Wellbeing

THE DEPTH OF MULTIDIMENSIONAL POVERTY: A MATTER OF SPACE

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SEPTEMBER 29, 2023

ROADMAP

Why the depth of MPI?

Contextualization – conceptual framework

Extension: measuring "depth"

Data

Empirical findings

Discussion

TARGETS

Propose an extension of the AF multidimensional poverty measure which measures the depth of poverty

Are measures of multidimensional poverty depth necessary whatsoever? If so, how the current measures could draw advantages from the ordinality properties of indicators used to measure poverty?

Comparing groups: estimate subnational decompositions of AF-depth

Does a measure of depth of poverty provide additional tools to better inform differences across space and over time?
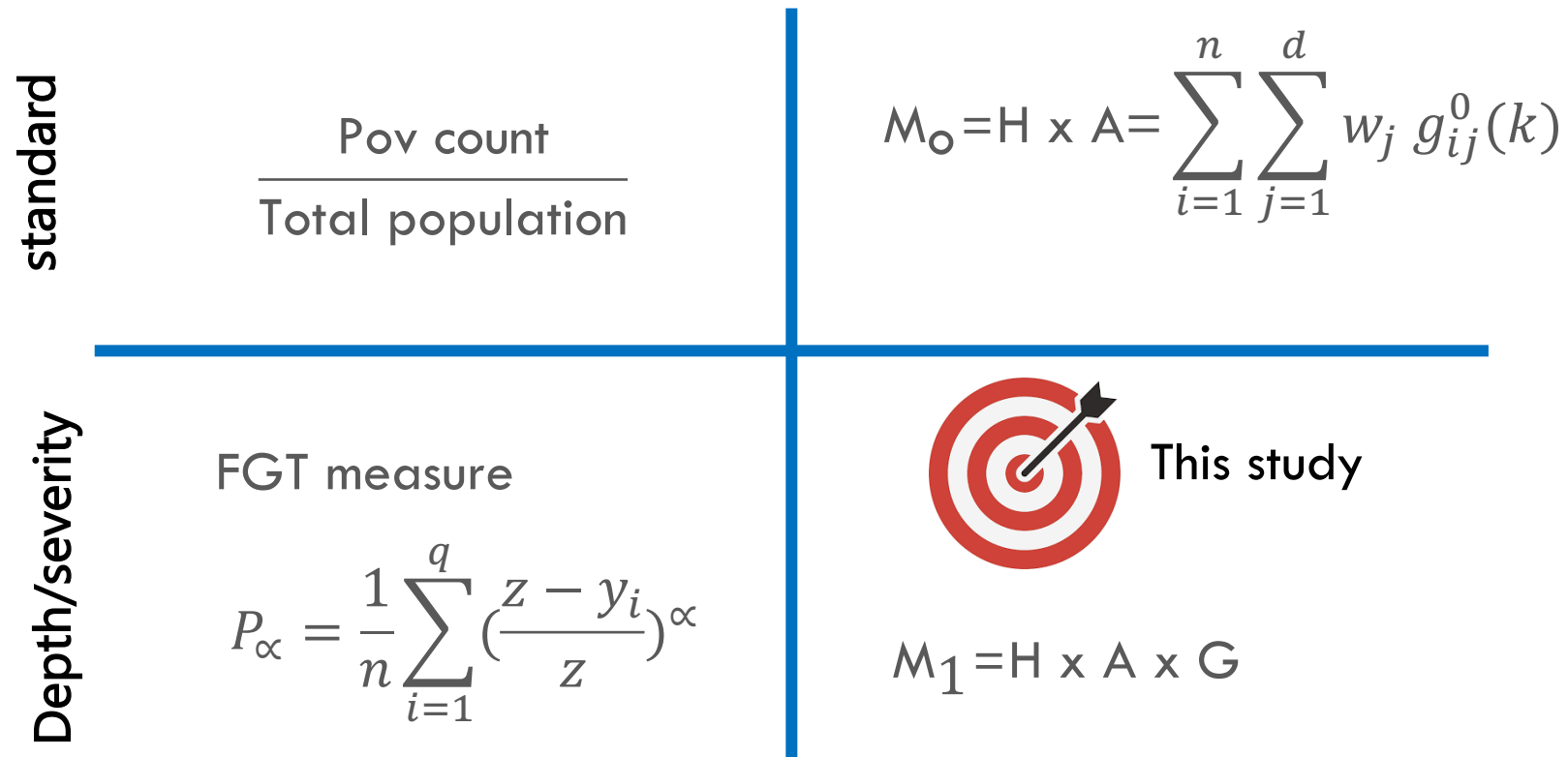
Empirical application using the official MPI of Colombia

THE MEASUREMENT OF MULTIDIMENSIONAL POVERTY

o "Most of the remaining unresolved issues in poverty analysis are related directly or indirectly to the multi-dimensional nature and dynamics of poverty" (Thorbecke, 2007).

o One of the most popular measure of multidimensional poverty is Alkire and Foster (2011). "Counting and multidimensional poverty measurement." Journal of Public Economics, 95 (7-8).

o Sen's capability approach is a **theoretical framework of poverty. Social arrangements** are prioritized based on the extent of freedom that people have to **fulfill achievements they value.**

Equality of what? (1979)

WHAT AND WHY THE "DEPTH" OF MULTIDIMENSIONAL POVERTY?

standard

$$\frac{\text{Pov count}}{\text{Total population}}$$

$$M_O = H \times A = \sum_{i=1}^{n} \sum_{j=1}^{d} w_j \, g_{ij}^0(k)$$

Depth/severity

FGT measure

$$P_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_i}{z}\right)^\alpha$$

 This study

$$M_1 = H \times A \times G$$

WHAT AND WHY THE "DEPTH" OF MULTIDIMENSIONAL POVERTY?

