Multidimensional Targeting: Identifying beneficiaries of Conditional Cash Transfers

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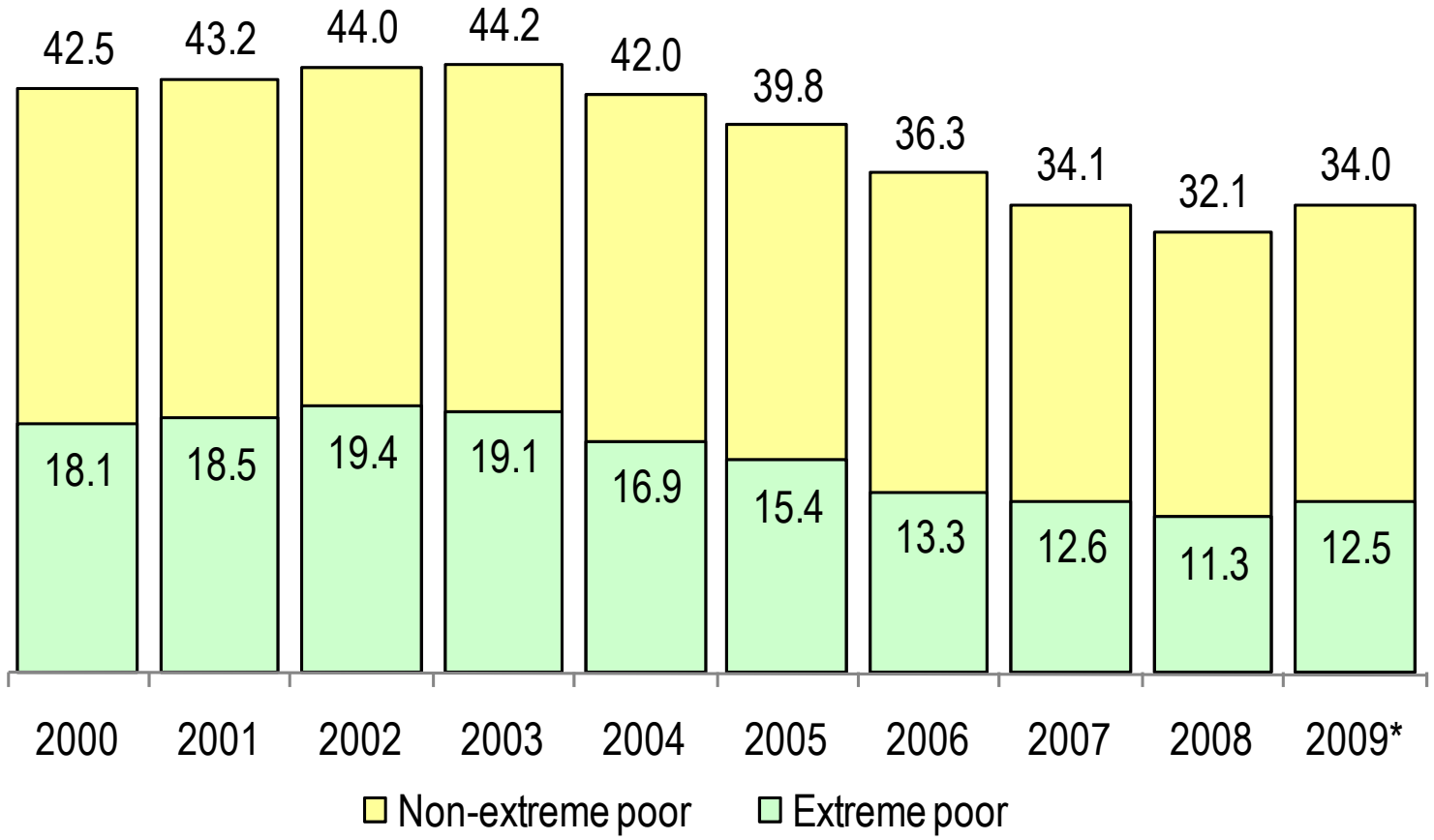
Poverty in Latin American countries

