OPHI

OXFORD POVERTY & HUMAN DEVELOPMENT INITIATIVE

www.ophi.org.uk

UNIVERSITY OF OXFORD

Measuring Destitution in Developing Countries: An Ordinal Approach for Identifying Linked Subset of Multidimensionally Poor

Sabina Alkire, Adriana Conconi and Suman Seth

Inequality – Measurement, Trends, Impacts, and Policies
UNU-WIDER, Helsinki, September 2014

Motivation

Understanding different degrees and kinds of poverty contributes to their removal

Poorest of the poor are characteristically different and may require different types of assistance

- Lipton (1983), Devereux (2003), Harris-White (2005)

Deprivations among the poorest may reflect more chronic form of deprivations

- McKay and Lawson (2003); Aliber (2003)

Recent Debates and Goals

World Bank Aims ending $1.25/day poverty by 2030

- Jim Yong Kim, President of the World Bank

Shared prosperity/inclusive economic growth

- Tracking income growth among nation's bottom 40 percent

"MDGs did not focus enough on reaching the very poorest"

- High-Level Panel on the Post-2015 Development Agenda (2013)

Certain Concerns Remain

1. Does reducing $1.25/day automatically reduce deprivations in other dimensions? Multidimensionality!
2. Is it sufficient to look at deprivations in different dimensions separately? Joint distribution of deprivations!
3. What method is appropriate that respects the ordinal nature of the data in practice? Counting Approach!
4. Does the overall improvement ensure improvement among the situation of the poorest? **Assessing Destitution!**

In This Paper

Methodological concern

- How do we legitimately use ordinal information (without 'cardinalizing' ordinal data inappropriately) to identify the destitute
- Our approach is based on the dual cut-off counting approach to identification developed by Alkire and Foster (2011)

Distributional concern

- How has poverty reduced among the 'destitute', in comparison with overall poverty
- Has the 'destitute' being left behind?

How are the Poorest of the Poor Referred?

Various terms are used

- Ultra poor (Lipton 2003 and others)
- Destitute (Devereux 2003, Harris-White 2005)
- Extreme Poor (World Bank $1.25 a day)

- No agreement on the *hierarchy* of these terms

- We use the term ‘destitute’ which has been presented as a more multidimensional concept
  - Devereux (2003), Harris-White (2005)

Literature on Identification of Ultra Poor

Lipton (1983, 1988)

- Those eating below 80% of dietary energy requirements, and spending 80% or more total income on food
- Similar definitions by Kakwani (1993) and Ellis (2012)

Other Monetary Approaches

- Cornia (1994), Klasen (1997), Roberts (2001) and Aliber (2003), IFPRI (2007), Harrigan (2008), Bird and Manning (2008), Foster and Smith (2013)

Multiple Inclusion Criteria (NGOs)

- BRAC in Bangladesh (Haldar and Mosley 2004, BRAC 2007)
- Bandhan in a district of India (Banerjee et al. 2011)

Literature on Identification of Destitute

Devereux (2003) proposes identifying destitute using: inability to meet subsistence needs, assetlessness, and dependence on transfers (does not propose any particular method)

Ellis (2012) identify those households who are ultra poor and have labour dependency ratio of four or more as destitute

In this paper, we use the counting approach framework to identify the destitute

Counting Approach: Dual Cutoff Identification

Dimensions

$$X = \begin{bmatrix} x_{11} & \cdots & x_{1d} \\ x_{21} & \cdots & x_{2d} \\ & \ddots & \\ x_{n1} & \cdots & x_{nd} \end{bmatrix} = \begin{bmatrix} x_{1\bullet} \\ x_{2\bullet} \\ \vdots \\ x_{n\bullet} \end{bmatrix}$$

Persons

$$\begin{bmatrix} x_{\bullet 1} & \cdots & x_{\bullet d} \end{bmatrix}$$

A general achievement matrix

x_{ij}: the achievement of individual i in dimension j

Example:

x_{1d}: the achievement of the *first* individual in dimension d

x_{n1}: the achievement of the n^{th} individual in the *first* dimension

Counting Approach: Dual Cutoff Identification

Dimensions

$$X = \begin{bmatrix} x_{11} & \cdots & x_{1d} \\ x_{21} & \cdots & x_{2d} \\ & \ddots & \\ x_{n1} & \cdots & x_{nd} \end{bmatrix} = \begin{bmatrix} x_{1\bullet} \\ x_{2\bullet} \\ \vdots \\ x_{n\bullet} \end{bmatrix}$$

Persons

$$\| \quad [\, x_{\bullet 1} \quad \cdots \quad x_{\bullet d}]$$

$$z = [\, z_1 \quad \cdots \quad z_d]$$

Deprivation cutoffs (First)

z_j: deprivation cutoff in dimension j

Person i is deprived in dimension j if $x_{ij} < z_j$

Deprivation status value: $g_{ij} = 1$ if deprived and $g_{ij} = 0$ if not

Counting Approach: Dual Cutoff Identification

Dimensions

$$g = \begin{bmatrix} g_{11} & \cdots & g_{1d} \\ g_{21} & \cdots & g_{2d} \\ & \ddots & \\ g_{n1} & \cdots & g_{nd} \end{bmatrix} = \begin{bmatrix} g_{1\bullet} \\ g_{2\bullet} \\ \vdots \\ g_{n\bullet} \end{bmatrix}$$

