Measuring Welfare Effects of Policy Reform

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Tackling Difficult Issues in Policy Reform: Evidence from Europe and Central Asia

March 24-5, 2015
Motivation

Evidence entails measurement
First step of PSIA
Establishes: what is the focus...and what is not!
Good measurement yields strong dividends in policy effectiveness
Focus
Communication
Coordination
Accountability
Anchor for good governance
Motivation

What is a good measure?

Desiderata

It must **understandable** and easy to describe
It must conform to a **common sense** notion of what you are measuring
It must fit the **purpose** for which it is being developed
It must be **technically** solid
It must be **operationally** viable
It must be easily **replicable**

Criteria used in Mexico in 2002 and again in 2006
Motivation

Today’s talk:
On the measurement of poverty and wellbeing
How measures can be used to inform policy and decisions

Goal: To give you ideas.
Practical ways to adapt and improve usual measurement tools.
To encourage you to innovate in line with your own policy needs.
Provide some examples on how others have innovated.
Outline

1. Understanding **Shared Prosperity**
   Communicating welfare, inequality, inclusive growth

2. **Person Equivalent** Headcount Measures
   Aligning incentives by incorporating depth, intuitively

3. **Multidimensional** Poverty Measures
   A framework for connecting policy and poverty
Understanding Shared Prosperity

Communicating welfare, inequality, inclusive growth


Free Download on Bank Website
Welfare

How to measure welfare?

At the individual level, economists use income as a welfare indicator

Or disposable income, or expenditure

How about for a country or some subgroup?

Tricky part – aggregation across people
Welfare

Most **common** approach: income per capita

Average or **mean** income $\mu$

Common alternative: National product per capita

**Ex**

Incomes $(2, 4, 8, 13, 21)$

$\mu = (2 + 4 + 8 + 13 + 23)/5 = 50/5 = 10$
Welfare

Growth Agenda
Maximize the growth in $\mu$

Ex

Initial (2, 4, 8, 13, 21) $\mu = 10$
Alternative 1 (2, 4, 9, 17, 26) $\mu = 12$
Alternative 2 (5, 5, 9, 13, 21) $\mu = 11$

Alternative 1 has faster growth in $\mu$
Welfare

Critique

Ignores **inequality**

and poverty

and other components of welfare

Problem

How to combine growth and distribution concerns in a single, easy to understand statistic? WB circa 2012
Inequality in Welfare

Solution: Shared prosperity index $\mu_{40}$

The mean of the lowest 40% of the population

Note: depends on all incomes, crude welfare aggregate

Revisit Ex

Initial $(2, 4, 8, 13, 21)$ $\mu_{40} = 3$

Alternative 1 $(2, 4, 8, 15, 24)$ $\mu_{40} = 3$

Alternative 2 $(5, 5, 9, 13, 21)$ $\mu_{40} = 5$

Alternative 2 has faster growth in $\mu_{40}$
FIGURE 2.1
Rates of Growth of the Bottom 40 Were Heterogeneous, but, on Average, Good across Europe and Central Asia in 2005–10
Inequality in Welfare

Key
Criterion incorporates inequality!

Inequality measure

\[ I_{40} = (\mu - \mu_{40})/\mu \]

linked to Palma

Ex

Initial (2, 4, 8, 13, 21)  \[ I_{40} = (10 - 3)/10 = 0.70 \]
Alt 1 (2, 4, 8, 15, 24)  \[ \mu_{40} = (11 - 3)/11 = 0.73 \]
Alt 2 (5, 5, 9, 13, 21)  \[ \mu_{40} = (11 - 5)/11 = 0.55 \]

Falling vs rising inequality
Inequality in Welfare

Note: $\mu$ and $\mu_{40}$ are two income standards
Summarizing distribution in a single representative income
Others? Median, mean of lowest 20%, geometric mean, 90th percentile income…

Note: Virtually all inequality measures are made up of two income standards
Ex $G = (\mu - S)/\mu$
Should track each income standard separately
# Income Standards and Inequality

<table>
<thead>
<tr>
<th>Measure</th>
<th>Twin Income Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gini Coefficient</td>
<td>$S_L$</td>
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<tr>
<td>Coefficient of Variation</td>
<td>Sen</td>
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<tr>
<td>Mean Log Deviation</td>
<td>geometric mean</td>
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<td>Generalized Entropy Family</td>
<td>general</td>
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<tr>
<td>or</td>
<td>mean</td>
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<td>90/10 ratio</td>
<td>$10^{th}$ pc income</td>
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<td>Decile Ratio</td>
<td>mean</td>
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<tr>
<td>Atkinson Family</td>
<td>$90^{th}$ pc income</td>
</tr>
<tr>
<td>Palma or Kuznets</td>
<td>$bottom \ 40%$ mean</td>
</tr>
<tr>
<td></td>
<td>mean</td>
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</tbody>
</table>
Application: Shared Prosperity

