Implementing the capability approach with respect for individual valuations: An illustration with Colombian data

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#### Motivation

- Identifying the worst-off is policy relevant: ranking individuals w.r.t their well-being or deprivation level
- Multidimensional perspective to well-being: unavoidable to aggregate. Selection of weights attached to different functionings or capabilities.
- Individual (heterogeneous) valuations



## How can we identify the **worst-off** in a **multidimensional framework** while respecting individual **valuations**?

• We propose the equivalent income measure as an specific well-being index consistent with individual valuations. Empirical analysis for Colombia.

#### Outline

- The Colombian context
- Identifying the worst-off and individual valuations
- The equivalent income approach
- The worst-off in Colombia: five approaches
- Conclusion



#### **Colombian context**

• Identifying the worst-off in Colombia



 Formula has been updated regularly (and secret now). It gradually moved from a pure proxy-means test to a multidimensional measure inspired by Sen's CA.

#### Colombian context

• Colombia is one of the happiest countries in the world... with large inequalities and income poverty



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#### Identifying the worst off and valuations

• Multidimensional vector of *m* (refined) functionings:

$$f_i = (f_i^1, \dots, f_i^m)$$

- Well-being comparisons:
  - SISBEN

$$WB_i = \sum_{j=1}^m w^j \times F(f_i^j)$$

- Counting approach

$$c_i = \sum_{j=1}^m w^j \times I(f_i^j \le \overline{f}^j)$$

• Where do the weights come from?

### Identifying the worst off and valuations

- Natural starting point: Individual valuation ordering (Sen, 1985):  $R_i$
- Valuation ordering can be represented by an individual specific valuation function:

 $f_i R_i f_i^*$  if and only if  $V_i(f_i) \ge V_i(f_i^*)$ 

• How to identify the worst-off consistent with their valuation ordering?

#### Taking the diversity of values into account



Taking the diversity of values into account

Neglecting the individual valuation may have counter-intuitive distributional implications, if individuals disagree with the imposed well-being measure.



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#### Equivalent Income

- Split f<sub>i</sub> into its income dimension and non-income dimensions: f<sub>i</sub> = (y<sub>i</sub>, x<sub>i</sub>)
- Fix reference values for all the non-income dimensions:  $\tilde{x}$
- Equivalent income y<sup>\*</sup><sub>i</sub> = the hypothetical income that, if combined with the reference value on all non-income dimensions, would place the individual in a situation that she finds equally good as her actual situation.
- This is :  $(y_i, x_i)I_i(y_i^*, \widetilde{x}).$

#### Equivalent Income

• Again, assume two individuals and two functionings.

# Equivalent Income . Case 1: identical valuation ordering



Respecting individual valuations implies that life A is better than life B. Yet, this does not imply that the subjective well-being of the individual in A is always larger than that of the individual in B.

# Equivalent Income: case 2. Different valuations – both individuals perfect health



Here, valuation orderings do not matter, since both individuals have perfect health. One computes their well-being considering only their income.

# Equivalence Income. Case 3: same objective situation (X) – different valuation orderings.



Individual with the steeper indifference curve is worseoff: she cares more about her health outcomes and, hence, suffers more from not reaching the situation of perfect health. This illustrates the importance of taking into account the fit between situations and valuation orderings.

No "resource fetichism" (Sen, 1985) •

# Equivalent Income. Case 4: different situation – different valuation orderings.



According to the valuation ordering of individuals in A and B (which we want to respect), the individual in A is as equally well-off as in A' and the individual in B is as equally well-off as in B'. Given that we can evaluate the lives A' and B' on the basis of their incomes, we can also evaluate A and B on the basis of these incomes.