Persons

$$\| \quad [\, g_{\bullet 1} \quad \cdots \quad g_{\bullet d}]$$

$$z = [\, z_1 \quad \ldots \quad z_d]$$

Deprivation cutoffs (First)

z_j: deprivation cutoff in dimension j

Person i is deprived in dimension j if $x_{ij} < z_j$

Deprivation status value: $g_{ij} = 1$ if deprived and $g_{ij} = 0$ if not

Counting Approach: Dual Cutoff Identification

Weights or relative values $w = (w_1,\ldots,w_d)$ are assigned

Deprivation score for person i is obtained as $c_i = \Sigma_j\, w_j g_{ij}$

- Deprivation score signifies the magnitude of deprivations

Poverty cutoff (Second cutoff): k

- Person i is identified as poor if $c_i \geq k$, non-poor otherwise

Set of poor denoted by Z

Counting Approach: Dual Cutoff Identification

Identification of the poor

Identification function: $\rho(x_{i.};z,w,k) = 1$ for $i \in Z$ and $\rho(x_{i.};z,w,k) = 0$, otherwise

- Deprivation cutoffs: z
- Poverty cutoff: k
- Weights: w

How to Identify Destitute (Subset of Poor)?

- Denote the set of destitute by $\underline{Z} \subseteq Z$
- Identification of destitute: $\rho(x_{i.};\underline{z},\underline{w},\underline{k}) = 1$ for $i \in \underline{Z}$ and $\rho(x_{i.};\underline{z},\underline{w},\underline{k}) = 0$, otherwise
  - Destitute deprivation cutoff: $\underline{z}$
  - Destitute poverty cutoff: $\underline{k}$
  - Weight vector: $\underline{w}$
- In order to have $\underline{Z} \subseteq Z$, we require that $\underline{w} = w$, $\underline{z} \leq z$, and $\underline{k} \geq k$
  - Non union criterion

Identifying a Subset of the Poor

The **intensity** approach

- Identify those who are more intensely poor with the set of same deprivation cutoffs
- Uses the deprivation cutoff vector z but a more stringent poverty cutoff $\underline{k} \geq k$
- Identification function: $\rho_i(x_{i.};z,w,\underline{k}) = 1$ for $i \in \underline{Z}$ and $\rho_i(x_{i.};z,w,\underline{k}) = 0$, otherwise
- Application: Human Development Report (2010)

Identifying a Subset of the Poor

The **depth** approach

- Identify those having multiple deprivations with larger depth of deprivations
- Uses the deprivation cutoff vector $\underline{z} \leq z$
- Obtain deprivation status value: $\underline{q}_{ij} = 1$ if $x_{ij} \leq \underline{z}_j$, else $\underline{q}_{ij} = 0$
- Obtain *deprivation score*: $\underline{c}_i = \Sigma_j \, w_j \underline{q}_{ij}$
- Identify person i as depth poor iff $\underline{c}_i \geq \underline{k}$ such that $\underline{k} \geq k$
- Identification function: $\rho_i(x_{i.};\underline{z},w,\underline{k}) = 1$ for $i \in \underline{Z}$ and $\rho_i(x_{i.};\underline{z},w,\underline{k}) = 0$, otherwise

Identifying a Subset of the Poor

The **mixed** approach

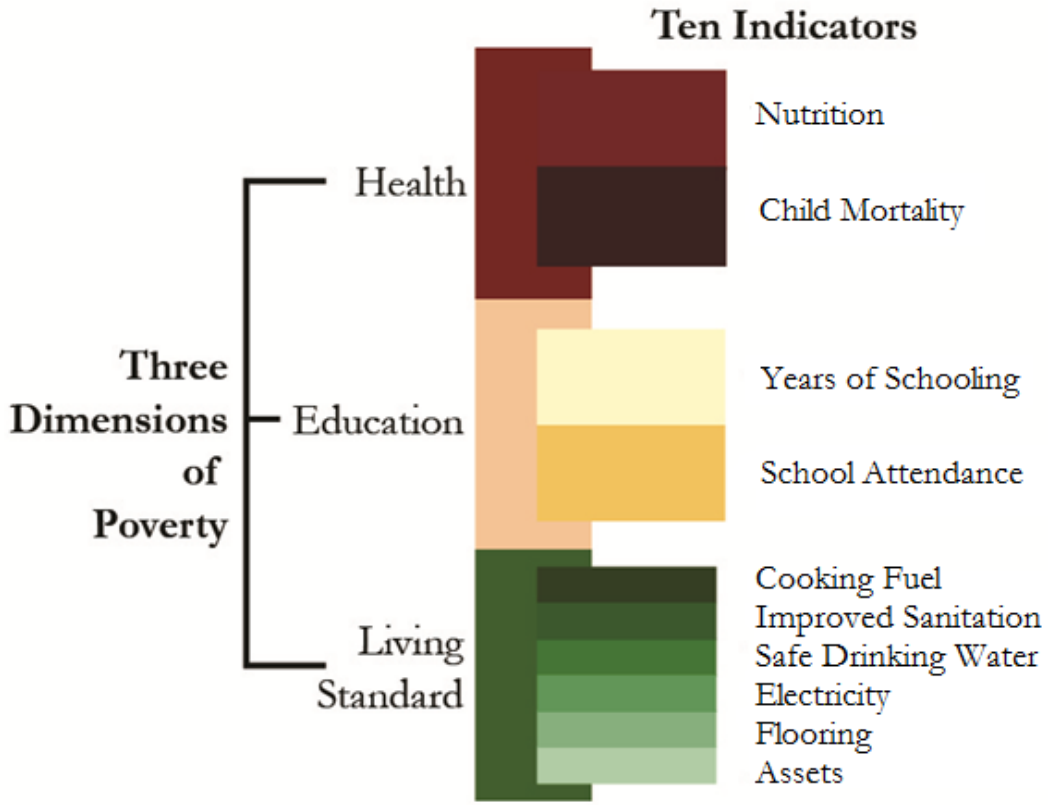
- Identify the set of intensity poor $\underline{Z}_I$ with $(z,w,\underline{k})$
- Identify the set of depth poor $\underline{Z}_E$ with $(\underline{z},w,\underline{k}')$ and $\underline{k} \leq \underline{k}' \leq k$
- The subset of poor $\underline{Z}$ can be identified as the intersection of the intensity poor and depth poor such that $\underline{Z} = \underline{Z}_I \cap \underline{Z}_E$
- Application: Alkire and Seth (2013)