FIGURE 2.4
In Latin America and the Caribbean, Europe and Central Asia, and East Asia and the Pacific, Income Growth among the Bottom 40 Has Been Stronger Than Mean Income Growth

Next: Monetary Poverty

Shared Prosperity: Paving the Way in Europe and Central Asia (2014)
Summary: Shared Prosperity

Q/ What does $\mu_{40}$ measure?

Q/ What does the growth in $\mu_{40}$ measure?

Q/ What does $\mu_{40}/\mu$ measure?

Q/ What does $(\text{growth in } \mu_{40})/(\text{growth in } \mu)$ measure?
Summary: Shared Prosperity

Q/ What does $\mu_{40}$ measure?
It is a crude welfare measure
Inequality adjusted mean $\mu_{40} = \mu(1 - I_{40})$

Q/ What does the growth in $\mu_{40}$ measure?
Growth in welfare

Q/ What does $\mu_{40}/\mu$ measure?
Equality

Q/ What does (growth in $\mu_{40}$)/(growth in $\mu$) measure?
Inclusive growth

Indicates when inequality is falling or rising
Person Equivalent Headcount Measures

Aligning incentives by incorporating depth, intuitively

Monetary Poverty

How to measure monetary poverty?

Recall

Welfare required aggregation

Measuring poverty requires **two steps**

**Identification** “Who is poor?”

**Aggregation** “How much total poverty is there?”
Identification Step

Most identify poor using **poverty cutoff** $z$

Minimum level of living regarded as satisfactory

Incomes below $z$ are poor

How is $z$ chosen?

In principle it is a **normative** choice

Supported by budget studies and other **evidence**

However, **no single poverty line is ever uniquely justified**

Hence **arbitrariness** enters in

Should compare at multiple lines: Foster and Shorrocks (1988)

In practice a **political** choice

Poverty **committee**

Szekely (2006) *Números Que Mueven al Mundo: La Medición de la Pobreza en México*
Identification Step: Digressions

Note 1 $1.25 a day?
Justifications weaker than country cutoffs

Note 2 Tying benefits targeting to z?
Imperils very meaning of z in the long run – Atkinson
Case study US – no change in 60 years!

Note 3 Relative z?
Ex: 60% median (Europe)

Bizarre results
All incomes fall in a crisis and there is less poverty!

Not poverty – inequality
Aggregation Step

Often use an FGT (or $P_\alpha$) index


Headcount Ratio $P_0$ or $H$ incidence
Poverty Gap Ratio $P_1$ or HI includes depth
Squared Gap FGT Measure $P_2$ includes distribution
Aggregation Step: FGT

Example

Incomes $x = (7, 1, 4, 8)$ and poverty line $z = 5$

Deprivation vector $g^0 = (0, 1, 1, 0)$

Headcount ratio $P_0 = \mu(g^0) = 2/4$

Normalized gap vector $g^1 = (0, 4/5, 1/5, 0)$

Poverty gap $P_1 = \mu(g^1) = 5/20$

Squared gap vector $g^2 = (0, 16/25, 1/25, 0)$

FGT Measure $P_2 = \mu(g^2) = 17/100$
Problem

However most policy discussions only use headcount ratio! Why? Claim: Too hard to communicate
   Journalists, Congress, other stakeholders
Yet $P_0$ gives policymakers the wrong incentive
   Cherry pick richest poor

And they know it and want help
Steve Radelet, former USAID Chief economist
Problem

Headcount measures treat each poor person as if identical
But they are not
Differ in depth (intensity) of poverty
5¢ per day below $1.25 vs 60¢ below

Broad implications
Headcount measures can distort global picture of poverty – ignoring intensity
They can distort the evaluation of progress through time – ignoring intensity

Goal
Create intuitive headcount measures that uses the language of headcounts, but also account for depth
Solution

Analogy

**Full time equivalent job** or employee – 40 hours = 1 job

Implementation

Empirically find **person equivalent** as **average depth** among the poor in a base year

Ex  40¢ a day is the average gap among the poor

Use as **Person Equivalent**

Note – this **benchmark** can be global, regional, or for country.