"How is poverty or deprivation to be measured in the presence of ordinal, categorical, or qualitative data? Must we retreat to a head count ratio, or can we continue to evaluate the depth or distribution of deprivations[…]? This issue can also arise in unidimensional studies but is almost inevitable in discussions of multidimensional poverty where data on capabilities and functionings can have the most rudimentary of measurement characteristics."

Foster, Greer and Thorbecke (2010). The Foster-Greer-Thorbecke (FGT) Poverty Measures: Twenty-Five Years Later. The Journal of Inequality, 8.

PREVIOUS STUDIES

- Bennett and Hatzimasoura (2011) propose an additive poverty index in the context of ordinal variables.

- Yalonetzky (2012) proposes an ordinal poverty measure which meets the desirable properties but with empirical limitations.

- Seth and Yalonetsky (2018) is the closest approach to this study. They propose a weighted sum of variables of ordered permutations.

CONCEPTUAL FRAMEWORK

- **The Alkire and Foster method on multidimensional poverty (M_O: adjusted headcount ratio)**

M_0

$$= \frac{1}{n} \sum_{i=1}^{n} \sum_{j=1}^{d} w_j g_{ij}^0(k) = \frac{q}{n} x \frac{\sum_{i=1}^{q} \sum_{j=1}^{d} w_j q_{ij}^0(k)}{q} = H * A$$
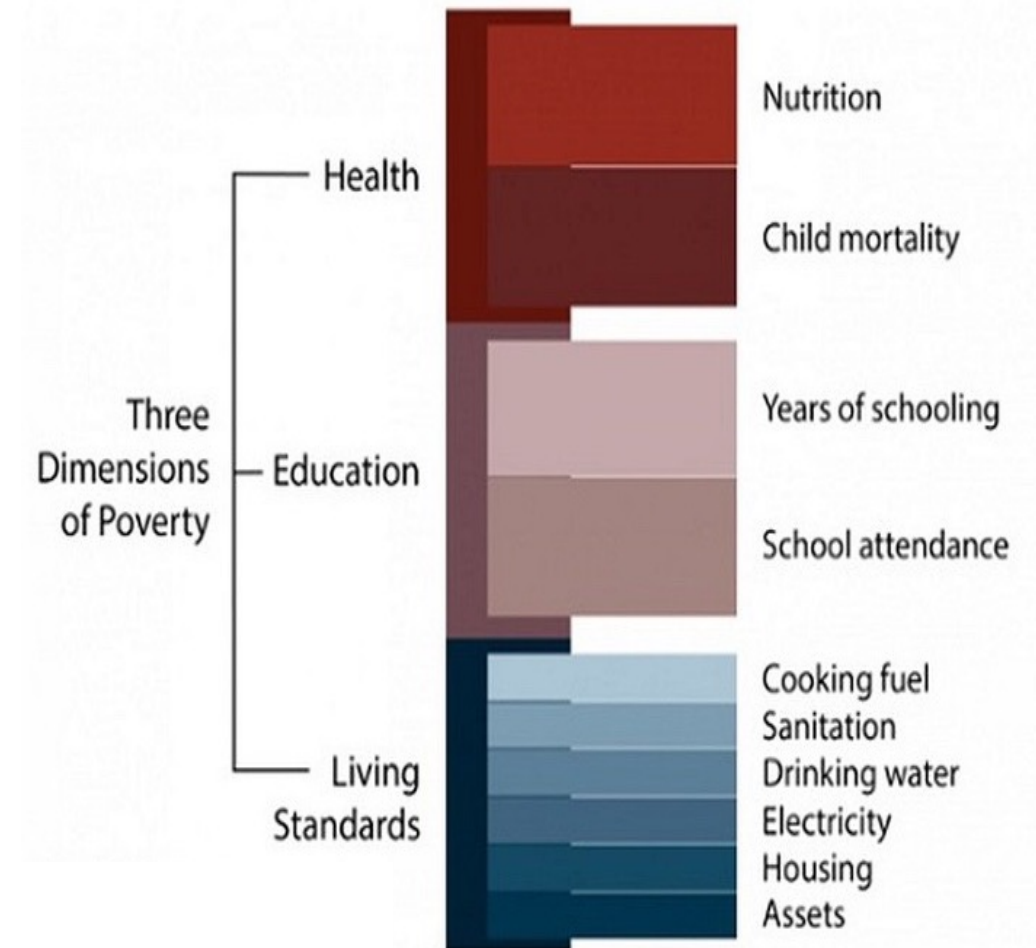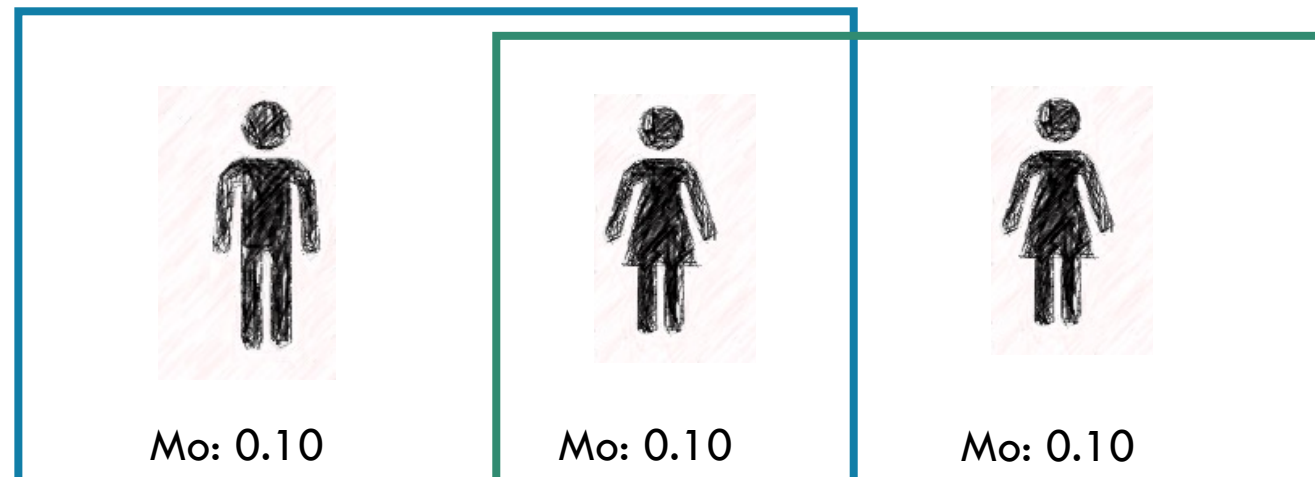