A more robust way to identify the poorest

Identification of the Poor in MPI

Develop a deprivation profile for each person, using a set of indicators, cutoffs and weights (Alkire and Santos 2010)

Identify someone as poor if he/she is deprived in 33% or more of the weighted indicators



Deprivation cutoffs: MPI

Indicator	Deprivation Cutoff (z)
Schooling	No household member has completed five years of schooling
Attendance	Any school-aged child in the household is not attending school up to class 8
Nutrition	Any woman or child in the household with nutritional information is undernourished
Mortality	Any child has passed away in the household
Electricity	The household has no electricity
Sanitation	The household's sanitation facility is not improved or it is shared with other households
Water	The household does not have access to safe drinking water, or safe water is more than a 30-minute walk (round trip)
Floor	The household has a dirt, sand, or dung floor
Cooking fuel	The household cooks with dung, wood, or charcoal
Assets	The household owns at most one radio, telephone, TV, bike, motorbike, *or* refrigerator; and does not own a car or truck

Deprivation Cutoffs: Destitute

Indicator	Deprivation Cutoff (z)
Schooling	No one completed **at least one** year of schooling (>=1)
Attendance	**No child** attending school up to the age at which they should finish **class 6**
Nutrition	**Severe Undernourishment** of any adult (**BMI<17kg/m^2**) or any child (**-3 standard deviations** from median)
Mortality	**2 or more children died** in the household
Electricity	The household has no electricity (**No change**)
Sanitation	There is **no facility/bush, or other (open defecation)**
Water	The household does not have access to safe drinking water, or safe water is more than a **45-minute** walk (round trip)
Floor	The household has a dirt, sand, or dung floor (**No change**)
Cooking fuel	The household cooks with dung or wood (**coal/lignite/charcoal are now non-deprived**)
Assets	The household has **no assets (radio, mobile phone, etc.)** and no car

Destitution

We have implemented a destitution measure using the *depth approach* across 49 countries

- **Indicators:** **Same as MPI**
- **Weights:** **Same as MPI**
- **Poverty cutoff:** **Same as MPI**
- **Deprivation cutoffs:** **Deeper**

All 'destitute' people are already poor

Data Coverage

49 countries cover 2.8 billion people in the world, including populous countries such as India, Indonesia, Pakistan, Nigeria and Bangladesh

These 49 countries contain 1.2 billion MPI poor

At-A-Glance

Half of the 1.2 Billion MPI poor people are destitute

Of these destitute, 97.3% live in Sub-Saharan Africa and South Asia; over half of them live in India.

The percentage of MPI poor who are destitute:

Sub Saharan Africa: **53.3%**
Latin America and Caribbean: **25.3%**
Europe & Central Asia: **18.7%**
South Asia: **50.6%**
East Asia & Pacific: **26.4%**
Arab countries: **12.3%**

How Deprived the Destitute Are?

