Who is poor? An analysis of how people living in poverty are identified in Latin America

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Abstract

This article examines empirically the soundness of how people living in poverty are identified, through three types of analysis and utilizing data from 2012 for five Latin American countries. The results demonstrate that the monetary method and the multidimensional non-monetary method alone are insufficient as a way to identify poverty in a comprehensive way. It is therefore appropriate to use intermediate poverty thresholds for the multidimensional rate, and typification of poverty groups within these countries is sensitive to the selection of the threshold. These findings reaffirm the need to reach a consensus regarding the definition of poverty in the region's countries.

Keywords: poverty; monetary method; multidimensional non-monetary method; identification methods; social deprivation.

1. INTRODUCTION

The first key step in measuring poverty levels is the identification of who is considered poor (Sen, 1976). This approach presupposes a conception of poverty which is framed in terms of the measurement scale, the unit of analysis, and the degree of totality *vs.* relativity of what being poor represents. Aggregation is added to identification, which affects the direction in which the estimated poverty level moves when reacting to modification of the data. For the purposes of the present analysis, emphasis will be placed on the identification stage of this process.

In Latin America, the predominant method of measuring poverty has been the income method or poverty line (PI), also known as the indirect method, which is used as a way to verify access to resources, though it does not address the actual satisfaction of necessities. Recently, this approach has been referred to as the unidimensional method because it considers access to monetary resources alone. However, there is also a direct measurement method used in the region (Sen, 1981), which works with a focus on Unsatisfied Basic Needs (UBN) and seeks to verify whether people effectively satisfy a set of basic needs in different dimensions of wellbeing. During the 1980s, 1990s, and a good part of the 2000s, many countries produced official statistics using both methods.

In recent years, the need for a broader evaluation of poverty has become clear—one that is not limited to the monetary sphere. The present work highlights a focus on rights and abilities, which is among the most influential conceptual frameworks in use that address the issue. The focus on rights points to the existence of human rights which are internationally respected, and as such, should be advanced in order to guarantee certain fundamental freedoms. For example, the Universal Declaration of Human Rights (1948) represented a fundamental turning point which broadened the set of rights that had until then been recognized, including economic and social rights (Sen, 2009). Consequently, a focus on capacities (Sen, 2009) signals the importance of evaluating wellbeing in terms of capacities or operations, i.e. the *goals* of development, and not of resources, its *means*. Operations are what a person is effectively capable of doing in different dimensions of their life (including nutritional status, cognitive capabilities, social capabilities, etc.). Capacities are the set of operations which are actually available to a person.

On the other hand, some participatory studies, such as Narayan *et al.* (2000), argue that poor people define their situation of deprivation by considering dimensions that go beyond that of income. Additionally, theoretical developments in the sphere of multidimensional measurement of poverty are conducive to developing measurements of poverty which fit within a range of desirable features (Atkinson, 2003; Bourguignon and Chakravarty, 2003; Alkire and Foster, 2011; among others).

In this way, measurements of poverty which use the direct method have seen new life. Various countries in the region, such as Mexico (CONEVAL, 2010), Colombia, Costa Rica, Chile, Ecuador, El Salvador, Honduras, Panama and the Dominican Republic, have made official multidimensional measurements of poverty (Santos, 2019). It is also common to construct a contingency table which combines the monetary identification method and the multidimensional non-monetary identification method of who is poor, producing a typology which characterizes the whole population in function of the presence or absence of monetary and non-monetary deprivations.

The coexistence of the two official poverty rates, one monetary and the other one non-monetary, enrich our understanding of the problem, while it also further complicates a response to the central question from a policy development point of view: who is poor? This is the case not only because the two poverty rates do not necessarily identify the same population as poor, but also because decisions about the identification criteria for both rates are continually up for debate.

This article examines how sensitive the quantity and homogeneity of the group of people identified as poor are to variations in the identification criteria, in one context characterized by the availability of a poverty rate by income, and in another of poverty by critical deficits. Varying the identification criteria is equivalent to modifying operational definitions of poverty, and thereby puts to the test the necessity and relevance of arriving at a consensus with respect to the meaning of being poor.

There is an important body of literature that addresses how sensitive poverty measurements by income are to variations, both of the poverty line (identification) and of the aggregation measurements. The latter has given rise to the so-called stochastic domain focus, which is considered the complete distribution—whether it be uni- or multidimensional—and which aims to determine whether one distribution is preferred over another by working with accumulated distribution functions. This focus allows for the creation of poverty structures, though these are incomplete, given that it is not always possible to determine the influence one distribution has over another (Foster and Sen, 1997).