Implications

A poor person with a gap of 5¢ = 1/8 of a person equivalent

A poor person with a gap of 60¢ = 3/2 of a person equivalent
Person equivalent headcount \( q_e \)

- Adds up shortfalls and divide by benchmark depth

Person equivalent headcount ratio \( H_e = q_e/n \)

- Divide by total population

Key result

- \( H_e \) measures poverty in the same way as the poverty gap ratio
- More intuitive

Big implication for the global picture

- Over space and time
- Example using $1.25 a day data
Person Equivalent Headcount Measures by Region (1990s Global Benchmark)

<table>
<thead>
<tr>
<th>Region</th>
<th>Range of Years</th>
<th>Population n (millions)</th>
<th>Headcount q (millions)</th>
<th>Headcount ratio $H$</th>
<th>Person-equivalent headcount $q_e$ (mill.)</th>
<th>Person-equivalent headcount ratio $H_e$</th>
<th>% change in $H$</th>
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<th>Depth Elasticity</th>
</tr>
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<tbody>
<tr>
<td>East Asia &amp; Pacific</td>
<td>1992-97</td>
<td>1,631</td>
<td>603</td>
<td>.37</td>
<td>560</td>
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<td>2007-10</td>
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Benchmark is global average income shortfall in 1992-2000 period: 39.6¢ per day
## Person Equivalent Headcount Measures

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Benchmark is global average income shortfall in 1992-2000 period: 39.6¢ per day
Application: PE Headcount Measures*

Developing Countries in ECA Region ($5 a day)

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<th>Year</th>
<th>H</th>
<th>I</th>
<th>He</th>
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<tbody>
<tr>
<td>1981</td>
<td>54.7</td>
<td>0.40</td>
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<td>2011</td>
<td>16.6</td>
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Data from Poverty and Inequality Database, The World Bank
Summary: PE Headcount Measures

Provide

Much **deeper** analysis than usual headcount ratio

For example, East Asia and the Pacific has the same person equivalent headcount ratio as Latin America and the Caribbean

Incorporate

Depth in a **transparent** way to policymakers

Was motivated by a policymaker – Steve Radelet (former USAID Chief Economist)

Linked

To the **poverty gap** ratio of the FGT class

*What do you think?*

*Next: Multidimensional Poverty*
Multidimensional Poverty Measures

A framework for connecting policy and outcomes

Motivation

Question

If global monetary poverty were to disappear (ie, fall below 3%) would this signal an end to poverty?

Answer

It’s a great start

But there is more to poverty than inadequate monetary resources

Eg

Capability deprivations Foster and Sen 1997

Basic social services

Human and social rights
Motivation

Question
Should poverty refer only to those advantages that can be valued in monetary terms?

Many voices, including those of the poor, would say no

Practical issues
Health insurance in the US
Housing in developing countries
How to value money over time and space (PPP)?
Malnourished children in India
Motivation

Tajikistan
  Population about 7.6 mln. in 2011

National Poverty
  36.5% of population below poverty line in 2013
    96 percent in 1999
    47 percent in 2009
  Pace of poverty reduction in the past 15 years has been among the top 10 percent in the world

Yet many issues with non-monetary dimensions
  90% experienced unscheduled electricity interruption
  80% experienced unscheduled drinking water interruptions
  Less than 50% of the population are satisfied with the quality of health, education, drinking water.

See also Swinkles (2014)

Source: Bakanova and Sobirzoda (2014).
Another Voice

“The task, then, for the governments of the developing countries is to reorient their development policies in order to attack directly the personal poverty of the most deprived 40% of their populations. This the governments can do without abandoning their goals of vigorous overall economic growth. But they must be prepared to give greater priority to establishing growth targets in terms of essential human needs: in terms of nutrition, housing, health, literacy, and employment - even if it be at the cost of some reduction in the pace of advance in certain narrow and highly privileged sectors whose benefits accrue to the few.

Such a reorientation of social and economic policy is primarily a political task, and the developing countries must decide for themselves if they wish to undertake it. It will manifestly require immense resolve and courage.”
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Robert McNamara (1972, p. 30)
Many countries are deciding for themselves!

Countries with their own MPIs | Date
--- | ---
Mexico | 2009
Bhutan | 2010
Colombia | 2011
Philippines | 2014
Chile | 2014
El Salvador | Soon
Honduras | Working
Costa Rica | Working
Dominican Republic | Working
Many others….

Organic, sustainable country demand!