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CONCEPTUAL FRAMEWORK

$$g^0 = \begin{vmatrix} 0 & 0 & 1 \\ 1 & 1 & 1 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \end{vmatrix} \qquad c = \begin{vmatrix} 0.\overline{3} \\ 1 \\ 0.\overline{6} \\ 0.\overline{3} \end{vmatrix} \qquad c(k{:}0.34) = \begin{vmatrix} 0.\overline{3} \\ 0 \\ 0.\overline{6} \\ 0.\overline{3} \end{vmatrix}$$

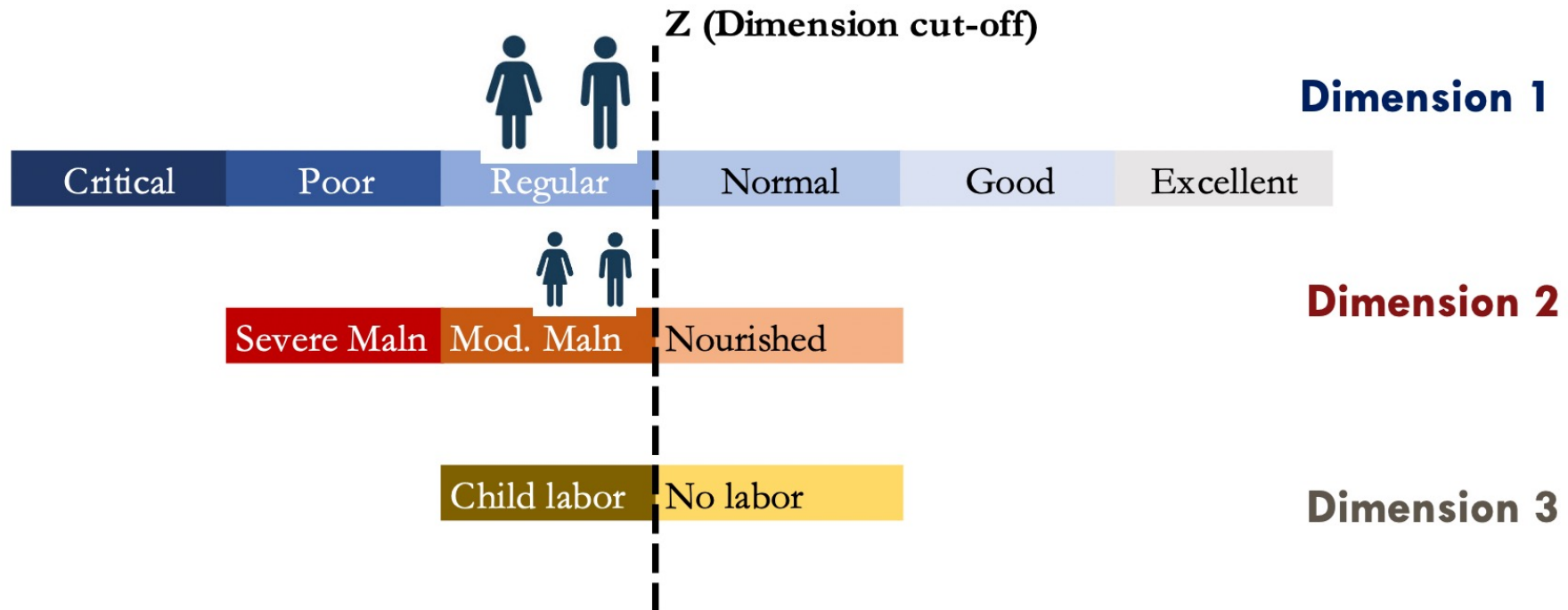$$w = \begin{vmatrix} 0.\overline{3} & 0.\overline{3} & 0.\overline{3} \end{vmatrix}$$