Additionally, Székely *et al.* (2000) examine the sensitivity of poverty measurements by income to methodological decisions such as the use of adult equivalent scales, the adoption of economies of scale for consumption, attention to income shortfalls and zero income, and adjustment for under-declaration of income in the case of 17 Latin American countries.

This work shares the same motivation as the literature cited here, and seeks to provide evidence that concerns one aspect of the sensitivity of poverty calculations that is still little explored: that which results from combining the income method with the direct method or the multidimensional non-monetary method. To do this, the identification of monetary poverty was taken as exogenously given and variations in calculations were analyzed based on changes in the multidimensional non-monetary poverty threshold.

The analysis was performed based on data from five Latin American countries: Brazil, Colombia, Mexico and El Salvador for 2012, and Bolivia for 2011. The exercise could have been done with data from other years or countries in the region, exposing similar discrepancies. This data set offers an appropriate degree of comparability.

The present work is only an approximation, given the large number of alternatives and modifications that could be explored. Yet it is valuable insofar as it exemplifies the variability of the numbers which result from measurements by definitions of poverty, and thereby represents a call for maximum methodological transparency, to advance agreed-upon definitions of poverty and to realize tests of robustness and sensitivity.

The text is structured in the following way: in the second section, identification of poverty according to the poverty line method, the multidimensional method and the contingency table method are described. In section three, results of the empirical analysis are presented. In the fourth section, alternatives for the identification of the poverty threshold in the multidimensional method are discussed, and section five presents the conclusions.

2. POVERTY IDENTIFICATION METHODS

The income method

Measuring poverty according to the poverty line in Latin America consists of calculating the cost of the basic food basket (BFB) or “indigence line” (IL), which satisfies the average nutritional requirements of the population, and the cost of the total market basket (TMB) or “poverty line” (PL), which is the BFB extended by the inverse of the Engel coefficient[1] .

Who is poor according to the income method? Those whose income is below the poverty line, which is to say: if $y_i < z_Y$ where $y_i \in \mathbb{R}_+$ is the income of person *i*, and *z* is the poverty line. In terms of aggregation, the measurement frequently used is the poverty rate, which is defined as the number of people identified as poor by LP, q_{LP}, as a proportion of total population *n*:

$$H_{LP} = q_{LP}/n$$

The poverty rate has the disadvantage of not registering increments in poverty when a poor person becomes poorer, in addition to when a regressive transfer is produced between poor people (Sen, 1976). Despite this, for the purposes of this work, this form of measurement is sufficient.

Determining conditions of poverty by income involves many decisions, such as how to identify nutritional requirements, select the reference population and define BFB items. Additionally, a procedure to calculate the Engel coefficient, and the use of income *vs.* consumption as indicators of resources, must be decided. Finally, there must be a procedure to correct said variables (such as allocations for missing data and adjustments for under-declaration). Székely *et al.* (2000) demonstrate that the proportion of people identified as poor in 17 Latin American countries rises from 12.7% to 65.8% of the total population depending on the procedures used for certain aforementioned processes.

The direct or multidimensional method

The traditional way of implementing the direct method in Latin America is a focus on basic needs (as undertaken by Last and Molina, 1975; INDEC, 1984). However, recently new measurements of poverty by the direct method have been developed in the region, following Alkire and Foster’s (AF) methodology (2011) and which include official measurements for various countries in the region, in addition to the multidimensional poverty rate for the Latin American region proposed by CEPAL (2014), Santos *et al.* (2015) and Santos and Villatoro (2018).

The AF method and the UBN method share a focus on counting the number of deprivations in order to identify poverty, and as such they can be presented together. Supposing that poverty is evaluated with *d* indicators, every person has a measurement for each indicator, which is compared to the satisfaction threshold of said indicator. The first step in identifying who is poor requires determining if the person exhibits deprivation in each indicator under consideration. Second, each person’s deprivation is weighed by the importance of the indicator. Based on the above, the deprivations under consideration are added together, obtaining a deprivation score for each person c_i.