- The proportion of population destitute: $\underline{H}$

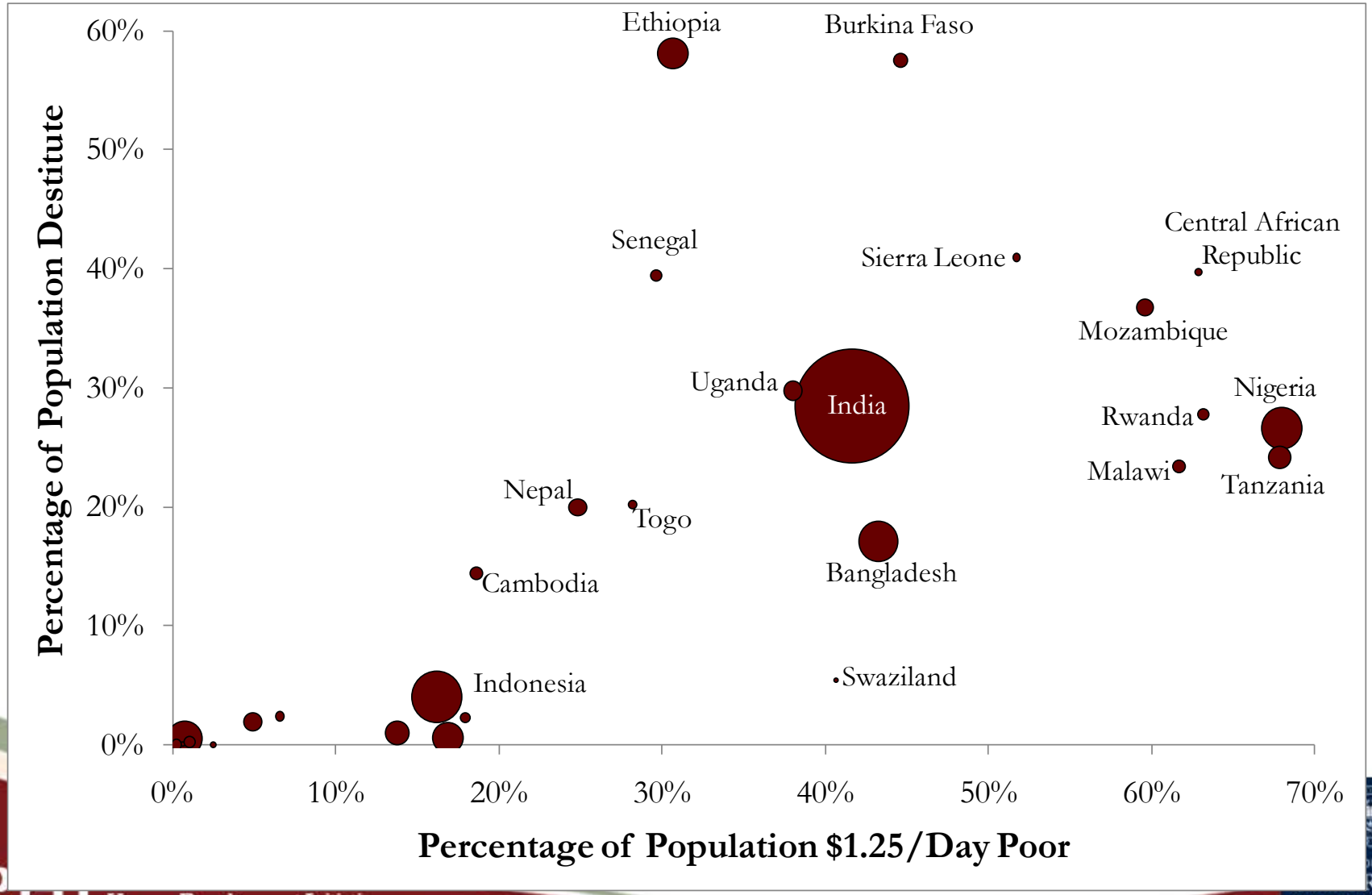
- The proportion of population destitute **and** deprived in indicator j by the depth indicator: $\underline{h_j}(\underline{k})$

- Then, the proportion of destitute deprived in indicator j by the depth indicator: $\underline{h_j}(\underline{k})/\underline{H}$