THE ISSUE OF PRIORITIZATION: COMPARING BETWEEN GROUPS OR INDIVIDUALS

Precedence to the poorer among the poor: "although all [multidimensional] poverty measures are sensitive to depth of deprivations, not all of them endure that the poorest among the poor receive precedence" (Seth and Yalonetzky (SY), 2018).
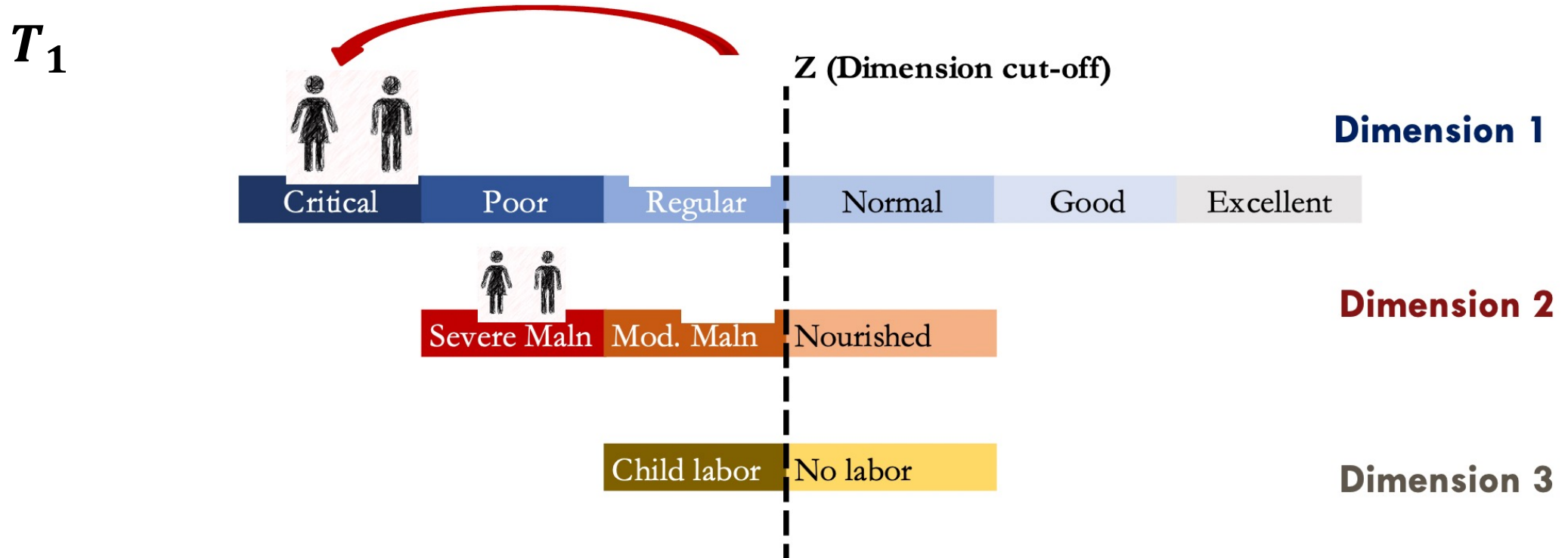
| Mo: 0.10 | Mo: 0.10 | Mo: 0.10 |

THE ISSUE OF PRIORITIZATION:
CHANGES ACROSS TIME

T_0

Z (Dimension cut-off)

Dimension 1

| Critical | Poor | Regular | Normal | Good | Excellent |

Dimension 2

| Severe Maln | Mod. Maln | Nourished |

Dimension 3

| Child labor | No labor |

THE ISSUE OF PRIORITIZATION: CHANGES ACROSS TIME

T_1

Z (Dimension cut-off)

Dimension 1

| Critical | Poor | Regular | Normal | Good | Excellent |

Dimension 2

| Severe Maln | Mod. Maln | Nourished |

Dimension 3

| Child labor | No labor |

Within the axiomatic framework:

(1) Minimal precedence to poorer (SY, 2018).

(2) Greatest precedence to poorer people (SY, 2018).

EXTENSION: AN ORDERED MPI

Variation 1: The deprivation matrix

$$M_0 \approx \frac{1}{n} \sum_{i=1}^{n} \sum_{jr=1}^{R} w_{jr} \, g_{(i)jr}^{0}(k)$$
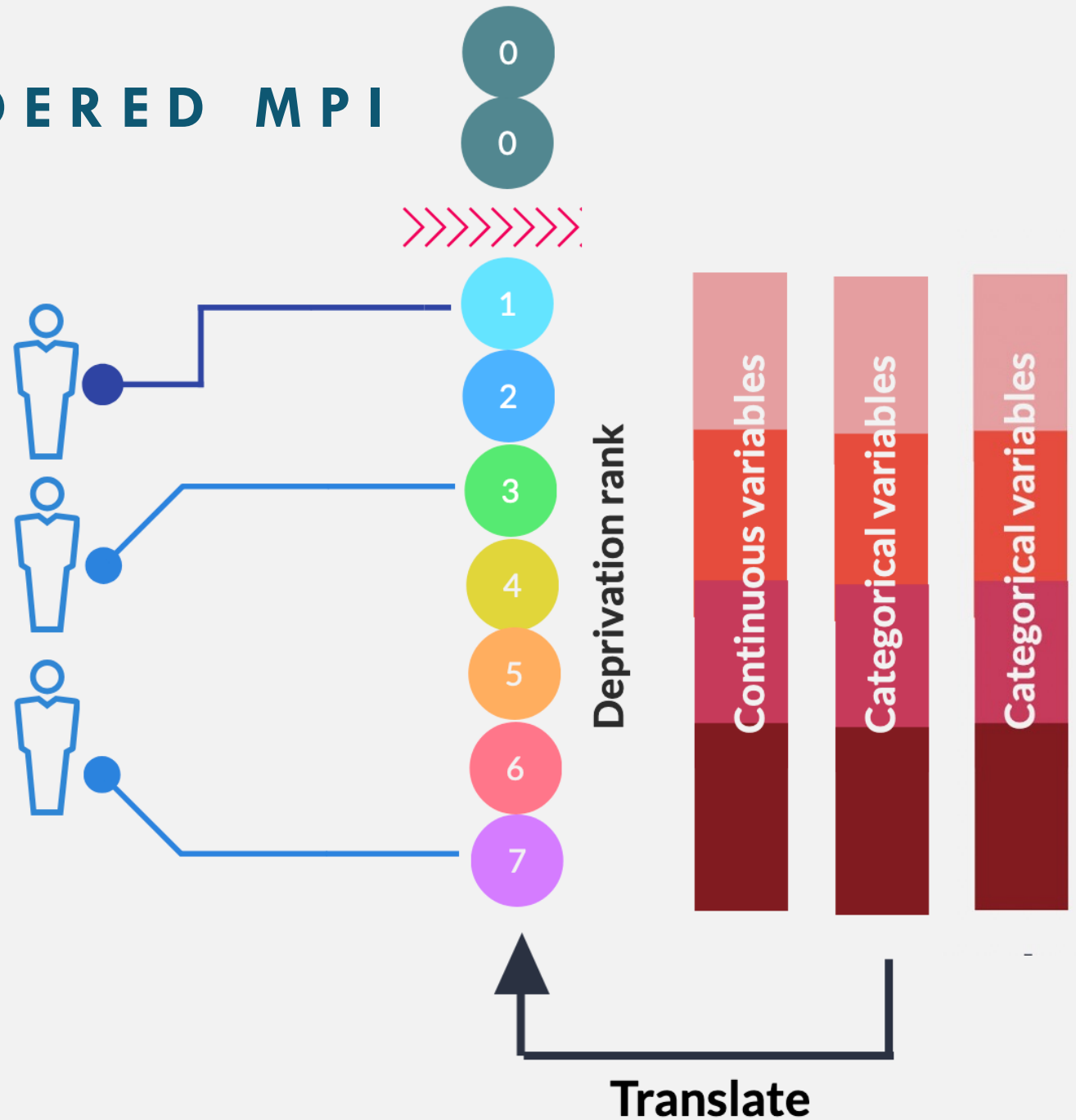
EXTENSION: AN ORDERED MPI