Who is poor according to the multidimensional method? Those who experience a particular combination of deprivations equal or greater to the deprivation threshold, which is denoted by $c_i \geq k$. Threshold *k* specifies the number of minimum deprivations that a person must experience in order to be considered poor. *k* may vary from a combination criterion, which requires experiencing at least one deprivation, to an intersection criterion, which requires experiencing all of the deprivations under consideration. Accordingly, *k* can be defined as equivalent to the proportion of deprivations that are experienced.

The UBN method labels someone as poor (or having UBN) if they live in a household which exhibits at least one UBN from a list which usually includes overcrowding, inadequate housing, lack of a toilet, children who do not attend school and an indicator of low economic capacity (a high dependency rate for the household and low education level of the head of household). As an aggregated measurement, the UBN method uses the proportion of people with one or more UBN:

$$H_{NBI} = q_{NBI}/n$$

It is worth mentioning that these countries’ Institutes of Statistics and Censuses end up reporting statistics which are disaggregated, like the proportion of people by deprivation quantity and type (see INE, 2012).

The UBN method has received critiques regarding: *1)* the selection of indicators that are utilized being subordinated to the availability of data from census sources and to their correlation with monetary poverty; *2)* the equal consideration of indicators, which implies a certain imbalance in dimensional consideration (given that various indicators refer to quality of housing); *3)* the use of a combination criterion. When using the poverty rate, the UBN rate ignores the depth (distance from the deprivation threshold) and breadth (number of deprivations) of poverty (see Feres and Mancero, 2001).

The AF methodology offers the possibility of overcoming some of these limitations, given that it allows for intermediate poverty thresholds (k), in addition to allowing the rate to be sensitive to the breadth of poverty. The first measurement proposed by AF is the adjusted count rate M_0. This measurement combines two sub-indices: the proportion of people who are multi-dimensionally poor, and the intensity of their deprivation, which is given by the average number of deprivations (under consideration) which people who were identified as poor experience. Accordingly, the proportion of poor people can be expressed according to threshold k as $H_k = q_k/n$, where q_k is the number of people identified as poor using threshold k. The intensity is given by $A = \sum_{i=1}^{n} c_i(k)/q$, where $c_i\ (k)$ is the sum of deprivations under consideration for those who were identified as poor. M_o is the product of these calculations:

$$M_0 = H_k \times A$$

The structure of calculation M_o is used to develop official multidimensional poverty measurements for the majority of countries in the region, and for the regional rate presented by Santos *et al.* (2015) (henceforth IPM-LA).

The present work uses a variant of the IPM-LA which retains 12 of the 13 indicators, including all except for income, given that the objective is precisely to evaluate measurements of non-monetary poverty as combined with measurements of monetary poverty. This rate will be known as Expanded-UBN. An alternative rate will be considered in turn, composed of 6 indicators which are approximated to the traditional configuration of the UBN rate. This rate will be called UBN. For simplicity's sake, and to differentiate from the IPM-LA, for both cases it was decided to equipoise deprivations rather than dimensions. The indicators and considerations for both rates are detailed in Table 1. These two measurements refer to social deprivations, given that neither of them contain income as an indicator.

Table 1. Social deprivations rates under consideration

Dimensions	*Household Indicators, including:*	*Calculation*	
		Extended-UBN Rate	*UBN Rate*
HOUSING		**25**	**33.3**
Housing materials[a]	Houses with dirt floors or roof, or walls with precarious materials (waste, cardboard, cans, cane, palm, straw, other materials).	8.3	16.6
Overcrowding	Three or more people per room in rural and urban areas.	8.3	16.6
Insecure housing ownership[b]	*1)* living in illegally ocupied housing, or *2)* residing in divested or loaned housing.	8.3	0
BASIC SERVICES		**25**	**33.3**
Lack of improved water sources	Urban areas: Obtaining water from one of the following sources: - a public network not on the property; - unprotected wells or those without a pump or motor; - mobile sources (reservoirs, car tanks, water carriers, among others); - bottled water; or - rivers, ravines, rain or other sources. Rural areas: Obtaining water from one of the following sources: - unprotected wells or those with a manual pump; - mobile sources (reservoirs, car tanks, water carriers, among others); - bottled water; or - rivers, ravines, rain or other.	8.3	16.6
Carencia de saneamiento mejorado	Urban areas: - sewage disposal that is unconnected to a system or septic tank; - shared bathroom; or - lack of hygienic services. Rural areas: - lack of hygienic services; - shared bathroom; or - untreated sewage disposal to the surface, rivers or the sea.		
Lack of energy	There is no electricity or wood; coal or waste are used as fuel to cook with.	8.3	0
EDUCATION		**25**	**33.3**
School non-attendance	At least one child or adolescent (between 6 and 17 years old) does not attend an educational establishment.	8.3	16.6
Insufficient level of education	No one age 20 or over has a minimum educational level, understood according to the following: - people between 20 and 59 years old have not completed the first cycle of full secondary education; and - people 60 years old or over have not completed full primary education.	8.3	16.6
Lagging education	At least one child or adolescent (between 6 and 17 years of age) is behind in the educational system by more than two years, according to their age.	8.3	0
STANDARD OF LIVING		**8.3**	
Lack of durable goods	Not being in possession of any of the following goods: *1)*) vehicle, *2)* refrigerator and *3)* washing machine.	8.3	0
EMPLOYMENT AND SOCIAL PROTECTION		**16.6**	**0**
Unemployment	At least one person between 15 and 65 years old is in one of the following situations: - unemployment; - non-remunerated work; or - is a discouraged worker.	8.3	0
Precarity of social security [c]	One of the following situations exists: - no one has any type of contributory health insurance; - no one is affiliated with a contributory social welfare system; or - no one has income from pensions or retirement.	8.3	0