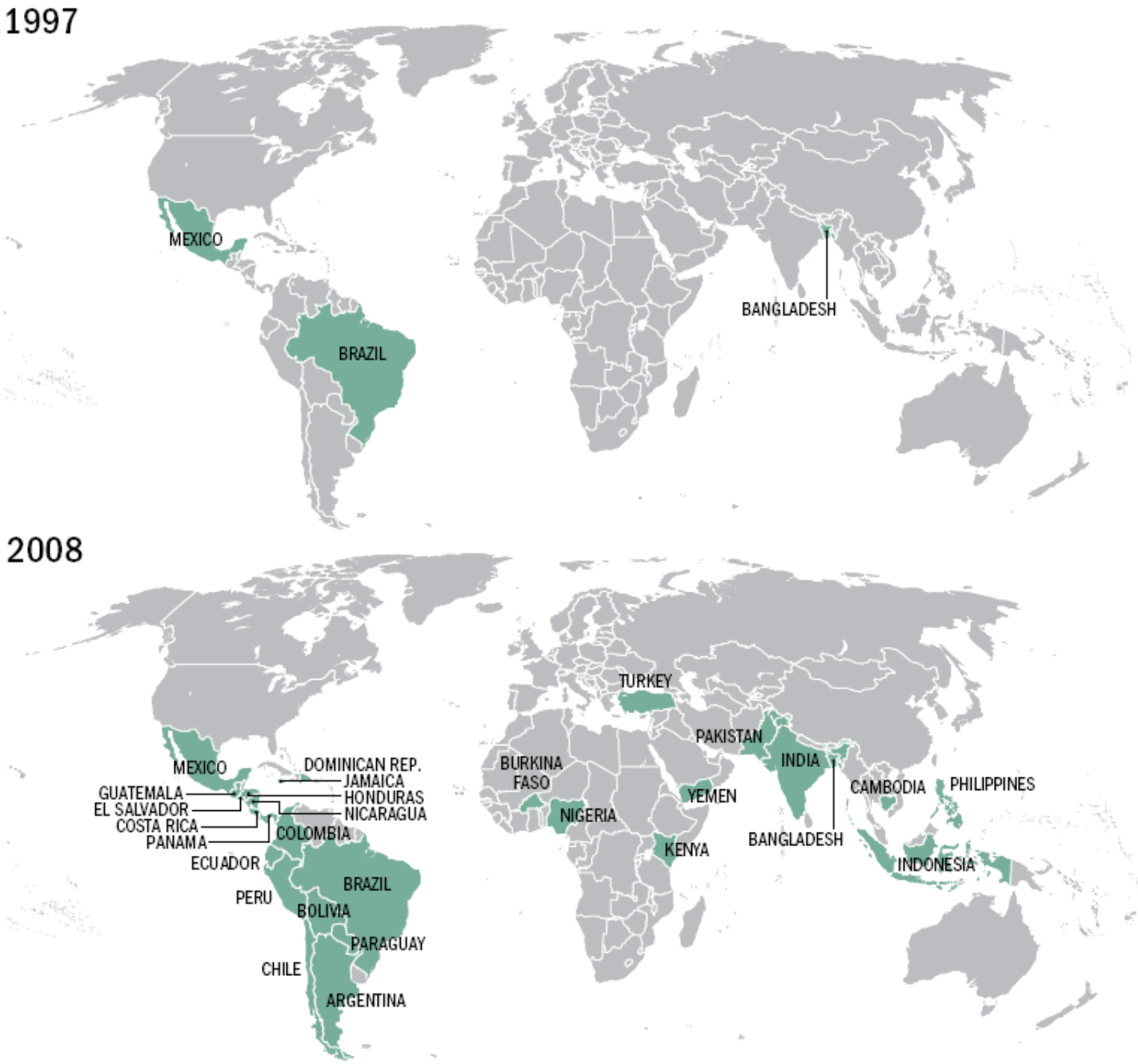
(Social policy was based on universal or self targeted programs in LAC)



Source: ECLAC “Social Panorama of Latin America - 2008”

Conditional cash transfers (CCT) programs have become popular in developing countries over the last decade.

CONDITIONAL & TARGETED



What are CCT programs?

- CCTs are government mechanisms that transfer cash to poor households conditional on pre-specified investments in the human capital of their children (nature of programs have expanded over time).
  - Health-nutrition conditions: periodic inspections, growth monitoring, and vaccinations for children younger than 5 years old; pre-natal care for mothers and attendance by mothers at periodic health information talks.
  - Education conditions: typically include school enrollment, school attendance, and some measure of performance (pilot programs)
- Purpose: to help households escape intergenerational poverty

Multidimensional Targeting of CCTs

Research question: How to improve the identification of CCT's target population to increase the impact of the program on the beneficiaries welfare?

