How Successful are Countries in Reducing Multidimensional Poverty?: Insights from an Inter-Temporal Analysis of 22 Countries

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Oxford, 18 March 2013
1. Rigorous Comparisons:
   - adjustments to reported MPIs
Multidimensional Poverty Index (MPI)

The MPI implements an Alkire and Foster (2011) $M_0$ measure. It was introduced by Alkire and Santos (2010) and UNDP (2010) for 100+ countries; and updated (Alkire Roche Seth 2011).

A person is identified as poor in two steps:

1) Sum the person’s weighted deprivations to create depr. score.

2) A person is identified as poor if their deprivation score >33%.
Comparing MPI across time

- 22 countries have two or more comparable DHS datasets.
- Indicator definitions often vary
- We adjust published MPIs to create rigorous comparisons
- Hence these often differ from published MPI figures.
- Newest data: 2007 – 2011
- 18 countries go back 5 to 7 years in time, the remaining four comparisons cover 2 to 4 years
- Oldest data: 1998/9 - 2008
- India: flooring is changed to housing
- Additional data for comparisons are taken from WDI unless otherwise noted
- All population data are 2010.
104 Countries included in the MPI (*HDR 2013*)

The size of the bubbles is a proportional representation of the total number of MPI poor in each country.
Analysis over time in 22 countries

The size of the bubbles is a proportional representation of the total number of MPI poor in each country.
2. Overview of changes:
- absolute and relative
- robustness checks
Changes in Bolivia, Ethiopia, Nepal and Uganda

The size of the bubbles is a proportional representation of the total number of MPI poor in each country.

Uganda
Bolivia
Nepal
Ethiopia

The graph shows the relationship between the percentage of people considered poor (H) and the average intensity of poverty (A) across different countries. The size of the bubbles indicates the total number of MPI poor in each country.
Changes in Bolivia, Ethiopia, Nepal and Uganda

The size of the bubbles is a proportional representation of the total number of MPI poor in each country.
Changes over time in MPI

18 countries have statistically significant MPI reduction at $\alpha=0.05$

**Note:**

- *** statistically significant at $\alpha=0.01$
- ** statistically significant at $\alpha=0.05$
- * statistically significant at $\alpha=0.10$
Changes over time in MPI

