OPHI

OXFORD POVERTY & HUMAN DEVELOPMENT INITIATIVE

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UNIVERSITY OF OXFORD

Solving exercise on AF Methodology

Multidimensional Data

Domains

$$X = \begin{bmatrix} 6 & 3 & 18 & 1 \\ 8 & 4 & 20 & 1 \\ 12 & 6 & 17 & 0 \\ 20 & 8 & 16 & 1 \\ 5 & 3 & 16 & 0 \end{bmatrix}$$ Persons

$$z = \begin{bmatrix} 10 & 6 & 18.5 & 1 \end{bmatrix}$$ Cut-offs

Deprivation Matrix

Replace entries: 1 if deprived, 0 if not deprived

$$X = \begin{bmatrix} \underline{6} & \underline{3} & \underline{18} & 1 \\ \underline{8} & \underline{4} & 20 & 1 \\ 12 & 6 & \underline{17} & \underline{0} \\ 20 & 8 & \underline{16} & 1 \\ \underline{5} & \underline{3} & \underline{16} & \underline{0} \end{bmatrix} \qquad g^0 = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

$$z = \begin{bmatrix} 10 & 6 & 18.5 & 1 \end{bmatrix}$$

Deprivations Count Vector

Sum individual's deprivations

$$g^0 = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 \end{bmatrix} \qquad ci = \begin{bmatrix} 3 \\ 2 \\ 2 \\ 1 \\ 4 \end{bmatrix}$$

Censored Deprivation Matrix

Poor if deprived in two dimensions, k = 2

Deprivation matrix

$$g^0 = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 \end{bmatrix} \quad ci = \begin{bmatrix} 3 \\ 2 \\ 2 \\ 1 \\ 4 \end{bmatrix}$$

Censored deprivation matrix

$$g^0(2) = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 \end{bmatrix} \quad ci(2) = \begin{bmatrix} 3 \\ 2 \\ 2 \\ 0 \\ 4 \end{bmatrix}$$

Censor data of non-poor

Compute H, A and M0

Share deprivations of poor

$$g^0(2)=\begin{bmatrix}1&1&1&0\\1&1&0&0\\0&0&1&1\\0&0&0&0\\1&1&1&1\end{bmatrix} \qquad ci(2)=\begin{bmatrix}3\\2\\2\\0\\4\end{bmatrix} \qquad ci(2)/4=\begin{bmatrix}3/4\\2/4\\2/4\\0\\4/4\end{bmatrix}$$

$$H=\frac{4}{5}=0.80 \qquad A=\left(\frac{3}{4}+\frac{2}{4}+\frac{2}{4}+\frac{4}{4}\right)/4=11/16$$

$$M0=\mu(g^0(2))=\frac{11}{20}=0.55$$

Interpretation

H = 4/5 - This means 80% of the population is poor (deprived in 2 or more dimensions)

A = 11/16 - On average the poor (those deprived in 2 or more dimensions) are deprived in approximately 69% of the indicators.

M0 = 11/20 - The poor in this society experience 55% of the total possible deprivations the society could experience.

Censored Headcounts

Censored Deprivation Matrix

$$g^0(2) = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

$$0.6 \quad 0.6 \quad 0.6 \quad 0.4$$

Censored Headcounts

Censored Headcounts

- 60% of the population is poor and deprived in income, education and BMI
- 40% is poor and deprived in water.
- The raw and censored headcounts differ in the case of the BMI indicator.