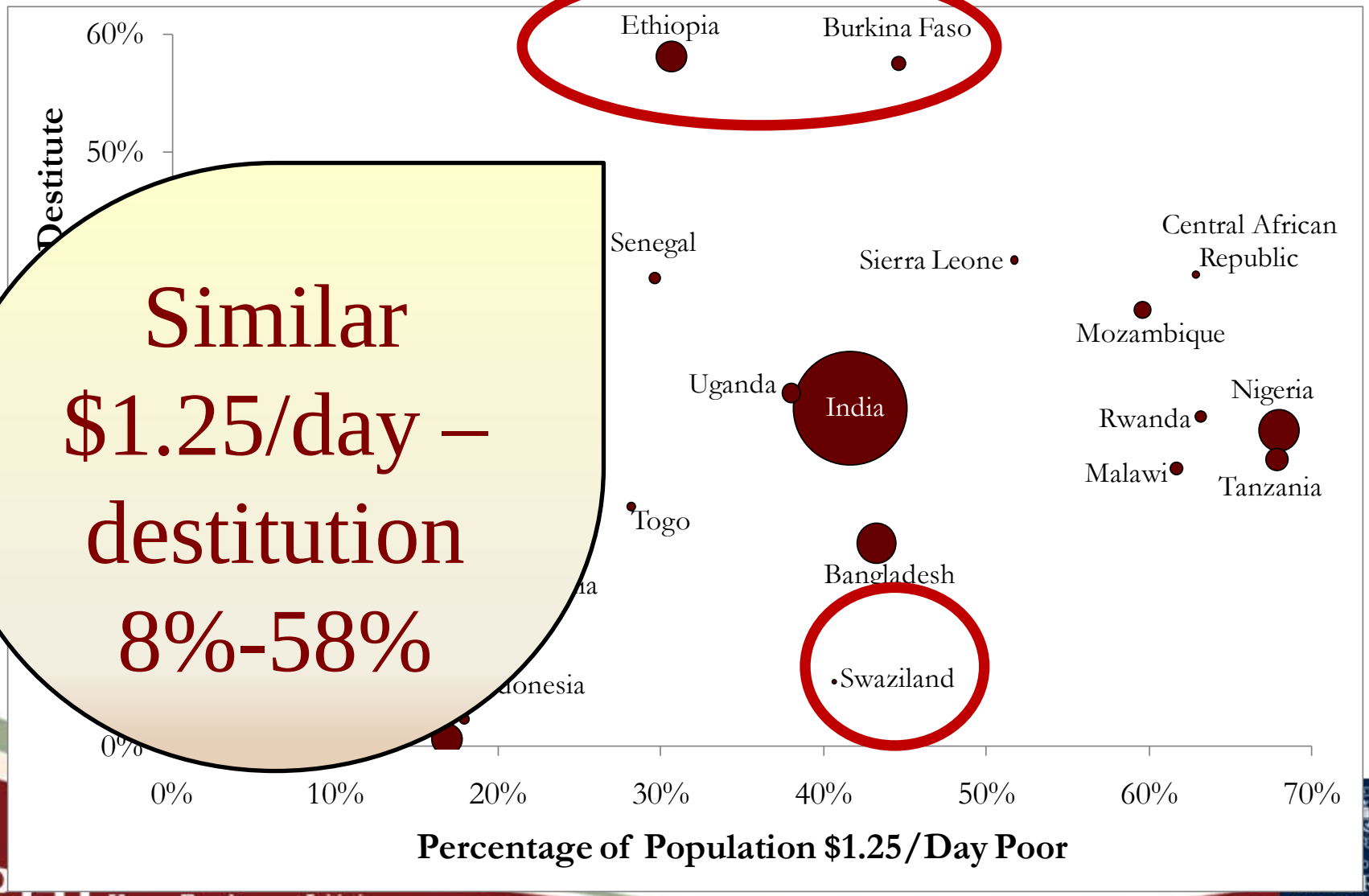
Deprivations among the Destitute

- 46% don't have anyone in their home with more than one year of schooling
- 36% have all primary-aged school children out of school
- 41% live in a household which has lost two or more children
- 67% have someone at home with severe malnutrition
- 71% don't have electricity to turn on the light
- 90% practice open defecation to relieve themselves
- 40% don't have clean water, or must walk 45 minutes to get it
- 83% have only a dirt floor
- 98% cook with wood, dung, or straw
- 69% don't even own a mobile phone or a radio – nor a refrigerator or bike or television