Contributions:

- **Develop a multidimensional methodology to select beneficiaries based on an *axiomatic* multidimensional poverty approach (Alkire and Foster, 2008);**

- **Provide an empirical application of the methodology (Urban Mexico);**

- **Evaluate the performance of household targeting models using ex-ante microsimulation techniques (Bourguignon et al, 2003).**

Multidimensional Targeting Methodology

Let $y = [y_{ij}]$ be the matrix of achievements in each dimension j for the household i, and $z=[z_j]$ be the vector of deprivation lines (cut-off). The deprivation matrix $g^0 = [g^0_{ij}]$ is then defined as:

$$g^0_{ij} = \begin{cases} 1 \text{ if } y_{ij} < z_j \\ 0 \text{ if } y_{ij} \geq z_j \end{cases} \quad \text{(household } i \text{ is deprived in } j\text{)}$$

Let $w = [w_j]$ be a row vector where w_j is the weight associated with dimension j. Based on matrix g^0 weighted by w, one can obtain a column vector

$$c = [c_i]$$

where $c_i = \Sigma g^0_{ij} * w_j$ shows the number of **weighted deprivations of household i.**

A second cut-off value needs to be defined.

Multidimensional Targeting Methodology (cont.)

An identification function $\rho_k(y_i,z)$ can be defined as:

$$\rho_k(y_i,z) = \begin{cases} 1 & \text{if } c_i \geq k \\ 0 & \text{if } c_i < k \end{cases}$$

where k is a minimum number of deprivations that a household must suffer to be considered multidimensionally deprived. Based on this criterion a censored column vector $c(k) = [c_i(k)]$ can be obtained:

$$c_i(k) = \begin{cases} c_i & \text{if } \rho_k(y_i,z)=1 \\ 0 & \text{if } \rho_k(y_i,z)=0 \end{cases}$$

$s=[s_i]$ where $s_i=c_i(k)/d$ indicates the score of household i and d is the total number of dimensions.

The proposal is to use the function $\rho_k(y_i,z)$ to identify the CCT beneficiaries and the vector s to prioritize deprived households.

Operationalizing the multidimensional targeting

Dimensions, indicators, cutoffs and weights needs to be defined :

Dimensions	Determined by the CCT's objectives (health-nutrition, education, monetary)
Indicators	Intermediate (3) and risks (10) indicators on malnutrition and school attendance, and poverty (*) !
Cutoffs for each indicator	Defined according to existing laws, practices of national experts on poverty, relative poverty criteria, etc.
Cutoff for deprivations	As function of the CCT's desired scope, budget availability, or matching the official poverty measurement.
Weights	Same weight for each dimension, and weights for each indicator according its participation in each dimension

(*) restricted to (a) the availability data in both the survey that collect the program and the national survey used to estimate the targeting model, and (b) indicators that not create negative incentives on the behavior of households.

Evaluating alternative targeting models

- **Compared models** (urban areas):

  (1) Current targeting of the CCT *Oportunidades* (SUP)

  (2) SUP with updated weights attached to indicators (updated SUP)

  (3) Income proxy-means test

  (4) Multidimensional targeting model (this paper!)
- **Criteria for comparing performance:**

  (1) Traditional method: monetary deprivation

  (2) Comparison of key nonmonetary characteristics for CCTs

  (3) Simulated impacts of transfers
- **Compared population:**

  X% of poorer households selected by each targeting model
- **Data used:** 2006 Household Income and Expenditure National Survey

"Traditional method" to evaluate the performance of models: monetary deprivation

Model	Income quintile**					Total
	I	II	III	IV	V	
Distribution (%)						
Income proxy	70.4	22.1	5.7	1.7	0.1	100.0
Current SUP***	62.3	22.0	9.2	4.5	2.0	100.0
Updated SUP****	64.7	21.5	9.0	3.6	1.2	100.0
Multidimensional	69.2	22.8	5.9	2.0	0.1	100.0
Coverage (%)						
Income proxy	44.6	12.8	3.0	0.8	0.1	10.0
Current SUP	39.5	12.8	4.8	2.1	0.8	10.0
Updated SUP	40.9	12.5	4.7	1.7	0.5	10.0
Multidimensional	44.3	13.4	3.1	0.9	0.1	10.0

* selecting the **10% poorer household** with each model.