Notes: [a] Information on floor type was not available for Brazil (2012); [b] Housing received in usufruct were not considered as a housing deprivation; [c] Information on health insurance was not available for Brazil (2012). Only social security indicators were considered.

Source: prepared by the authors, based on Santos et al. (2015).

It should be noted that poverty threshold *k* constitutes a very important parameter (equivalent to the poverty line in a monetary measurement), which reflects in good measure the underlying conceptualization of poverty. Of course, this concerns not only *k* in and of itself, but its configuration in terms of the number of indicators and thresholds being used.

The integrated, bi-dimensional or contingency table method

During the mid-1980s, contingency tables began to be used as a measurement of poverty by UBN and poverty line (PL), denoted by Beccaria and Minujin (1985) and Kaztman (1989) as the "integrated method" (also known as the bi-dimensional focus), as a way to evaluate whether the incidences of poverty obtained by different methods were similar (Boltvinik, 2013). The confirmation of important differences between the calculations generated by these methods led to the construction of an *ex post* typology. It was understood, therefore, that the PL method did not capture necessities that do not involve any expense, and that the UBN method was not suitable as a way to capture the necessities that can be satisfied by income.

Table 2: Contingency table for monetary and non-monetary poverty

	UBN or non-monetary deprivations		
Monetary (PL)	*Poor*	*Not poor*	*Total*
Poor	n_{11}	n_{10}	n_{1+}
Not poor	n_{01}	n_{00}	n_{0+}
Total	n_{+1}	n_{+0}	n

Source: based on Alkire et al. (2015), Chapter 2.

The categories under consideration in the first version with a bi-dimensional focus can be described in the following manner (Feres and Mancero, 2001): *a)* chronic poverty (n_{11}): "consistently" poor households (Ringen, 1987) that would form a "solid core" of poverty; *b)* inertial poverty (n_{01}): made up of subjects that would have recently left poverty due to income, but who maintain non-monetary deprivations; and *c)* recent poverty (n_{10}): those who have seen their income fall below the poverty line as a consequence of some economic impact, but who do not have social deprivations. As such, the bi-dimensional method, at least using Kaztman (1989) and CEPAL/DGEC's (1988) interpretation, is not always associated with a strict criterion that identifies poverty but rather offers a typification which can be useful when designing policies.

The recent diffusion of new developments in the field of multidimensional poverty measurements has renewed interest in the use of contingency tables, while their principal official demonstration takes the form of multidimensional measurements which are currently used in Mexico. The Commission for Poverty Measurement which is proposed in Chile (2014) should also be mentioned, as well as the work of MDS Brazil (2015).

In recent applications in Mexico, Chile and Brazil, changes were made with respect to the original interpretation of the contingency table method. For example, in Mexico (CONEVAL, 2010), those who are poor according to income and who experience at least one social deprivation are considered multidimensionally poor (people who under the traditional interpretation would be chronically poor). Those who are poor due to income but not because of deprivations are referred to as vulnerable by income, while those who pertain to the inverse category are called vulnerable by social deprivation. In turn, Mexico as well as Chile generated a subgroup of those in extreme poverty, defined as having income under the indigence line and being poor due to social deprivations.