Variation 1:

$$g^0_{(i)jr}(k)= \begin{cases} 1 & \text{if the individual } i \text{ is mapped in the rth rank below a cut}-\text{off } r_j \text{ of } x_j \\ \\ 0 & \text{if the individual i is not mapped in the rth deprived rank of indicator } x_j \end{cases}$$

For multiple variables, G represents an assembly of partitioned matrices G=$(G_1, ..., G_j)$ for each indicator.
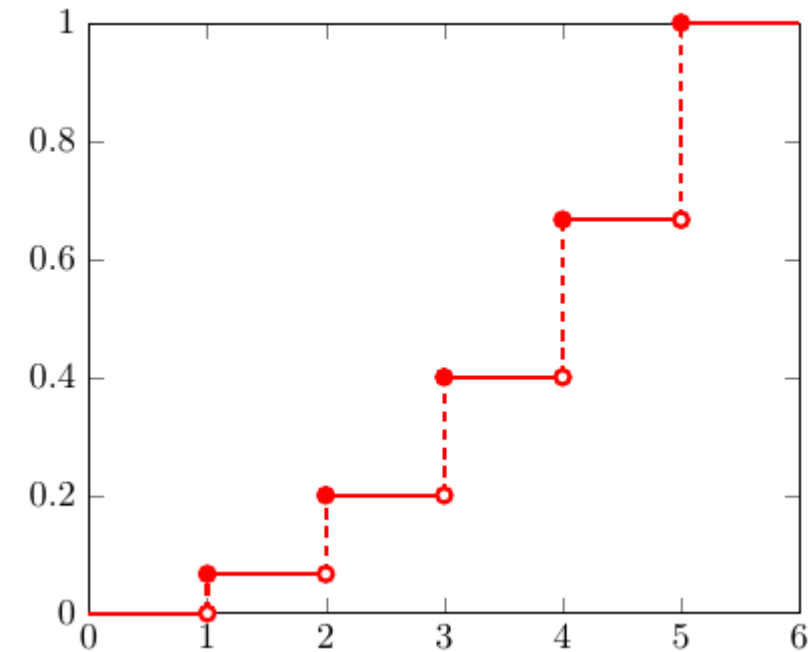
Variation 2:

$$M_0 = \frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{d} w_j g_{ij}^0(k) \approx \frac{1}{n}\sum_{i=1}^{n}\sum_{jr=1}^{R} w_{jr} g_{(i)jr}^0(k)$$

The proposed weights are defined by

$$w_{jr} = w_j * w_r = w_j * F(r_{jr}) = w_j * \sum_{r_{jo} \le r_j} f(r_{jr})$$
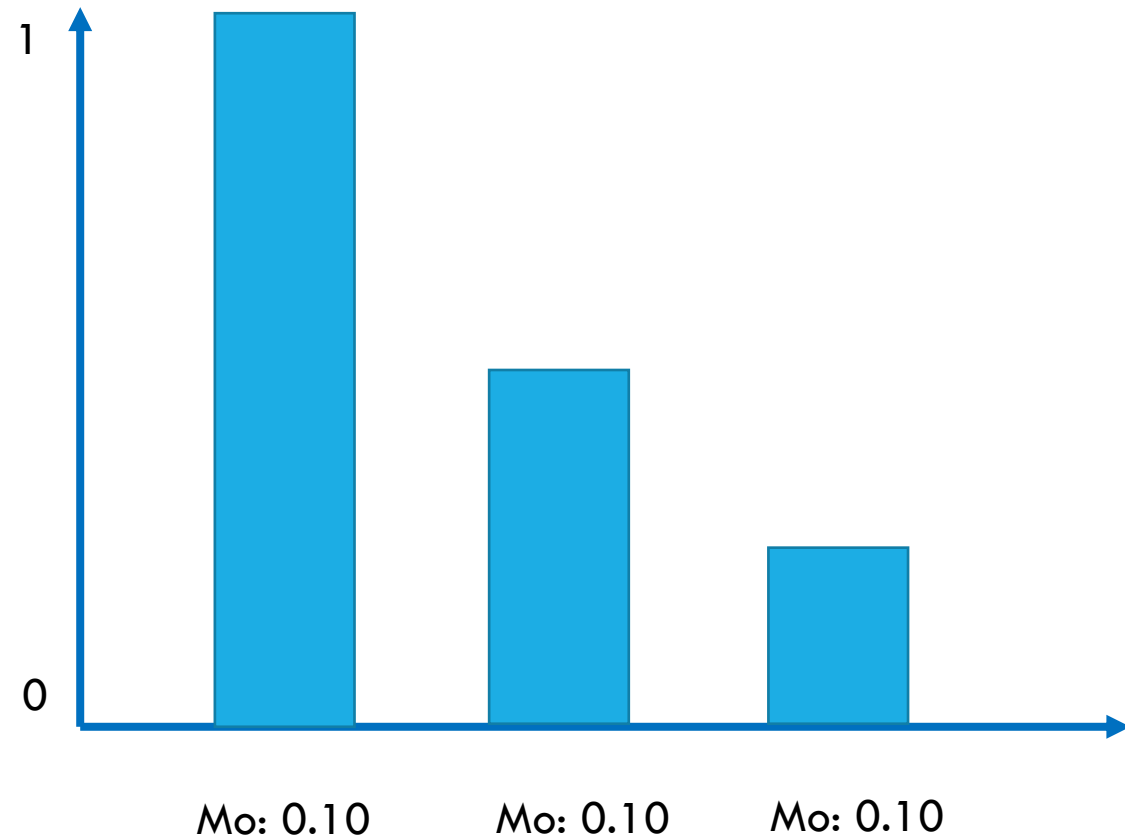
Where $F(z_{jo})$ is a Cumulative Distribution Function for a discrete variable r_{jr} that defines the classification of an ordered response of a given dimension j below a dimension-poverty threshold.