Annualized Absolute Variation

Largest Absolute poverty reduction

in top 7

in top 3

Madagascar 2004-2008/9
Armenia 2005-2010
Jordan 2007-2009
Guyana 2005-2009
Senegal 2005-2010/11
Colombia 2005-2010
Peru 2005-2008
India 1999-2005/6
Zimbabwe 2006-2010/11
Malawi 2004-2010
Kenya 2003-2008/9
Nigeria 2003-2008
Lesotho 2004-2009
Ethiopia 2005-2011
Ethiopia 2000-2005
Uganda 2006-2011
Bolivia 2003-2008
Cambodia 2005-2010
Tanzania 2008-2010
Ghana 2003-2008
Bangladesh 2004-2007
Rwanda 2005-2010
Nepal 2006-2011
In relative terms Colombia does well. Armenia also but poverty level was very low. Some countries do well in both absolute and relative terms.
<table>
<thead>
<tr>
<th>Country</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Annualized variation</th>
<th>t-statistics for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute % Relative</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Armenia 2005-2010</td>
<td>.003 (.001)</td>
<td>.001 (.000)</td>
<td>.000</td>
<td>-12.9%</td>
</tr>
<tr>
<td>Bangladesh 2004-2007</td>
<td>.365 (.007)</td>
<td>.289 (.006)</td>
<td>-.025</td>
<td>-7.0%</td>
</tr>
<tr>
<td>Bolivia 2003-2008</td>
<td>.175 (.005)</td>
<td>.089 (.003)</td>
<td>-.017</td>
<td>-9.8%</td>
</tr>
<tr>
<td>Cambodia 2005-2010</td>
<td>.298 (.006)</td>
<td>.212 (.006)</td>
<td>-.017</td>
<td>-5.8%</td>
</tr>
<tr>
<td>Colombia 2005-2010</td>
<td>.040 (.002)</td>
<td>.023 (.001)</td>
<td>-.003</td>
<td>-8.4%</td>
</tr>
<tr>
<td>Ethiopia 2000-2005</td>
<td>.677 (.004)</td>
<td>.605 (.005)</td>
<td>-.014</td>
<td>-2.1%</td>
</tr>
<tr>
<td>Ethiopia 2005-2011</td>
<td>.605 (.005)</td>
<td>.523 (.005)</td>
<td>-.014</td>
<td>-2.2%</td>
</tr>
<tr>
<td>Ghana 2003-2008</td>
<td>.309 (.007)</td>
<td>.202 (.007)</td>
<td>-.021</td>
<td>-6.9%</td>
</tr>
<tr>
<td>Guyana 2005-2009</td>
<td>.053 (.005)</td>
<td>.041 (.002)</td>
<td>-.003</td>
<td>-5.4%</td>
</tr>
<tr>
<td>India 1998/9-2005/6</td>
<td>.300 (.002)</td>
<td>.251 (.003)</td>
<td>-.007</td>
<td>-2.4%</td>
</tr>
<tr>
<td>Jordan 2007-2009</td>
<td>.011 (.002)</td>
<td>.011 (.001)</td>
<td>.000</td>
<td>-3.6%</td>
</tr>
<tr>
<td>Kenya 2003-2008/9</td>
<td>.296 (.008)</td>
<td>.244 (.010)</td>
<td>-.009</td>
<td>-3.2%</td>
</tr>
<tr>
<td>Lesotho 2004-2009</td>
<td>.239 (.005)</td>
<td>.182 (.007)</td>
<td>-.012</td>
<td>-4.8%</td>
</tr>
<tr>
<td>Madagascar 2004-2008/9</td>
<td>.383 (.016)</td>
<td>.400 (.007)</td>
<td>.004</td>
<td>1.0%</td>
</tr>
<tr>
<td>Malawi 2004-2010</td>
<td>.381 (.006)</td>
<td>.334 (.005)</td>
<td>-.008</td>
<td>-2.0%</td>
</tr>
<tr>
<td>Nepal 2006-2011</td>
<td>.350 (.013)</td>
<td>.217 (.012)</td>
<td>-.027</td>
<td>-7.6%</td>
</tr>
<tr>
<td>Nigeria 2003-2008</td>
<td>.368 (.011)</td>
<td>.313 (.006)</td>
<td>-.011</td>
<td>-3.0%</td>
</tr>
<tr>
<td>Peru 2005-2008</td>
<td>.085 (.007)</td>
<td>.066 (.004)</td>
<td>-.006</td>
<td>-7.3%</td>
</tr>
<tr>
<td>Rwanda 2005-2010</td>
<td>.460 (.005)</td>
<td>.330 (.006)</td>
<td>-.026</td>
<td>-5.6%</td>
</tr>
<tr>
<td>Senegal 2005-2010/11</td>
<td>.440 (.019)</td>
<td>.423 (.010)</td>
<td>-.003</td>
<td>-0.7%</td>
</tr>
<tr>
<td>Tanzania 2008-2010</td>
<td>.367 (.008)</td>
<td>.326 (.007)</td>
<td>-.021</td>
<td>-5.7%</td>
</tr>
<tr>
<td>Uganda 2006-2011</td>
<td>.417 (.007)</td>
<td>.343 (.009)</td>
<td>-.015</td>
<td>-3.5%</td>
</tr>
<tr>
<td>Zimbabwe 2006-2010/11</td>
<td>.180 (.006)</td>
<td>.145 (.005)</td>
<td>-.008</td>
<td>-4.2%</td>
</tr>
</tbody>
</table>

**Note:** *** statistically significant at $\alpha=0.01$, ** statistically significant at $\alpha=0.05$, * statistically significant at $\alpha=0.10$
Robustness Analysis – changes poverty cutoff (k)
Among countries lacking statistically significant progress

Madagascar 2004-2009

Senegal 2005-2011

Oxford Poverty & Human Development Initiative
Robustness Analysis – changes poverty cutoff (k)
Among countries with substantial progress

