%	0.6%	26.8%	28.3%
	Only adult(s) have six years of schooling, not child(ren)	52.7%	24.5%	19.6%	26.6%	0.6%	23.5%	34.8%
Adults and children are same	Both adult(s) and child(ren) have six years of schooling	33.5%	17.5%	9.6%	17.2%	1.1%	20.7%	14.0%
	Both adult(s) and child(ren) don't have six years of schooling	93.6%	92.1%	76.8%	89.7%	9.1%	86.2%	93.4%
No children	Adult(s) with six years of schooling -- no child in the Household	17.5%	20.9%	7.2%	14.7%	0.3%	16.7%	11.4%
	Adult(s) without six years of schooling -- no child in the Household	85.1%	87.4%	70.3%	80.2%	2.1%	78.1%	81.9%
	National total	56.1%	41.1%	37.3%	27.5%	0.8%	35.3%	38.3%

MPI

		Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan
Intergenerational progress	Household with a Pioneer child: Only child(ren) have six years of schooling	0.207	0.139	0.089	0.142	0.002	0.101	0.121
	Only adult(s) have six years of schooling, not child(ren)	0.223	0.102	0.082	0.109	0.002	0.093	0.155
Adults and children are same	Both adult(s) and child(ren) have six years of schooling	0.140	0.069	0.039	0.067	0.004	0.076	0.060
	Both adult(s) and child(ren) don't have six years of schooling	0.530	0.493	0.387	0.484	0.030	0.441	0.539
No children	Adult(s) with six years of schooling -- no child in the Household	0.078	0.081	0.029	0.056	0.001	0.060	0.047
	Adult(s) without six years of schooling -- no child in the Household	0.404	0.433	0.322	0.384	0.007	0.363	0.444
	National total	0.273	0.194	0.175	0.121	0.003	0.154	0.198

Intensity A

		Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan
Intergenerational progress	Household with a Pioneer child: Only child(ren) have six years of schooling	42.3%	42.4%	42.8%	41.0%	33.3%	37.7%	42.8%
	Only adult(s) have six years of schooling, not child(ren)	42.3%	41.6%	42.0%	41.0%	37.2%	39.4%	44.4%
Adults and children are same	Both adult(s) and child(ren) have six years of schooling	41.7%	39.2%	40.5%	38.6%	33.3%	36.9%	42.7%
	Both adult(s) and child(ren) don't have six years of schooling	56.6%	53.5%	50.4%	54.0%	33.3%	51.1%	57.6%
No children	Adult(s) with six years of schooling -- no child in the Household	44.8%	38.9%	40.1%	38.0%	37.1%	35.9%	40.7%
	Adult(s) without six years of schooling -- no child in the Household	47.5%	49.5%	45.7%	47.9%	35.1%	46.5%	54.2%
	National total	48.7%	47.3%	46.8%	43.9%	34.4%	43.6%	51.7%

Appendix Table A2. Child Disaggregation for South Asian Countries

Country	**Year**	**MPI of children 0–17**	**Headcount ratio of children 0–17 (H)**	**Intensity of children 0–17 (A)**	**Share of children 0–17 in the population**	**Number of MPI poor children 0–17 (*thousands*)**	**Share of South Asian MPI poor children living in each country**
Afghanistan	2015/16	0.291	59.2%	49.1%	53.7%	11,012	4.6%
Bangladesh	2014	0.226	46.3%	48.7%	39.6%	29,818	12.4%
Bhutan	2010	0.19	39.4%	48.1%	38.5%	121	0.1%
India	2015/16	0.157	34.6%	45.3%	34.0%	155,853	64.7%
Maldives	2016/17	0.003	0.9%	34.2%	35.2%	1	0.0%
Nepal	2016	0.178	39.9%	44.5%	40.5%	4,682	1.9%
Pakistan	2017/18	0.238	44.8%	53.0%	45.4%	39,271	16.3%
Total		**0.180**	**38.0%**	**47.3%**	**36.3%**	**240,759**	**100%**