Destitute Vs. $1.25/Day Poverty

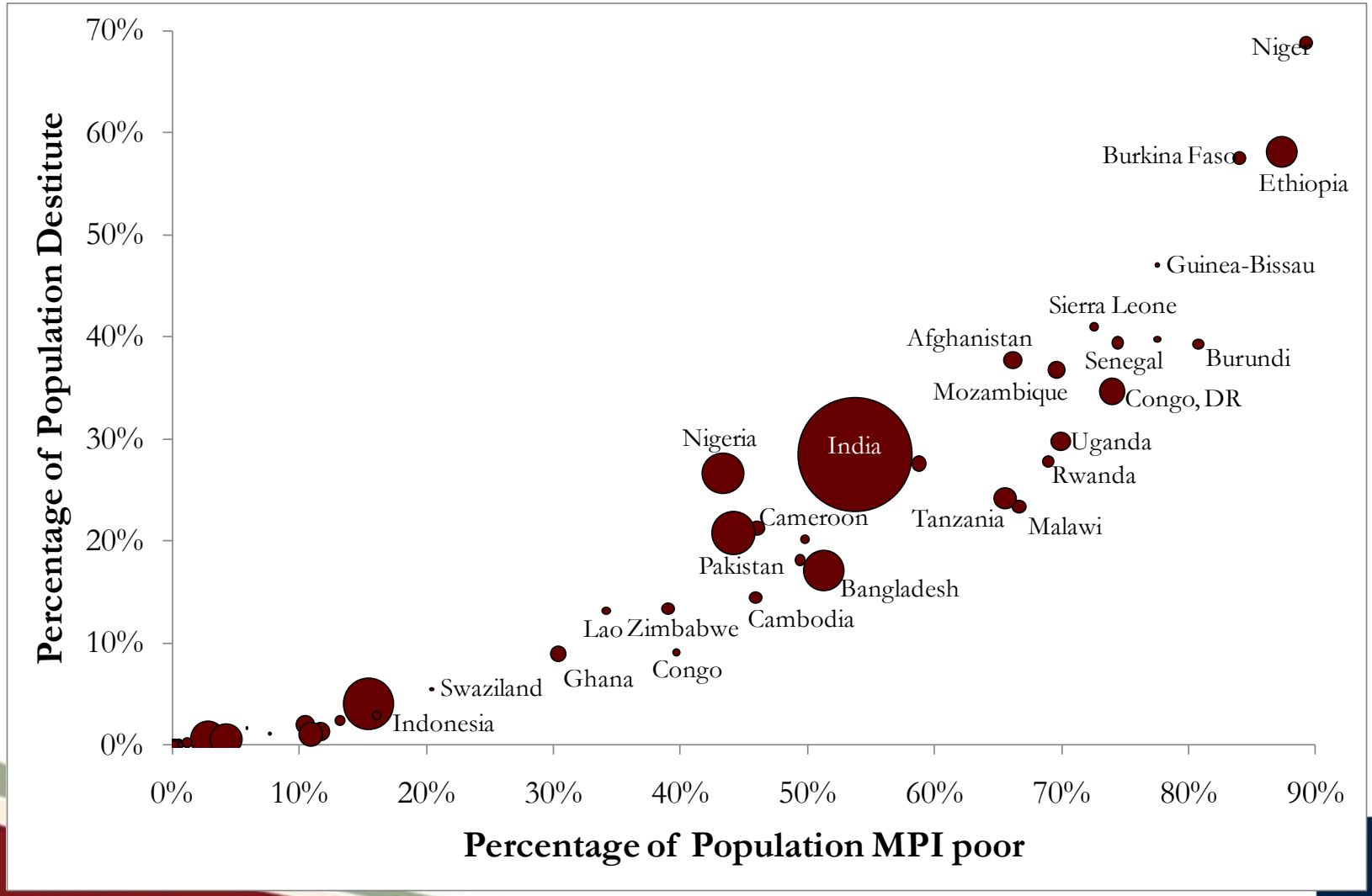


Destitute Vs. $1.25/Day Poverty

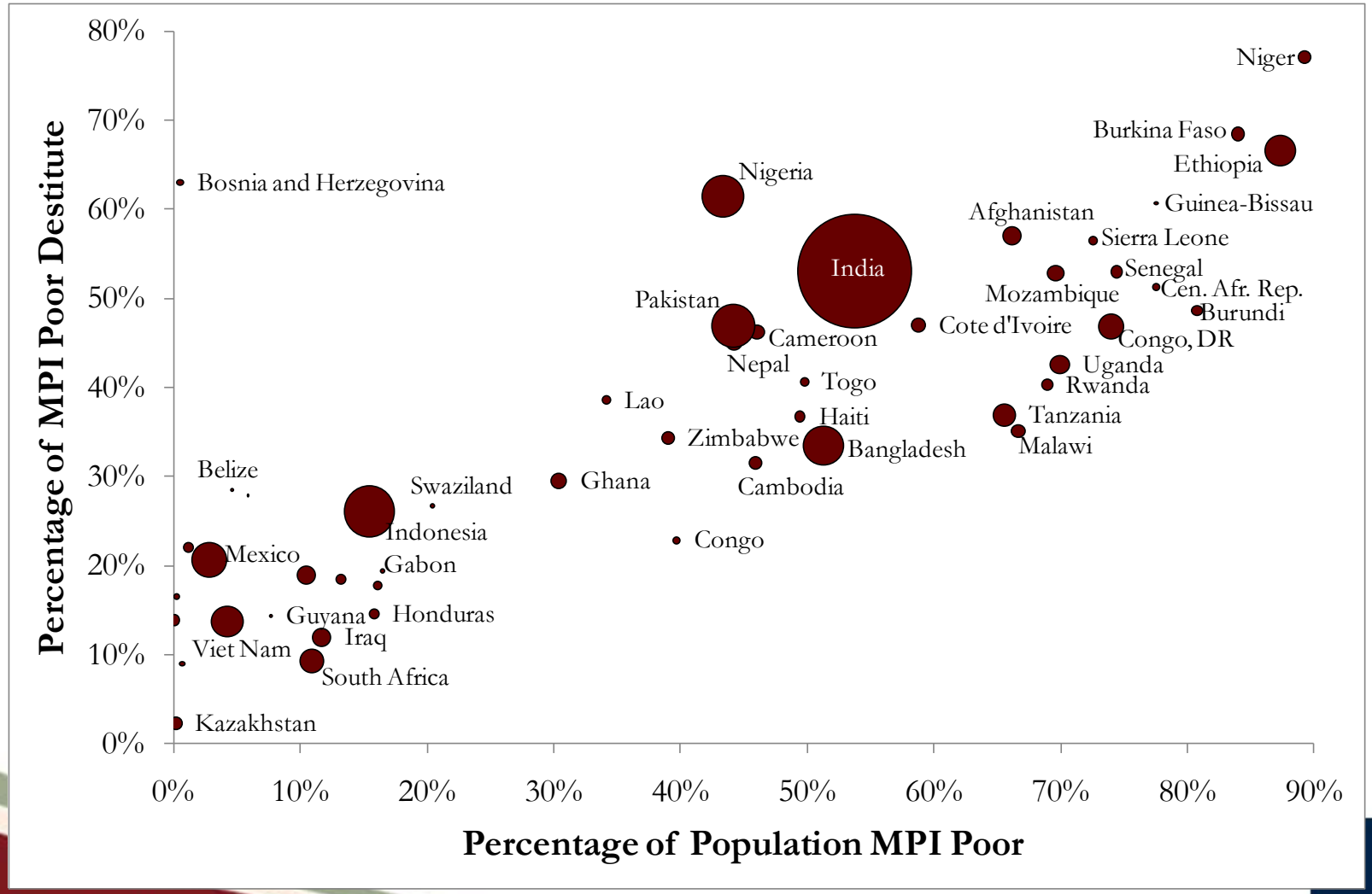


Similar $1.25/day – destitution 8%-58%

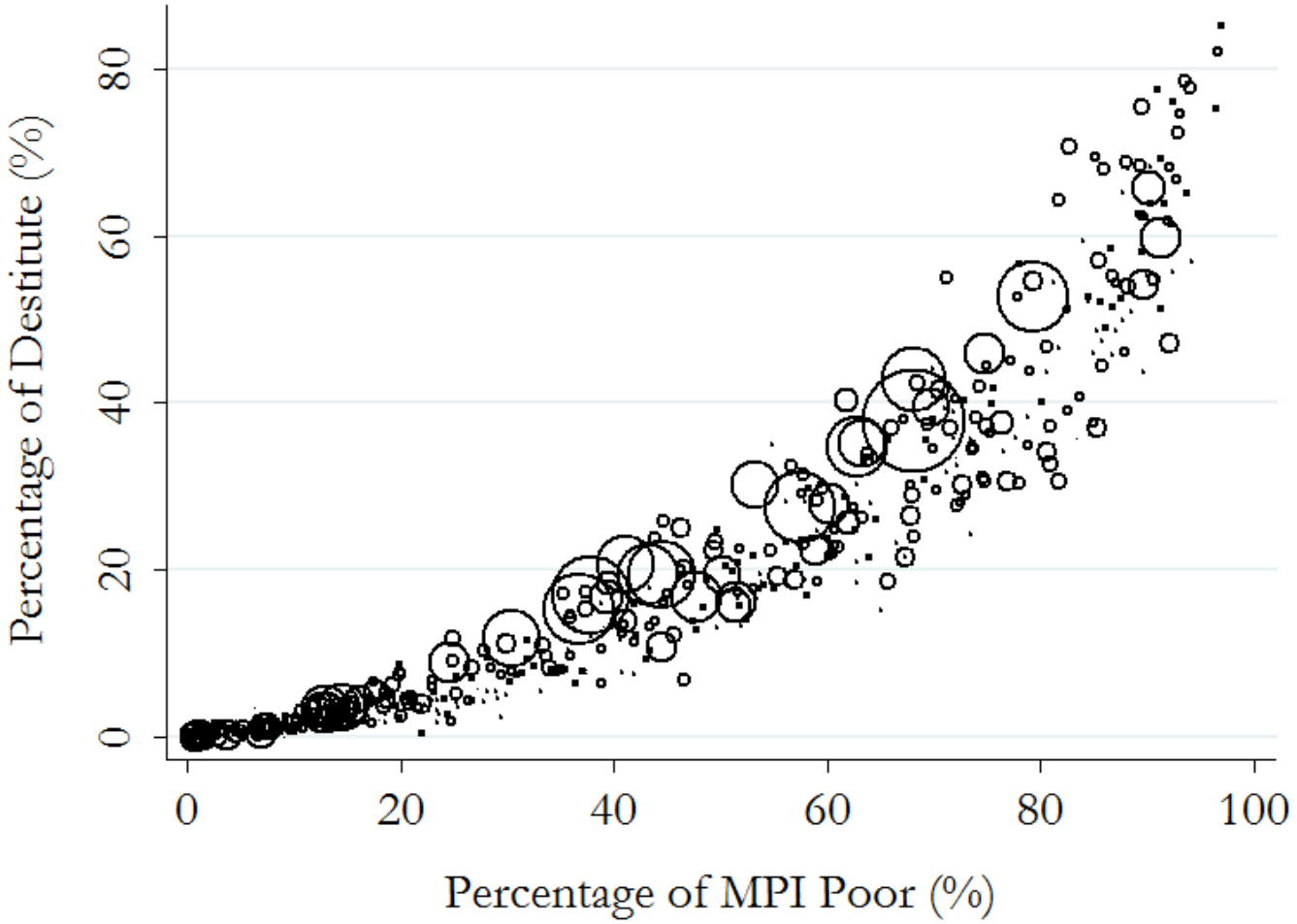
MPI Poor vs. Destitute



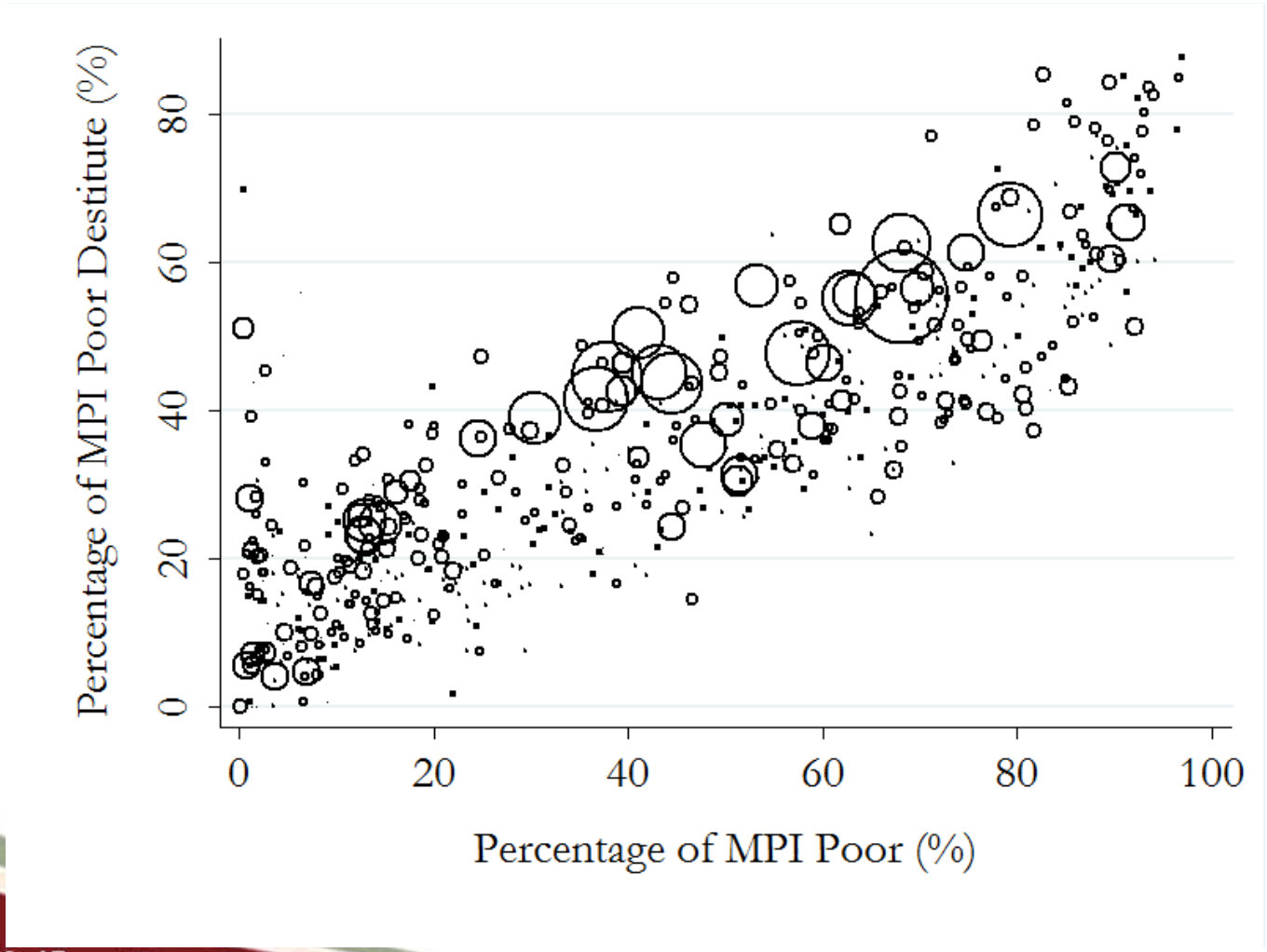