![Graphs showing robustness analysis for different countries](image)

- Bangladesh 2004-2007
- Nepal 2006-2011
- Rwanda 2005-2010
- Bolivia 2003-2008
- Ghana 2003-2008
- Nepal 2006-2011

These graphs illustrate how the Multidimensional Poverty Index (MPI) changes over time, highlighting the lower and upper limits for different poverty cutoffs (k) in various countries.
Robustness Analysis – changes poverty cutoff (k)
Some border line cases: all have low MPI values (<0.09)
3. MPI and $1.25 a day: complementary
MPI vs $1.25/day: finding comparable trends

- Difficult to compare MPI vs $1.25 trends due to infrequent poverty data
  
  - Matching year comparisons are only available for Peru and Colombia.
  - There is no $1.25 data for Zimbabwe.
  - For 8 countries, $1.25 data are older than the comparable MPI: Armenia, Ghana, Guyana, Kenya, Lesotho, Malawi, Tanzania and Uganda.
  - Since periods are different, we use $1.25 interpolation for 7 countries: Bangladesh, Bolivia, Cambodia, Jordan, Malawi, Nigeria and Rwanda.
All ‘top performing’ countries reduced MPI as fast or faster than income poverty.

Bolivia, Ethiopia, Nigeria, and Armenia reduced $1.25 more.
The relative chart shows the percentage of total poverty reduction achieved (annualized). Here, we see a slightly higher reduction
Relative to their starting levels, the top five countries reduced MPI the same or proportionally more than $1.25 poverty.

This graph shows the percentage of the initial poverty that was eradicated annually for the poverty gap and for MPI.
4. How MPI changes:
- Reductions in incidence
- Reductions in intensity
Reducing incidence and intensity

**Country A:**
Poverty reduction policy (without inequality focus)

**Country B:**
Policy oriented to the poorest of the poor

Country B reduced the intensity of deprivation among the poor more. The final index reflects this.

(MPI satisfies **Dimensional Monotonicity**)

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[Policy oriented to the poorest of the poor](#)
The very best is to reduce simultaneously the incidence and the intensity of poverty.
Reducing incidence or intensity?

Annual Absolute Variation in % Headcount Ratio (H)

Annual Absolute Variation in Intensity (A)

Good / Good

Bad / Good

Bad / Bad

Reduction in Incidence of Poverty (H)

Reduction in Intensity of Poverty (A)
Reducing incidence or intensity?

Malawi vs Ethiopia
Bolivia vs Bangladesh: Same reduction in incidence but different reduction in intensity of poverty

Annual Absolute Variation in % Headcount Ratio (H)

Annual Absolute Variation in Intensity of Poverty (A)

Bad / Bad

Good / Good

Bad / Good
Reducing incidence or intensity?

Different groups – different paths to poverty reduction?
MPI Reduction

Different path to poverty reduction

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>Incidence of poverty effect (H)</th>
<th>Intensity of poverty effect (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rwanda</td>
<td>2005-2010</td>
<td>32%</td>
<td>68%</td>
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<tr>
<td>Ethiopia</td>
<td>2005-2011</td>
<td>55%</td>
<td>45%</td>
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<tr>
<td>Nigeria</td>
<td>2003-2008</td>
<td>6%</td>
<td>94%</td>
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</tbody>
</table>
### Intensity and Incidence: both reduce MPI

Notably, Ethiopia, Malawi and Senegal follow a path of reducing intensity.