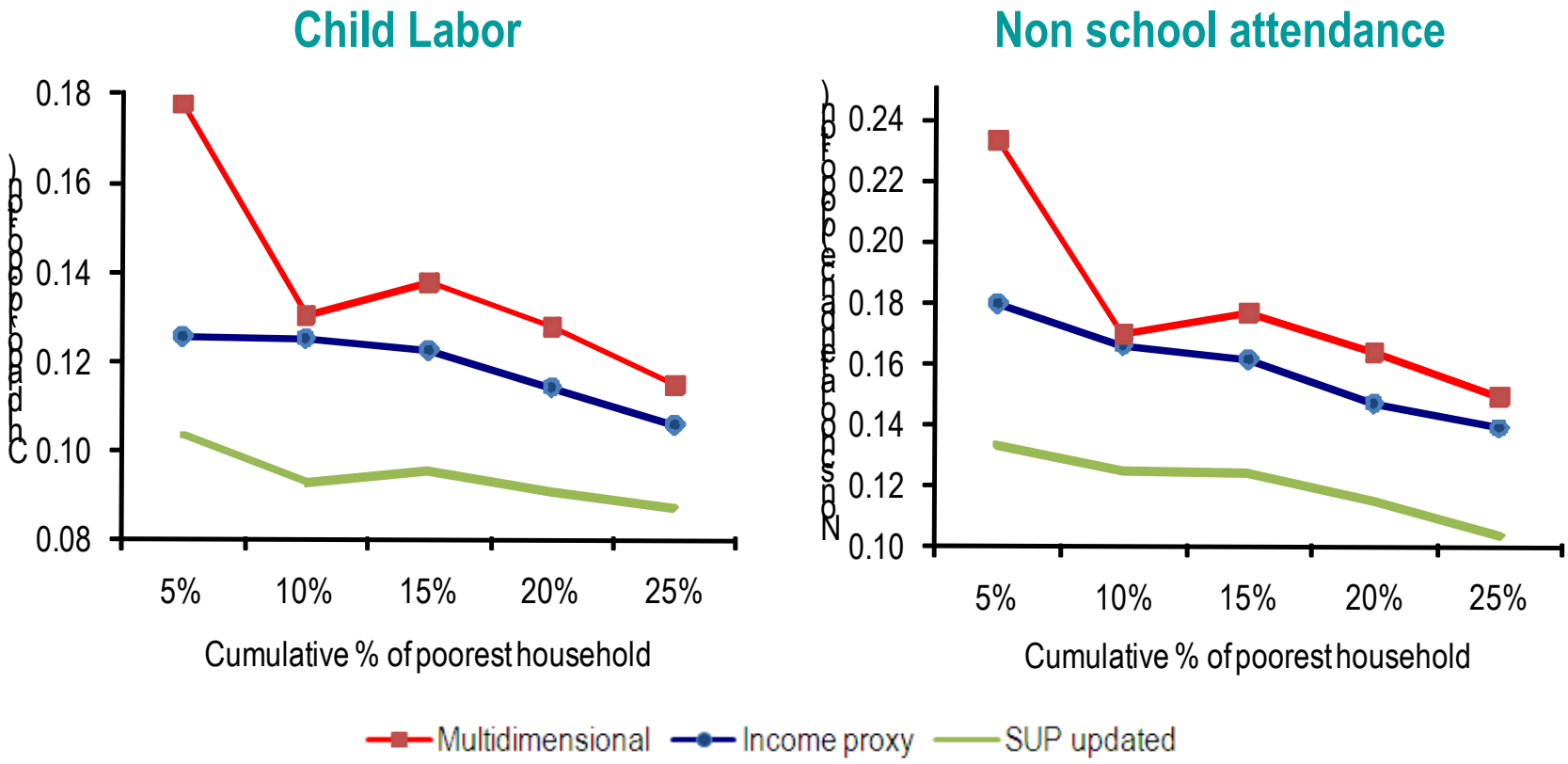
** Five population groups of equal size based on per capita income (I poorer and V less poor).

*** weights calculated by *Oportunidades* with ENIGH 2000.

**** weights calculated with ENIGH 2006

Source: Author's calculation Based on ENIGH 2006

Comparison of indicators of CCTs beneficiaries to evaluate the performance of models: beyond monetary deprivation



NOTES: (a) Child labor and non-school attendance were estimated for members aged 12 – 17 years. (b) The different levels of poverty (between 5 - 25 percent) were defined with each targeting models' score.
Source: Author's calculation based on ENIGH 2006

Simulated impact of transfers* to 5% of poorer households selected with each models: beyond monetary deprivation

