Problem Set on Multidimensional Poverty Measures
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A) Paper-Based Problems:
Given the following matrix of distribution of three dimensions (income, self rated health, and years of education):

\[
X = \begin{bmatrix}
4 & 1 & 5 \\
8 & 4 & 6 \\
12 & 1 & 11 \\
3 & 4 & 6 \\
15 & 1 & 9 \\
12 & 5 & 12 \\
\end{bmatrix}
\]

a) Calculate H, M0, M1 and M2 using a cutoff value of k=2 and equal weights. Assume that the poverty lines are (10, 3 and 8 correspondingly).

I. Which is the contribution of each dimension to M0?
II. Which is the contribution of the group of the first three individuals to overall M1?
III. What happens to each of the measures if individual 2 reported a health status of 2 instead of 4?

b) Calculate H, M0, M1 and M2 using nested weights: assigning a value of 2 to income, and 0.5 to health and education respectively.

B) Computer-Based Problems (Using Stata):
First make sure to count with enough memory to work with the data:
set memory 256m
Open the data set distributed to you, called ‘Half_Sample_Bhutan.dta’
Variables to use:

- Poor: 1 if income poor, 0 otherwise
- HHEducation: 1 if at least one household member is literate and all children between 6 and 15 years old are attending school.
- Proom: number of people per room
- Dwater: 1 if the household has access to drinking water.
- Electricity: 1 if the household has access to electricity.
Using the four mentioned variables write a *dofile* that estimates the Multidimensional Headcount and the M0 measures. Use equal weights for each variable. Ignore the population weights for this exercise. Do it for:

a) The overall sample, with the different k values

b) Distinguishing between urban and rural areas

c) What is the percentage of people deprived in each dimension? How are these percentages in rural and urban areas? Which dimensions present the highest levels of deprivation?

c) How do the measures change as k increases? How is M0 with respect to H? Why?

For k=2, in the estimates of the whole sample, what is the average deprivation share among the poor (A)? How do you interpret this?

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<tr>
<th></th>
<th>Multidimensional H</th>
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<th>Mo</th>
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<tbody>
<tr>
<td>k</td>
<td>Total</td>
<td>Rural</td>
<td>Urban</td>
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<td>1</td>
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<td>2</td>
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