Shared methodology with south-south technical support

Multidimensional Poverty Peer Network with support from BMZ
Origins: Mexican Law 2006
Demand to evaluate poverty with many dimensions

Previous academic work: aggregation not identification
Set cutoffs to identify deprivations
Then identified poor in one of two ways
  Poor if have any deprivation (union)
  Poor if have all deprivations (intersection)

Policy problem
  Impractical when there are many dimensions
Needed intermediate approach
Multidimensional Poverty: Overview

Alkire and Foster (2011)
Address problem

Identification – Dual cutoffs
  Deprivation cutoffs
  Poverty cutoff – across dimensions

Aggregation – Adjusted FGT
  Reduces to FGT in single variable case
  Natural generalization of FGT to multidimensional case

Focus – Adjusted Headcount Ratio
  Measures average breadth of deprivation
Adjusted Headcount Ratio

Concept - Poverty as multiple deprivations
  Mirrors identification used by NGOs – BRAC
  Depends on joint distribution

Allows ordinal or qualitative data
  Dirt floors vs covered floors; quality of sanitation
  Qualitative data into quantitative data

Transparent
  Defined by variables, deprivation cutoffs, deprivation values, poverty cutoff
  Can be replicated and tested for robustness

Understandable
  Participatory exercises
Adjusted Headcount Ratio

Has been implemented

Cross country – MPI in the HDR’s since 2010
Country – Mexico, Bhutan, Colombia, etc.
State – Sao Paolo, Minas Gerais

All contextualized to address local policy concerns

Being considered for SDGs

Other measures with same technology –

Gross national happiness index (Bhutan)
Women’s Empowerment in Agriculture Index (USAID/IFPRI;OPHI)
Service delivery performance measure (Allwine and Foster, 2014)
Example 1: - Global MPI

**Headline** for communication and monitoring

**Coordinated dashboard** for policy analysis
Example 1 – Global MPI

Description

An internationally comparable index of acute poverty for 100+ developing countries.


Methodology is being adapted for national poverty measures – using better indicators for each policy context.

A revised MPI 2015+ is being considered for monitoring extreme poverty in the SDGs
Example 1 – Global MPI

Data Sources

Demographic & Health Surveys (DHS - 52)
Multiple Indicator Cluster Surveys (MICS – 34)
World Health Survey (WHS – 16)

+6 special surveys covering urban Argentina (ENNyS), Brazil (PNDS), Mexico (ENSANUT), Morocco (ENNVM/LSMS), Occupied Palestinian Territory (PAPFAM), and South Africa (NIDS).

Constraints: Data are 2002-2013. Not all have precisely the same indicators.
Constructing the MPI - Overview

3 Dimensions

10 Indicators

Years of Schooling
School Attendance

Child Mortality
Nutrition

Education (1/3)

Health (1/3)

Cooking Fuel
Sanitation
Water
Electricity
Floor
Asset Ownership

Standard of Living (1/3)

(1/6)

(1/6)

(1/6)

(1/6)

(1/18 Each)
Constructing the MPI

1. Build a deprivation score for each person

Nathalie faces multiple deprivations in health and living standards
2. **Identify who is poor**

A person is multidimensionally poor if they are deprived in 33% or more of the dimensions.

*Nathalie’s deprivation score is 67%*
Constructing the MPI

3. **Compute** the MPI = $M_o$ as the product of two components:

\[
MPI = H \times A
\]

*Incidence H*

percentage of people who are poor

*Intensity A*

average percentage of dimensions in which poor people are deprived

Alkire and Foster *Journal of Public Economics* 2011
H and A for every country
Disaggregated data by region
Composition of poverty by dimension
Composition by region and dimensions

Percentage Contribution of Each Indicator to the MPI at the Sub-national Level

Percentage of Poor People

Over Time: Bangladesh improved school attendance, Ethiopia nutrition and water, Ghana many at the same time.
The MPI is like a high resolution lens…
The MPI is like a high resolution lens…

You can zoom in
The MPI is like a high resolution lens…

You can zoom in

and see more
Why Multidimensional Poverty? It is different from monetary poverty And different policies reduce it.