Destitute as Proportion of MPI Poor



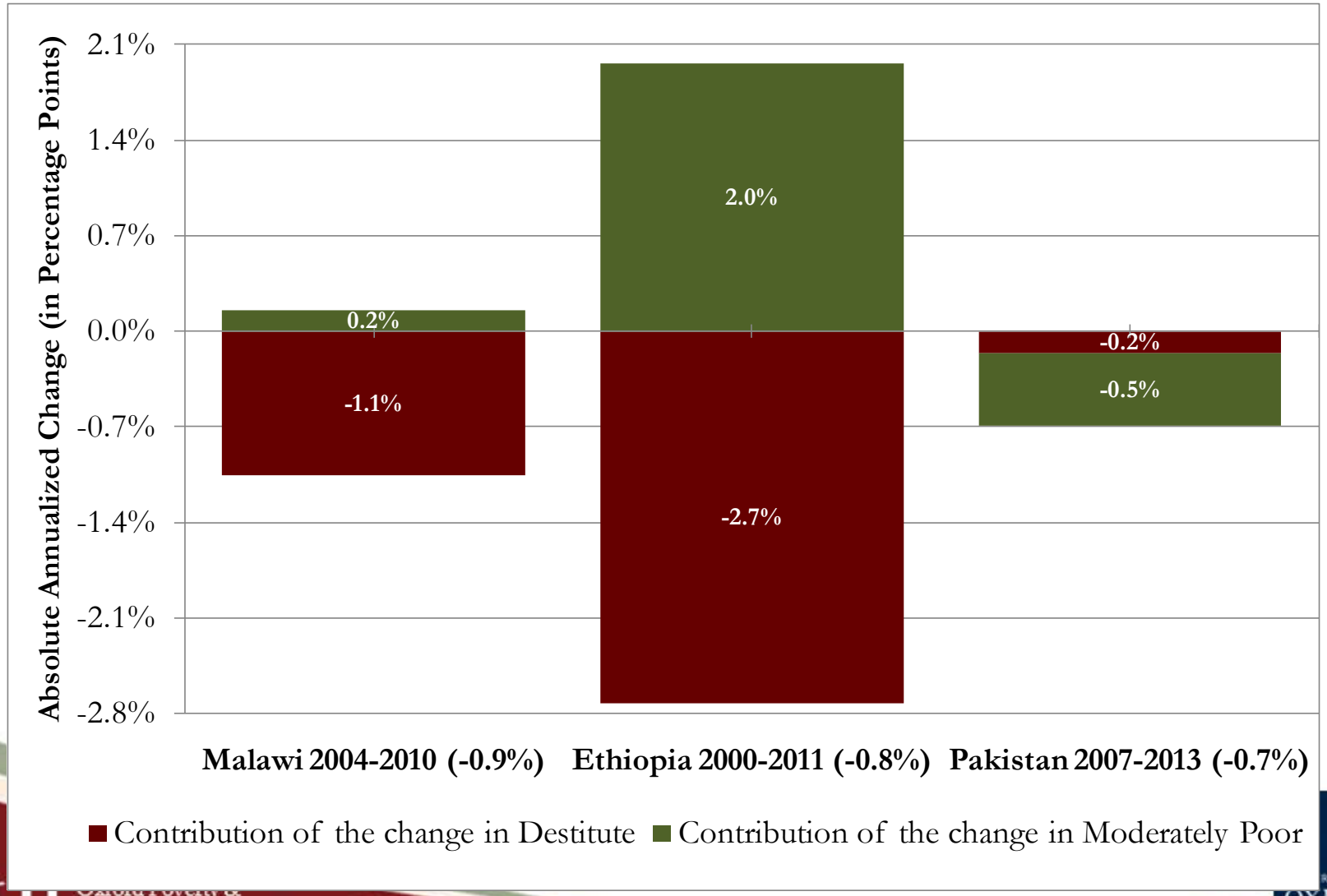
MPI Poor vs. Destitute (Sub-national)



Destitute as Proportion of MPI Poor (Sub-national)



Breaking Down Changes in Overall Poverty



Conclusions

We outline an approach in the counting approach framework to identify the destitute

Proper identification of the poorest of the poor is crucial in order to create adequate incentives to improve their conditions

Our application shows sobering large number of MPI poor are Destitute, facing extreme living conditions