Data sources

Calculations were performed for five countries in the Latin American region—Brazil, Colombia, Mexico and El Salvador in 2012, and Bolivia, for which the data correspond to 2011 due to availability at the time of making the calculations. These countries were chosen based on completeness of information and variability in the incidence of poverty. In Table 3, data sources are presented, along with the percentage of people identified as poor for each threshold *k,* under the two social deprivation rates.

Table 3. Data sources and incidence of poverty by social deprivation. Rates for 12 and 6 deprivations (percentage of the population)

Countries	Source and year	12 deprivation rate (%)				6 deprivation rate (%)		
		Number and proportion of deprivations				Number and proportion of deprivations		
		K=1	K=2	K=3	K=4	K=1	K=2	K=3
		(8.3)	(16.7)	(25)	(33.3)	(16.7)	(33.3)	(50)
Brazil	Pesquisa Nacional por Amostra de Domicilios 2012	60	31	15	6	44.5	13.8	3.3
Colombia	Major Integrated Household Survey 2012	76	53	34	22	48.5	21.9	9.6
Mexico	National Survey of Household Income and Expenses 2012	80	59	42	28	62	36	17
El Salvador	Multipurpose Household Survey 2012	85	69	55	42	68	45	27.5
Bolivia	Continuous Household Survey 2011	93	81	66	51	81	55	35

Note: k=poverty threshold due to social deprivations; when k=1, it is enough for people who have some deprivation to be classified as poor; when k=2, at least 2 deprivations are required in order for people to be considered poor.

Source: prepared by the authors. The databases are provided by the CEPAL's Data Bank of Household Surveys (BADEHOG).

3. RESULTS OF THE ANALYSIS

Agreement between monetary and non-monetary identifications of poverty

Monetary and non-monetary measurements are distinct, and as such, it can be expected that a certain discrepancy will exist. Nonetheless, a degree of agreement is also desirable, given that each measurement captures different expressions of the same phenomenon. In other words, if two measurements of poverty are completely in agreement, either of the two methods can be used to measure poverty, without the need of combining them. In turn, if the two poverty measurements methods produce completely discrepant classifications, they must be capturing different phenomena.

The simplest way of analyzing agreement between two methods which address the same phenomenon is to calculate the total number of coinciding observations as a percentage of the total number of observations. Given the notation presented in Table 2, agreement is defined as:

$$C = \frac{n_{11} + n_{00}}{n}$$

Table 4 provides results for a simple agreement analysis, considering several social deprivation thresholds, from one deprivation (combination criterion) to all of them (intersection criterion).

Table 4. Agreement between measurements by PL and social deprivations for different *k* Values (percentage of the total population)

Social deprivation threshold (k)	*Brazil 2012*	*Colombia 2012*	*Mexico 2012*	*El Salvador 2012*	*Bolivia 2011*
1	54.1	54.9	53.1	57.0	42.3
2	75.3	70.4	64.6	64.6	51.6
3	82.3	75.2	69.3	68.6	60.7
4	83.4	75.3	70.9	70.0	67.7
5	82.6	73.5	69.7	68.8	71.6
6	82.0	71.6	68.3	65.7	72.8
7	81.6	70.0	65.8	62.8	72.8
8	81.5	68.7	64.0	59.2	70.8
9	81.5	67.9	63.3	56.8	68.0
10	81.5	67.4	63.0	55.3	65.3
11	81.5	67.2	62.9	54.6	63.8
12	81.5	67.1	62.8	54.5	63.7

Note: for high values of *k* (9 or more), the degree of agreement stabilizes due to the fact that people in monetary poverty begin to be captured unequivocally by non-monetary poverty measurement, and the percentage of people who are considered poor by social deprivation stabilizes.

Source: prepared by the authors.

The data laid out in Table 4 demonstrate that the percentages of agreement between both methods are less for the lowest *k* levels, and then increase, reaching their maximum for a *k* of between 3 and 5 deprivations, after which they begin to decrease again for the most demanding *k* values. Bolivia is the exception, where recently the section of 6 and 7 deprivations produces the greatest agreement between the two methods.