MPI Poor • $1.25 a day
Example 2: National Methodologies

Motivations

Show progress quickly and directly (Monitoring/Evaluation)
Consistent with the political cycle
Inform planning and focus policy
Target poor people and communities more effectively
Can reflect poor people’s own understandings of poverty

Cases of National Measures

Mexico December 2009
Colombia August 2011
Others in progress

- Slides drawn from government agencies
- Available on agency websites
Example 2.1 - Mexico

Good Governance in Bad Times
Multidimensional Poverty in Mexico
Methodology & results

First released December, 2009
Change in the Number of Poor People in Mexico 2008-2010

**Millions of people**

- **Income Poverty**
  - 2008: 44.5% (48.8 million)
  - 2010: 46.2% (52.0 million)

- **Social Deprivations**
  - Food security: 4.1
  - Education: -0.8
  - Housing: -2.3
  - Basic Services: -2.9
  - Social Security: -9.0
  - Access to Health Care: -10.0

**Social Deprivations**
- **Extreme income poverty**
  - 2008: 4.8
  - 2010: 3.5
  - 2010 levels:
    - 46.2% poverty
    - 48.8 million

**Change in the Number of Poor People**
- **2008**
  - 44.5% poverty
  - 48.8 million people
- **2010**
  - 46.2% poverty
  - 52.0 million people

**Fuente:** estimaciones del CONEVAL con base en el MCS-ENIGH 2008 y 2010
Example 2.2 - Colombia

Coordinating Action
Multidimensional Poverty Index for Colombia and its applications (MPI-Colombia)

ROBERTO ANGULO
YADIRA DÍAZ
RENATA PARDO

National Planning Department
Division of Social Promotion and Quality of Life
September 2011
Dimensions, Variables and Weights
MPI-Colombia

Educational Conditions
- Schooling
  - School Attendance
  - At the right level
  - Access to infant services
  - No Child Labour

Childhood & Youth
- Absence of long-term unemployment
- Formal work

Work
- Coverage
  - Access to health care given a necessity

Health

Housing & Public Services
- Improved Water
- Sanitation
- Flooring
- Exterior Walls
- Overcrowding
Poverty committee
Coordinating and monitoring poverty reduction

- **Leaders**
  - Counselor for the Presidency
  - National Planning Department
- **Permanent members**
  - Ministry of Health
  - Ministry of Labor
  - Ministry of Housing
  - Ministry of Agriculture
  - Ministry of Education
  - Ministry of Finance

MANDATORY PRESENCE
The President of Colombia
Summary: Multidimensional Poverty

Role?

Presents complementary picture of poverty
Includes other key, direct, non-monetary dimensions

Policy Relevant tool

Dimensions can embody country specific policies and priorities
Show progress quickly and directly (Monitoring/Evaluation)
Inform planning and coordinate action
Target poor people and communities more effectively
Reflect poor people’s own understandings of poverty

Accounting system for understanding poverty

HA; Decompositions by subgroup, breakdown by dimension; changes
Recall

What is a good measure?

Desiderata

It must **understandable** and easy to describe
It must conform to a **common sense** notion of what you are measuring
It must fit the **purpose** for which it is being developed
It must be **technically** solid
It must be **operationally** viable
It must be easily **replicable**

*What do you think?*
Thank You!
The Multidimensional Poverty Peer Network

Launched in June 2013 at University of Oxford with:
President Santos of Colombia
Ministers from 16 countries in person
A lecture from Professor Amartya Sen
http://www.ophi.org.uk/policy/policynetwork/

Supported by the German Federal Ministry for Economic Cooperation and Development (BMZ)
MPPN has grown
As of November 2014:

Over 30 countries
10 multilateral bodies
Circulated draft survey modules for MPI 2015+
Side Event UNGA September 2014
Side Event for UN Statistics Commission 2015
Endogenous capacity building
Thank you, again
Appendix 1: Summary of Methodology

New technology for measuring multidimensional poverty
Alkire and Foster (2011)
New book by Alkire, Foster, Santos, et al forthcoming from OUP

Data
Many dimensional indicators with deprivation cutoffs
Determine who is deprived in which indicator

Identifying the poor
Create a score by adding up the values of deprivations
A person is poor if score is as high as a poverty cutoff
Multiply deprived enough = dual cutoff approach

Measuring poverty
Adjusted headcount ratio $M_0$ measures poverty as the average score across all persons (where nonpoor are assigned a score of zero).
$M_0$ is product of headcount ratio and the average intensity of deprivation among the poor
Appendix 2: Complementary Technologies

Two forms of technologies for evaluating poverty
- for identification and aggregation

1 Unidimensional methods apply when:
   Single welfare variable – eg, calories
   Variables can be combined into an aggregate variable – eg, expenditure, income

2 Multidimensional methods apply when:
   Variables cannot be meaningfully aggregated – eg, sanitation conditions and years of education
   Desirable to leave variables disaggregated because sub-aggregates are policy relevant – eg food and nonfood consumption