EMPIRICAL APPLICATION: DATA

- The main source of data are the National Quality of Life Suvery Colombia (*Encuesta de la Calidad de Vida*) –ECV-.

- The QLS has a yearly frequency of collection.

- Used to replicate the official MPI of Colombia.

- The dimensions considered in Colombia for the MPI's construction are: education (2 indicators), childhood and youth (4 indicators), health (2 indicators), employment (2 indicators), dwelling conditions (5 indicators).
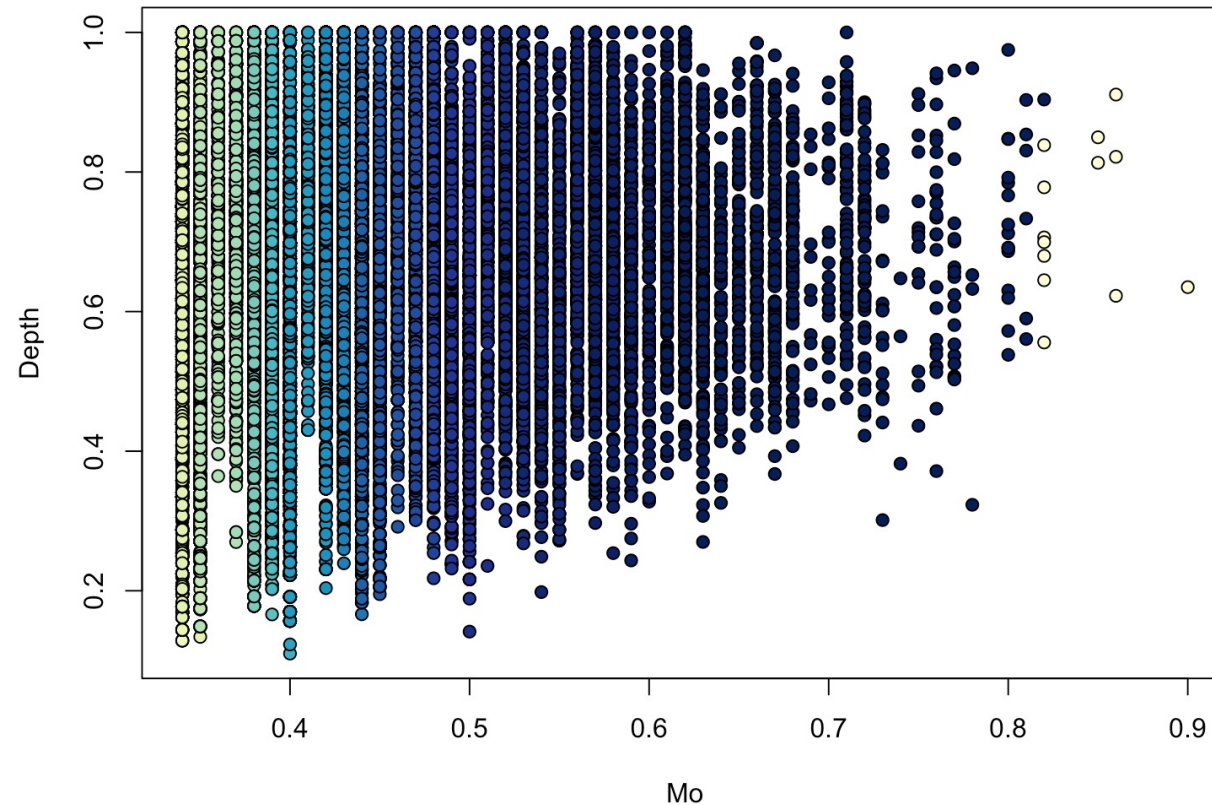
RESULTS: REGIONAL DIFFERENCES