The behavior seen in the degree of agreement between the two methods—as regards poverty threshold *k* of the multidimensional rate—is intuitive. When a combination criterion is used for the deprivation rate, it is probable that a person would experience a non-monetary deprivation, without necessarily being considered poor due to income: n_{01} tends to be high, and accordingly, the degree of agreement tends to be low. As poverty threshold *k* increases, this possibility decreases and it becomes less likely that a person would experience multiple simultaneous deprivations, and not be poor by income. That is to say, as n_{01} tends to decrease and the level of agreement begins to increase. Nonetheless, while the value of *k* climbs higher and higher, n_{10} tends to increase (it becomes more probable that someone would be poor due to income without necessarily showing a high number of non-monetary deprivations). In this way, once again the degree of agreement decreases.

One problem with an agreement indicator based on the percentage of agreement between two methods is that part of the agreement being observed can be a result of chance. A measure which attempts to correct this is the Kappa coefficient (Cohen, 1960), designed to measure the intraclass correlation, and defined as:

$$k = \frac{Po - Pe}{(1 - Pe)}$$

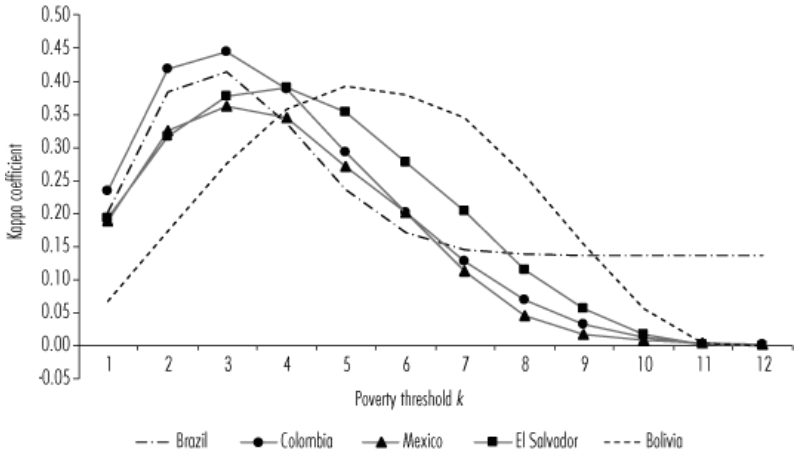
where *Po* is the observed agreement (*Po* = *C*) and *Pe* is the expected degree of agreement due to chance. Put in the terms presented in Table 2, the expected agreement is calculated as the sum of the products of the probabilities of both methods classifying a person as poor, and the probability that both methods would classify a person as not poor:

$$Pe = \left(\frac{n_{1+}}{n}\right) * \left(\frac{n_{+1}}{n}\right) + \left(\frac{n_{0+}}{n}\right) * \left(\frac{n_{+0}}{n}\right)$$

When there is perfect agreement, Kappa is equal to 1. If the agreement observed is equal to that which is expected due to chance, Kappa is 0, and the negative values (which are very unusual) indicate a degree of agreement lower than chance. Coefficient Kappa values less than 0.2 are usually interpreted as insignificant; values between 0.2 and 0.4 as a low level of agreement; values between 0.4 and 0.6 as a moderate level of agreement; and values greater than 0.6 as a high level of agreement (Viera and Garrett, 2005).

In Figure 1 it can be noted that—as with coefficient C—the agreement between both methods, as calculated for coefficient Kappa, is greater for intermediate *k* thresholds for social deprivation (mainly 3 or 4 deprivations), and is lower for the most extreme deprivation thresholds. It can also be observed that the agreement levels with coefficient Kappa are lower than with measure C, suggesting that part of agreement level C is actually due to chance.

Figure 1. Agreement between measurements by PL and social deprivations, with changing multidimensional thresholds for social deprivation



Source: prepared by the authors.

The fact that for intermediate social deprivation poverty threshold levels there is still moderate agreement, implies that both measurements are partially capturing the same phenomenon, though it also suggests that neither of them is sufficient on its own as a way to adequately capture poverty.

