Developing MPI for Arab Countries

Heba El Laithy          Dina Armanious
Faculty of Economics and Political science
Cairo University

Motivation of work

• It is believed that MPI does not reflect the level of deprivation in middle income and rich Arab countries.
• Three levels of cutoff points and more indicators are proposed, and hence three levels of MPI.
• These three MPIs should reflect variability among households and individuals within a given country.
• The purpose of this work is not to compare these MPIs, but rather to test whether it suffices to propose different levels of deprivation.
**MPI**
- Indicators used, three levels of deprivations
- Robustness checks; wealth index, urban rural, sex of head, across dimensions and for MPI
- Dominant analysis

---

**Constructing Multidimensional poverty index**

- Define Dimensions
- Defining the set of indicators within each dimension. Data for all indicators needs to be available for the same person or household.
- Setting the deprivation cutoffs for each indicator.
- Selecting the relative weights that each indicator has, such that these sum to one.
- Determining the poverty cutoff, to identify multidimensionally poor.

MPI involves a number of decisions on each of the above points which affect the prevalence of multidimensional poverty and group ranking
Recent development of MPI

- Global Multidimensional Poverty Index 2014 uses similar dimensions and definitions as 2010 index.
- In 2014, measurement of destitution has been introduced. This destitution measure has precisely the same dimensions, indicators, weights, and poverty cutoff as the MPI. Only one set of parameters changes: the deprivation cutoffs. The cutoffs for 8 of the 10 indicators reflect more extreme deprivations. For example, two or more children in the household have died, no one in the household has more than one year of schooling, a household member is severely malnourished, Alkire 2014.

Recent development of MPI, cont.

- HDR 2014 proposed a revised specifications of definitions of deprivations in some indicators compared to their 2010 specifications.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Indicator</th>
<th>Deprivation 2010</th>
<th>Deprivation 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Years of Schooling</td>
<td>No household member has completed five years of schooling.</td>
<td>No household member has completed at least six years of schooling.</td>
</tr>
<tr>
<td></td>
<td>Child School Attendance</td>
<td>Any school-aged child is not attending school up to the age which they would complete class 8.</td>
<td>No change.</td>
</tr>
<tr>
<td>Health</td>
<td>Child Mortality</td>
<td>Any child has died in the household.</td>
<td>A child has died in the household within the five years prior to the survey.</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Any adult or child for whom there is nutritional information is malnourished</td>
<td>A household member (for whom there is nutritional information) is malnourished, as measured by the body mass index for adults (women ages 15-49 in most of the surveys) and by the height for age z score calculated using World Health Organization standards for children under age 5.</td>
<td></td>
</tr>
<tr>
<td>Living standard</td>
<td>Assets</td>
<td>The household does not own more than one radio, TV, telephone, bike, motorbike or refrigerator and does not own a car or truck</td>
<td>Not having at least one asset related to access to information (radio, TV, telephone) and not having at least one asset related to mobility (bikes, motorbikes, car, truck, animal cart, motorboat) or at least one asset related to livelihood (refrigerator, arable land, livestock).</td>
</tr>
</tbody>
</table>
Assets deprivation using 2010 and 2014 definitions

The poorest quintile exhibited the largest changes in assets deprivation

MPI using 2010 and 2014 Definitions

- Prevalence of poverty is higher when using 2014 definitions due to new deprivation of assets.
- The poorest quintile exhibited the largest changes especially in Iraq and Morocco
Suggested development of MPI for Arab Countries

- Three levels of indicators are proposed within the same dimensions and using the same weighting scheme;
- Equal weights for dimensions
- Equal weights for indicators within dimension
- Sum of weights is 1

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Indicator</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Years of schooling</td>
<td>Deprieved if no adult household member has completed 5 years of schooling</td>
<td>Deprieved if no adult household member has completed 8 years of schooling</td>
<td>Deprieved if no adult household member has completed 11 years of schooling</td>
</tr>
<tr>
<td>School attendance</td>
<td>Deprived if any child age (7 to 17) is not attending school in grades 6 to 8 of school</td>
<td>Deprived if any child age (7 to 17) is not attending school</td>
<td>Deprived if any child age (7 to 17) is not attending school or if any child 7 to 17 years is two years or more behind in the right school grade</td>
<td></td>
</tr>
<tr>
<td>Infant and child mortality</td>
<td>Deprived if any child (under age 5) has died in the family within 5 years prior to survey</td>
<td>Similar to level 1</td>
<td>Similar to level 1</td>
<td></td>
</tr>
<tr>
<td>Nutrition</td>
<td>Deprived if any adult or child for whom there is nutritional information is malnourished (child’s height for age is below minus two standard deviations from the international median, adult BMI less than 18.5)</td>
<td>Deprived if any child (less than 5) is underweight or stunted or adult BMI less than 18.5</td>
<td>Deprived if first or second level of deprivation or Weight for height above a SD of the median for children or adult BMI is 30 or above</td>
<td></td>
</tr>
<tr>
<td>Immunization</td>
<td>Deprived if any child 12 months or more not fully immunized against DPT, polio and measles</td>
<td>Deprived if any child 12-23 months not fully immunized or if any child 24-35 months not fully immunized and did not take MMR and Hepatitis B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female health</td>
<td>Age of first pregnancy less than 18 years</td>
<td>Age of first pregnancy less than 18 years</td>
<td>Age of first pregnancy less than 18 years</td>
<td></td>
</tr>
</tbody>
</table>
### Deprivation Indices