	Without transfers by age				With transfers by age				% change			
	9-12	13-15	16-18	Total	9-12	13-15	16-18	Total	9-12	13-15	16-18	Total
Income proxy												
Attending school	94.0	67.7	22.3	71.6	94.7	75.6	30.6	76.0	0.7	11.6	37.2	6.1
Attending & working	1.2	3.2	3.5	2.3	1.2	3.2	3.5	2.3	0.0	0.0	0.0	0.0
Attending & not working	92.9	64.6	18.8	69.4	93.5	72.4	27.1	73.7	0.7	12.1	44.2	6.3
Current SUP												
Attending school	92.6	69.8	18.1	74.1	93.3	72.6	28.5	76.9	0.7	4.0	57.6	3.9
Attending & working	1.6	5.2	3.6	2.9	1.6	5.2	3.6	2.9	0.0	0.0	0.0	0.0
Attending & not working	91.0	64.6	14.5	71.2	91.7	67.4	24.9	74.0	0.7	4.4	72.0	4.0
Updated SUP												
Attending school	93.1	68.6	19.4	75.3	93.7	71.7	29.7	78.1	0.7	4.7	53.1	3.7
Attending & working	0.8	6.0	3.1	2.4	0.8	6.0	3.1	2.4	0.0	0.0	0.0	0.0
Attending & not working	92.3	62.6	16.4	72.8	93.0	65.8	26.7	75.6	0.7	5.1	63.1	3.9
Multidimensional model												
Attending school	94.9	69.8	22.6	68.5	95.5	75.1	36.1	73.9	0.6	7.6	59.7	7.9
Attending & working	2.0	4.4	4.1	3.3	2.0	4.4	4.3	3.3	0.0	0.0	6.7	2.5
Attending & not working	92.8	65.4	18.6	65.2	93.5	70.7	31.8	70.5	0.7	8.1	71.3	8.1

* Using the Oportunidades scheme of transfers in the second half of 2006

NOTE: earnings and school attendance behavior models were considered for the simulations

ENIGH 2006 (includes only urban households that are not beneficiaries of the program)

Simulated impact of transfers* to 15% of poorer households selected with each models: beyond monetary deprivation

	Without transfers by age				With transfers by age				% change			
	9-12	13-15	16-18	Total	9-12	13-15	16-18	Total	9-12	13-15	16-18	Total
Income proxy												
Attending school	96.4	75.9	32.3	75.2	97.1	81.9	46.7	80.7	0.7	7.9	44.4	7.3
Attending & working	1.9	4.2	5.1	3.4	1.9	4.2	5.5	3.4	0.0	0.0	7.0	2.7
Attending & not working	94.5	71.7	27.2	71.9	95.2	77.7	41.2	77.2	0.7	8.3	51.4	7.5
Current SUP												
Attending school	96.5	74.8	30.2	78.4	97.3	80.1	43.5	82.7	0.8	7.1	44.3	5.5
Attending & working	1.6	6.5	5.1	3.6	1.6	6.5	5.6	3.7	0.0	0.0	9.7	2.8
Attending & not working	94.9	68.4	25.0	74.9	95.7	73.7	37.9	79.1	0.8	7.7	51.3	5.6
Updated SUP												
Attending school	96.7	74.6	24.1	78.0	97.3	79.2	36.8	81.8	0.6	6.1	52.7	4.9
Attending & working	1.7	5.8	5.8	3.5	1.7	5.8	6.2	3.6	0.0	0.0	5.8	1.7
Attending & not working	95.0	68.9	18.3	74.5	95.6	73.5	30.7	78.2	0.6	6.7	67.6	5.0
Multidimensional model												
Attending school	95.8	76.1	29.7	72.4	96.5	82.6	44.4	78.6	0.7	8.5	49.5	8.5
Attending & working	1.7	4.3	4.1	3.1	1.7	4.3	4.4	3.2	0.0	0.0	7.3	2.6
Attending & not working	94.1	71.8	25.6	69.3	94.8	78.3	40.0	75.4	0.7	9.1	56.2	8.7

* Using the Oportunidades scheme of transfers in the second half of 2006

NOTE: earnings and school attendance behavior models were considered for the simulations

ENIGH 2006 (includes only urban households that are not beneficiaries of the program)

Concluding Remarks

- This paper proposes a model for targeting CCT beneficiaries that takes into account the two criteria that defines the target population of CCT programs: poverty and under-investment in human capital.

- Using ex-ante evaluation, the paper shows that targeting CCT beneficiaries based on a multidimensional approach increases the effect of CCT transfers on the welfare of beneficiaries when compared to traditional targeting mechanisms.

- The implications of these findings should be considered in light of equity and efficiency arguments. The reduction of targeting errors improves the welfare of the neediest households (along some deprivation dimension) and reduces the amount of resources allocated to social programs because resources will more effectively reach households with multiple deprivations.

Thank you