Implementation equivalent incomes

- Colombian Encuesta Nacional de Calidad de Vida (ECV) from 2008
- Functionings in six dimensions: income, health, education, housing, unemployment, and security
- In order to compute equivalent income measures, we need information on individual valuations, i.e., on the well-considered judgments by individuals concerning their lives. However, valuation ordering is not observed

#### Equivalent income

• (Latent) life satisfaction s<sub>i</sub> can be modelled as:

 $s_i = \alpha + (\beta + \zeta \times d_i) \ln (y_i) + (\gamma + \xi \times d_i)' x_i + \delta' z_i + u_i,$ 

- Different valuations modelled by interaction between functions and rural dummy  $d_i$
- Other factors affecting life satisfaction are in z<sub>i</sub> (age, marital status, regional indicators)
- Ordered logit regression

#### Implementation equivalent income

	Recent And the device a manufact based in the data	
income (in logarithm)	$0.276^{***}$	(0.0257)
health [1,4]	$0.326^{***}$	(0.0385)
education [0,3]	$0.126^{***}$	(0.0371)
house (in logarithm)	$0.642^{***}$	(0.0518)
unemployment (binary)	-0.309+	(0.162)
security (binary)	$0.145^{*}$	(0.0706)
income $\times$ urban	0.0219	(0.0336)
health $\times$ urban	$0.125^{*}$	(0.0490)
$education \times urban$	-0.0537	(0.0447)
house $\times$ urban	0.127 +	(0.0671)
${ m unemployment}   imes  { m urban}$	-0.204	(0.197)
security $\times$ urban	0.0772	(0.0973)
age	0.00154	(0.00582)
age squared	-0.00000891	(0.0000570)
male	-0.0352	(0.0441)
widowed	-0.0824	(0.0675)
divorced	-0.387***	(0.0544)
single	-0.318***	(0.0560)
urban	-1.941**	(0.685)

#### Equivalent income

• With these coefficients, we can compute an equivalent income for each individual

$$s_{i} = \alpha + (\beta + \zeta \times d_{i}) \ln (y_{i}) + (\gamma + \xi \times d_{i})' x_{i} + \delta' z_{i} + u_{i},$$
  
$$= \alpha + (\beta + \zeta \times d_{i}) \ln (y_{i}^{*}) + (\gamma + \xi \times d_{i})' \widetilde{x} + \delta' z_{i} + u_{i}$$

Then:

$$y_i^* = y_i \times \exp\left[\left(\frac{\gamma + \xi \times d_i}{\beta + \zeta \times d_i}\right)'(\widetilde{x} - x_i)\right].$$
Penalty for not being at reference value for non-income dimension

#### Distribution of equivalent incomes



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#### Alternative 1: income



### Alternative 2: subjective well-being



#### Alternative 3: SISBEN score:

28 indicators; weights based on the Fuzzy set approach



### Alternative 4: Colombian MPI

15 indicators in 5 dimensions (uniform weights)



#### Rank correlation between five measures

		DUD	DIDDEN	UMPI
$\mathbf{SWB}$	0.37			
SISBEN	0.49	0.30		
$\operatorname{CMPI}$	0.53	0.32	0.63	
Equivalent income	0.78	0.44	0.65	0.68

#### Overlap (bottom 10%)



Equivalent Income

#### Overlap (bottom 10%)



Equivalent Income

The choice of weights does matter

#### Portrait of worse off 10%

	all	income	satisfaction	SISBEN	CMPI	equivalent income
income	650,000	47,000	274,000	256,000	255,000	110,000
health	2.69	2.34	2.38	2.50	2.41	1.98
education	1.42	0.92	1.05	0.84	0.58	0.68
house	51,000	35,000	34,000	$24,\!000$	$24,\!000$	21,000
unemployment	0.03	0.09	0.06	0.05	0.04	0.11
security	0.88	0.84	0.84	0.82	0.68	0.79
age	47.34	51.19	47.40	46.69	49.90	50.80
male	0.69	0.56	0.67	0.64	0.69	0.69
widowed	0.09	0.14	0.09	0.11	0.12	0.11
divorced	0.13	0.17	0.17	0.16	0.13	0.12
single	0.11	0.14	0.12	0.09	0.07	0.09
literate	0.90	0.78	0.81	0.74	0.56	0.68
$\mathbf{u}$ rban	0.59	0.44	0.47	0.33	0.30	0.32

Source: Own computations on data from ECV 2008 (subsample of household heads)

### Conclusion

- There are different methods to identify the worst off in the literature ...
- ... with important empirical differences ...
- ... and policy implications.

Normative question: should we take the valuations of the worst-off about what constitutes a good life into account when identifying the worst off?