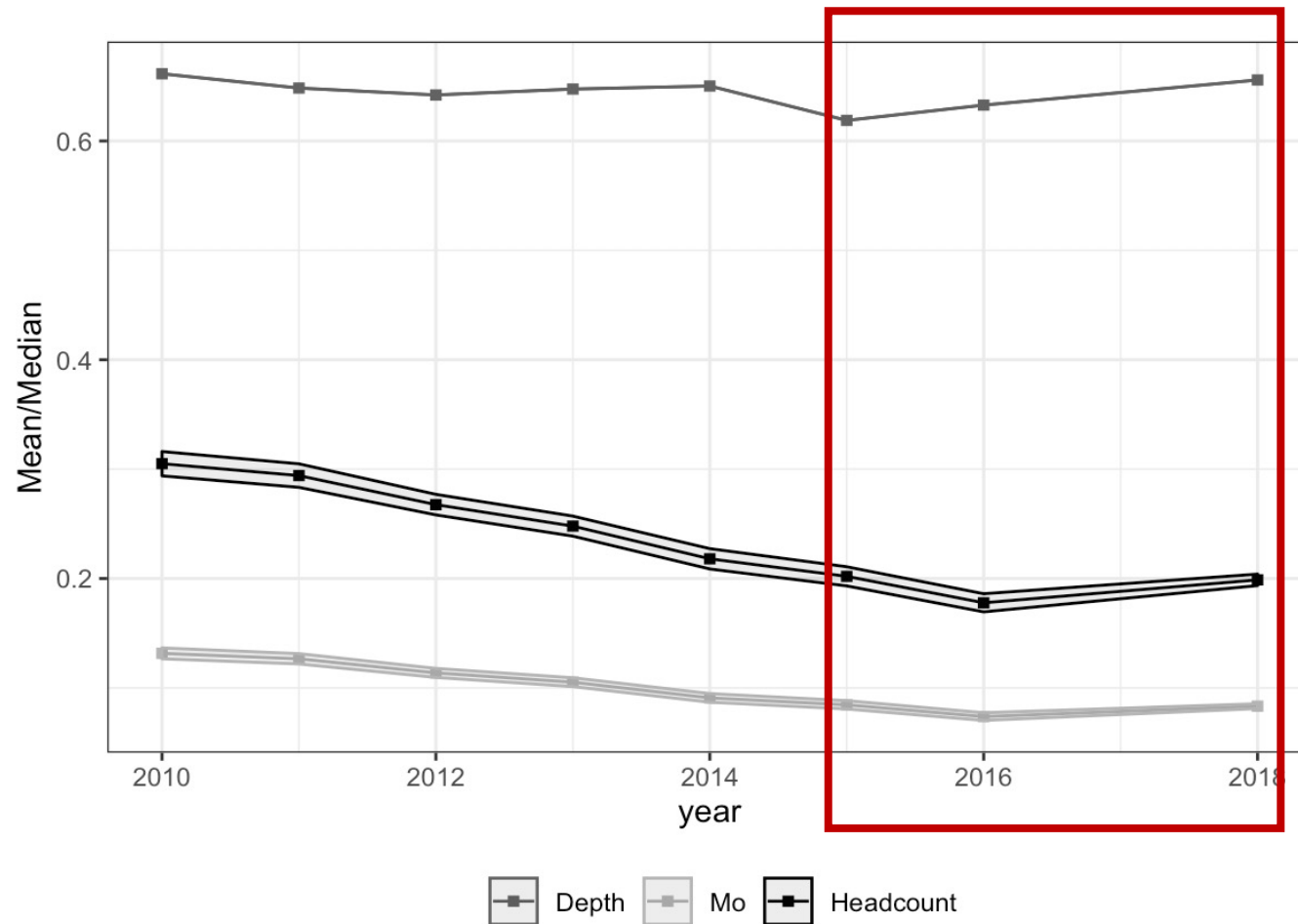There is a dissimilarity between regions depth that share the same Mo
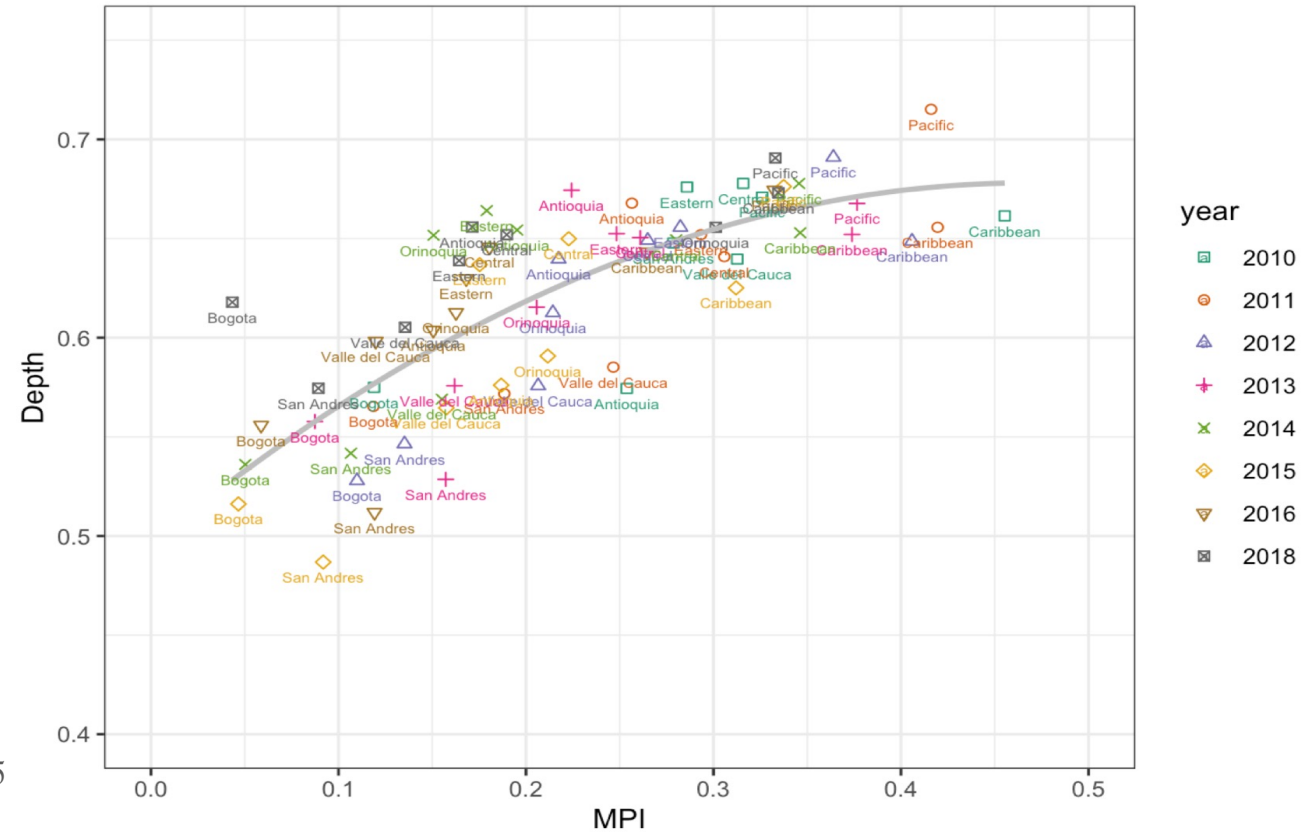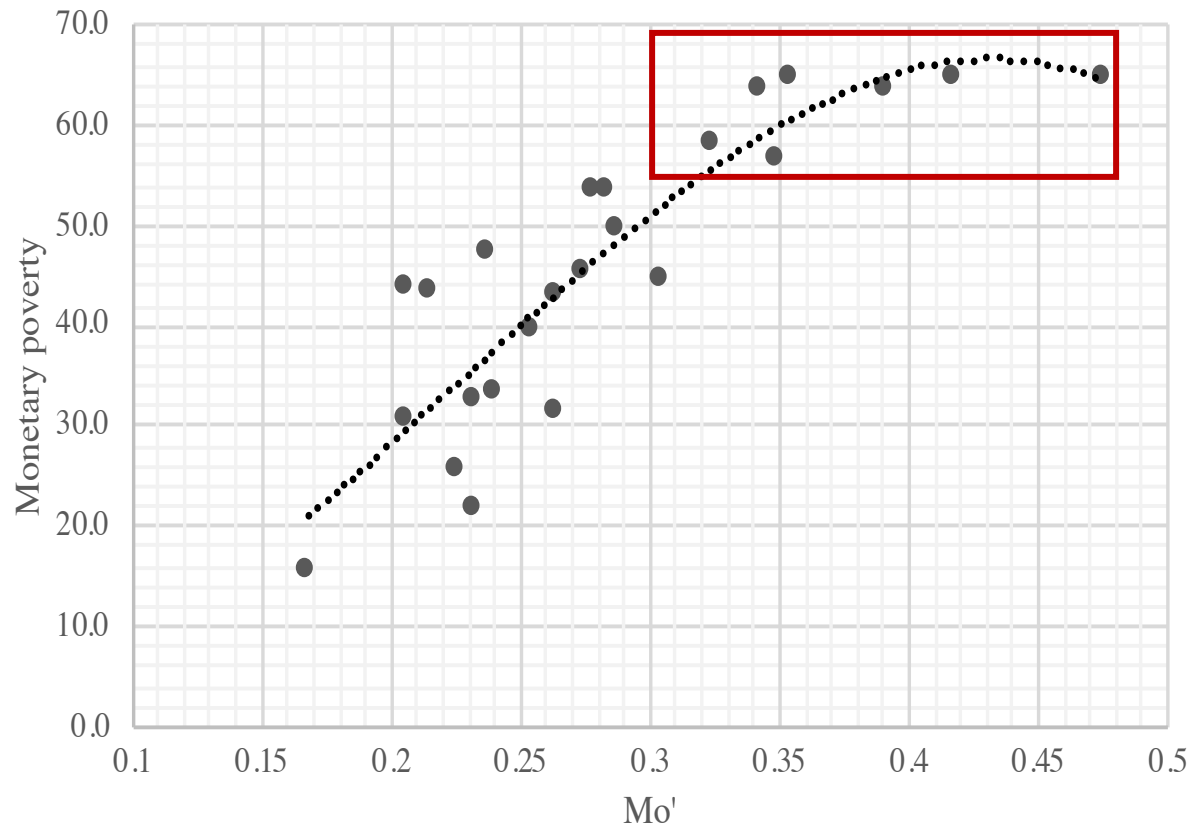
RESULTS: HOUSEHOLD DIFFERENCES