<table>
<thead>
<tr>
<th>Country</th>
<th>Annualized Absolute Variation in MPI</th>
<th>71%</th>
<th>78%</th>
<th>85%</th>
<th>88%</th>
<th>86%</th>
<th>83%</th>
<th>94%</th>
<th>90%</th>
<th>107%</th>
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<tr>
<td>Madagascar</td>
<td>79%</td>
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<td>Armenia</td>
<td>95%</td>
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<td>Jordan</td>
<td>14%</td>
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<td>5%</td>
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<td>Colombia</td>
<td>17%</td>
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<td>Peru</td>
<td>17%</td>
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<td>India</td>
<td>32%</td>
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<td>Zimbabwe</td>
<td>15%</td>
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<tr>
<td>Malawi</td>
<td>21%</td>
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<td>Kenya</td>
<td>17%</td>
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<td>Nigeria</td>
<td>33%</td>
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<td>Lesotho</td>
<td>29%</td>
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<td>Ethiopia 2</td>
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<td>Uganda</td>
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<tr>
<td>Bolivia</td>
<td>26%</td>
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<tr>
<td>Cambodia</td>
<td>29%</td>
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<tr>
<td>Tanzania</td>
<td>21%</td>
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<tr>
<td>Ghana</td>
<td>33%</td>
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<tr>
<td>Bangladesh</td>
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<td>Nepal</td>
<td>21%</td>
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</tbody>
</table>

**Annualized Absolute Variation in MPI**

-0.030 -0.025 -0.020 -0.015 -0.010 -0.005 -0.000 -0.005 0.010

**Intensity and Incidence:** Both reduce MPI
5. How MPI changes:
- Reductions in each indicator
How the best countries reduced MPI

Annualized Absolute Change in proportion who is poor and deprived in:

- Nutrition
- Child Mortality
- Years of Schooling
- Attendance
- Cooking Fuel
- Sanitation
- Water
- Electricity
- Floor
- Assets

Nepal (.350)
Bangladesh (.365)
Rwanda (.460)
Other reduction patterns

Annualized Absolute Change in proportion who is poor and deprived in...

<table>
<thead>
<tr>
<th>Country</th>
<th>Nutrition</th>
<th>Child Mortality</th>
<th>Years of Schooling</th>
<th>Attendance</th>
<th>Cooking Fuel</th>
<th>Sanitation</th>
<th>Water</th>
<th>Electricity</th>
<th>Floor</th>
<th>Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana (.309)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Tanzania (.367)</td>
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<tr>
<td>Cambodia (.298)</td>
<td></td>
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<td></td>
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<tr>
<td>Bolivia (.175)</td>
<td></td>
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</tbody>
</table>

Ghana (0.309)
Tanzania (0.367)
Cambodia (0.298)
Bolivia (0.175)
Other reduction patterns

Annualized Absolute Change in proportion who is poor and deprived in...

- Nutrition
- Child Mortality
- Years of Schooling
- Attendance
- Cooking Fuel
- Sanitation
- Water
- Electricity
- Floor
- Assets

Madagascar (.383)
Malawi (.381)
Uganda (.417)
6. Subnational MPI Changes:
- Going beyond averages
- Showing disparity
Changes over time in Rwanda

Countries like Rwanda show equal pace of reduction across regions

Rwanda 2005-2010: Annualized Absolute Changes in Regional MPI

<table>
<thead>
<tr>
<th>Region</th>
<th>Annualized Absolute Change in the regional MPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>North (0.481)</td>
<td>-0.020</td>
</tr>
<tr>
<td>West (0.481)</td>
<td>-0.020</td>
</tr>
<tr>
<td>East (0.479)</td>
<td>-0.015</td>
</tr>
<tr>
<td>South (0.469)</td>
<td>-0.010</td>
</tr>
<tr>
<td>National (0.460)</td>
<td>-0.005</td>
</tr>
<tr>
<td>City of Kigali (0.260)</td>
<td>-0.000</td>
</tr>
</tbody>
</table>
Changes over time in Nepal

Countries like Nepal show uneven progress in poverty reduction across regions.
Changes over time in Nigeria

Nigeria 2003-2008: Annualized Absolute Changes in Regional MPI

South East (.131)
South West (.132)
South South (.215)
North Central (.321)
National (.368)
North West (.530)
North East (.552)

Annualized Absolute Change in the regional MPI
Changes over time in Nigeria by indicator

Annualized Absolute Change in proportion who is poor and deprived in...

- Nutrition
- Child Mortality
- Years of Schooling
- Attendance
- Cooking Fuel
- Sanitation
- Water
- Electricity
- Floor
- Assets
7. Conclusions & Final comments