<table>
<thead>
<tr>
<th>Family</th>
<th>Deprived if no electricity</th>
<th>Deprived if no electricity</th>
<th>Deprived if no electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (MPI)</td>
<td>Deprived if the SH does not have access to clean water (used surface water) within 30 minutes walk</td>
<td>Deprived if HH don’t have well with pump or public tap</td>
<td>Deprived if HH don’t have piped water to house</td>
</tr>
<tr>
<td>Drinking water (MPI)</td>
<td>Deprived if household toilet is shared with others who are not members of their household or used unimproved toilet</td>
<td>Deprived if household toilet is shared with others who are not members of their household or used unimproved toilet</td>
<td>Deprived if household toilet is shared with others who are not members of their household or used unimproved toilet</td>
</tr>
<tr>
<td>Sanitation (MPI)</td>
<td>Deprived if earth, sand, dung*</td>
<td>Deprived if natural flooring (earth, sand, dung) or “rudimentary flooring” (wood, planks, bamboo)</td>
<td>Deprived if earth or “rudimentary flooring” or “concrete floor/asphalt”</td>
</tr>
<tr>
<td>Flooring (MPI)</td>
<td>Deprived if HH cooks with wood, charcoal or dung</td>
<td>Deprived if the household cooks with wood, charcoal or dung and does not have a designated space for cooking</td>
<td>Deprived if the household cooks with wood, charcoal or dung and does not have a designated space for cooking</td>
</tr>
<tr>
<td>Cooking fuel (MPI)</td>
<td>Deprived if HH cooks with wood, charcoal or dung</td>
<td>Deprived if the household cooks with wood, charcoal or dung and does not have a designated space for cooking</td>
<td>Deprived if the household cooks with wood, charcoal or dung and does not have a designated space for cooking</td>
</tr>
<tr>
<td>Assets ownership (MPI)</td>
<td>not having at least one asset related to access to information (radio, TV, telephone) and not having at least one asset related to mobility (bike, motorcycle, car, truck, animal cart, motorboat) or at least one asset related to livelihood (refrigerator, arable land, livestock)</td>
<td>not having at least one asset related to access to information (radio, TV, telephone, internet, computer, tablet) and not having at least one asset related to mobility (bike, motorcycle, car, truck, animal cart, motorboat) and at least one asset related to livelihood (refrigerator, arable land, livestock. AC, heater)</td>
<td>not having at least one asset related to access to information (radio, TV, telephone, internet, computer, tablet) and not having at least one asset related to mobility (bike, motorcycle, car, truck, animal cart, motorboat) and at least one asset related to livelihood (refrigerator, arable land, livestock. AC, heater)</td>
</tr>
</tbody>
</table>

### Pilot country studies

**MPIs without women deprivation**

**MPIs with women deprivation**

- Different levels of MPI were evaluated for three countries; Iraq (MICS), and Jordan (DHS), Morocco (PAPFAM)
- As we move from one level to the other, Poverty rate increases.
- When women health indicator was used, MPI decreases
Why immunization indicators were not included

- Full immunization is almost universal; Deprivation is 2% and 3% for two levels of deprivation in Jordan.
- When adding immunization deprivation to health dimension, weights should be 1/9 not 1/6.
- This gives smaller weight to malnutrition indicators (ranged from 7% to 27%) which is usually high and thus the second and third levels of MPI are much smaller.
- In conclusion; adding indicator reduces weights for original indicators and hence the additional indicator should not be so small.

Roc Curves to assess correlation between MPIs

<table>
<thead>
<tr>
<th>Rank correlation</th>
<th>MPI_1</th>
<th>MPI_2</th>
<th>MPI_3</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPI_1</td>
<td></td>
<td>.859</td>
<td>.746</td>
</tr>
<tr>
<td>MPI_2</td>
<td>.855</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPI_3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How robust are MPIs

Robustness tests entail the following question
- whether ranking; by region, wealth status...would be different had we change dimensions or indicators within dimensions.

Robustness checks by dimension
Three levels of enrollment

Iraq

Jordan

All levels are different
Robustness checks by dimension
Three levels of malnutrition

- All levels are different
- Adding underweight prevalence resulted small but higher rate,
- Adding obesity prevalence has large impact on prevalence rates.

Robustness checks by dimension
Three levels of water deprivation

All levels are different, specially for the poorest 3 quintiles
Gaps of Prevalence rates of water deprivation between poorest
and richest quintiles are larger in Morocco at all levels.
Robustness checks by dimension
Three levels of floor deprivation

All levels provide similar prevalence but the third level in Jordan provides higher rate for the poorest three quintiles.

Robustness checks by dimension
Three levels of assets deprivation

All levels are different, specially for the poorest 3 quintiles
Robustness checks by dimension
Two levels of overcrowding deprivation

**Iraq**

**Jordan**

All levels are different

Robustness checks at cutoff point

**0.33**

**Iraq**

**Jordan**

- Different MPIs gave different prevalence but rankings are unchanged with respect to wealth status.
- Similar analysis were performed for household size, region and sex of household head. The same conclusion were reached.
Dominance analysis for MPIs

- Cutoff point can be country specific, it is important to conduct sensitivity analysis to check that conclusions about rankings (e.g. between regions) and changes (e.g. between two surveys) is robust to the choice of cutoff point.
- Dominance analysis examines whether ranking by region, wealth status...would be different had we chosen a different cutoff.

Dominance analysis with respect to wealth index

Jordan

no matter which cutoff point is considered, multidimensional poverty decreased as we move from the poorest to richest quintile.
Dominance analysis

Iraq

- Group ranking by region or wealth status stayed the same for all cut of points.
- This holds for all MPIs

To sum up

- The proposed three levels of thresholds/indicators reflect different levels of deprivations,
- Ranks are robust to different levels of indicators and cut off points for the aggregate index.
- In measuring Multidimensional Poverty no need to differentiate between different levels of floor,
- Adding immunization reduces deprivation levels and hence we ignored it.