There are large variabilities of the depth of poverty across different
Mo

RESULTS: CHANGES ACROSS TIME

RESULTS: DIMENSIONAL DECOMPOSITION BY GROUPS

Contributions of categorical indicators to the MPI, 2019

	Caribbean	Pacific
Water source 1	0.32	0.07
Water source 2	1.19	0.48
Water source 3	1.62	6.32
Water source	3.13	6.87
Education achievement 1	2.87	2.29
Education achievement 2	6.54	7.65
Education achievement 3	6.67	8.39
Education achievement	16.08	18.33

CONCLUSIONS

o Adjusted multidimensional poverty measures can be further complemented if the richness of ordinal variables are considered to better inform the well-being phenomena.

o A multidimensional poverty that contemplates characteristics of ordinal variables is possible and can highlight differences across space and within dimensions.

o In the absence of adequate spatial price index to correct monetary poverty, Mo displays a better picture accounting for areas' differences that are not evident in income variables.

o The depth of poverty allows us to identify and prioritize the poorest among the poor.

o The proposed index could be valuable for a *social planner* to assess prioritization of social programs intended to geographical areas (regions, departments, cities) or households. E.g. Sisbén.

CAVEATS AND WORK IN PROGRESS

- The aggregation of variables of different types for comparative purposes is still arbitrary as well as the density function defined for each dimensional subgroup.

- Alternatively, machine learning is used to get optimal classes of the relevant variables (data driven process).

Thank you!!