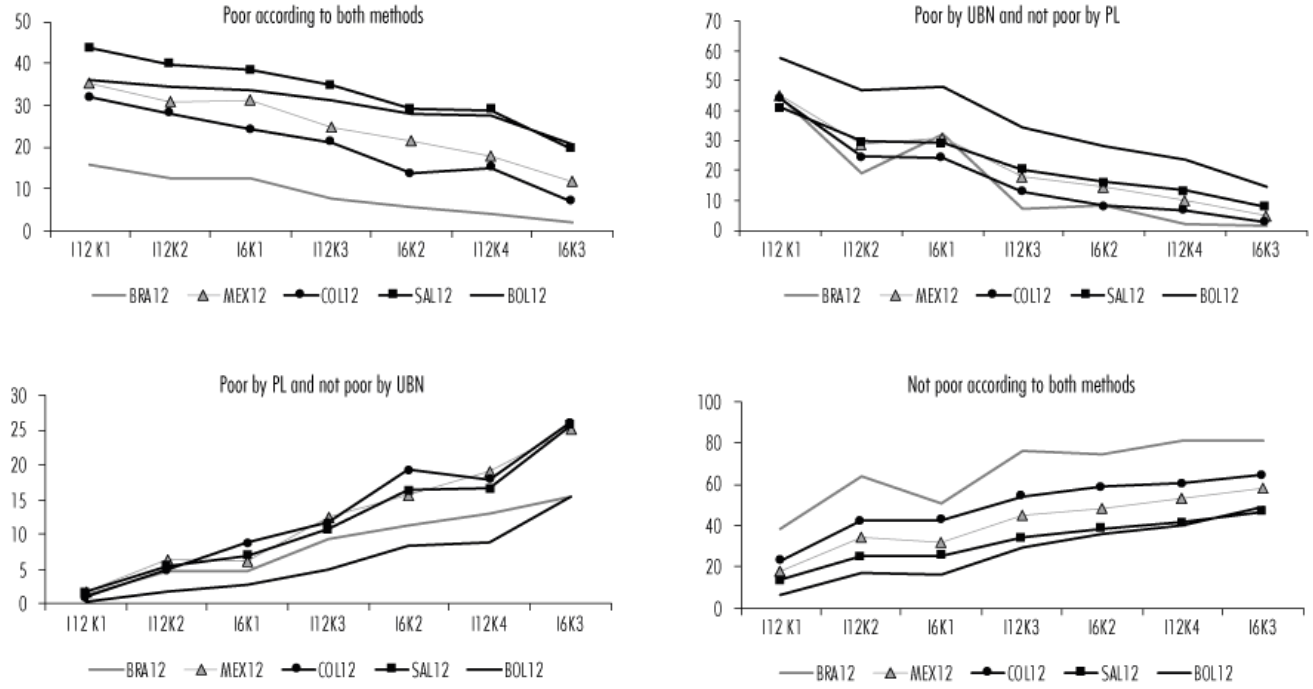
It should be noted as well that identification according to the poverty line has been taken as exogenously given and valid. Still, it is known that this threshold's determination is subject to a large number of methodological decisions that affect the observed degree of agreement with non-monetary multidimensional measurements.

Sensitivity of identification to variations in the multidimensional poverty threshold

This section evaluates the effect of variations in the threshold and number of deprivation indicators for the multidimensional rate on the identification of categories generated by the bi-dimensional method. The robustness of the contingency table method is examined using 7 alternative specifications in total: the UBN rate version (6 indicators) with a *k* of between 1 and 3, and the Extended-UBN rate version (12 indicators) with a *k* of between 1 and 4. Given the number of indicators, a greater *k* means less probability of being identified as poor. Accordingly, given *k*, it is less probable to be identified as poor with the UBN rate version than with the Extended-UBN, since it has fewer indicators. It should be mentioned that *k*=1, *k*=2, *k*=3, *k*=4, *k*=5, and *k*=6 in the UBN rate are comparable respectively to *k*=2, *k*=4, *k*=6, *k*=8, *k*=10 and *k*=12 in the Extended-UBN, insofar as they require deprivation levels of 16.7, 33, 50, 66.7, 83.3 and 100%, respectively.

Figure 2 (composed of four graphics) demonstrates the structuring of the countries in question for each one of the four groups defined by the contingency table presented in table 1, using different specifications of the multidimensional rate. It can be seen that the structuring of countries according to the incidence of each group tend to be maintained with the variation of threshold (*k*) and the number of indicators in the multidimensional rate, which is most evident for the groups who are "poor according to both methods" and "not poor according to both methods." The robustness of calculations of "inconsistent" groups (considered poor according to PL and not poor according to deprivations, and vice versa) is somewhat less. That is, it can only be affirmed unambiguously that Bolivia is the country where the group of people considered poor by deprivations and not poor by PL has a higher incidence, and the group of people who are considered poor by PL and not poor by deprivations has a lower incidence, independently of value *k* and the number of indicators.

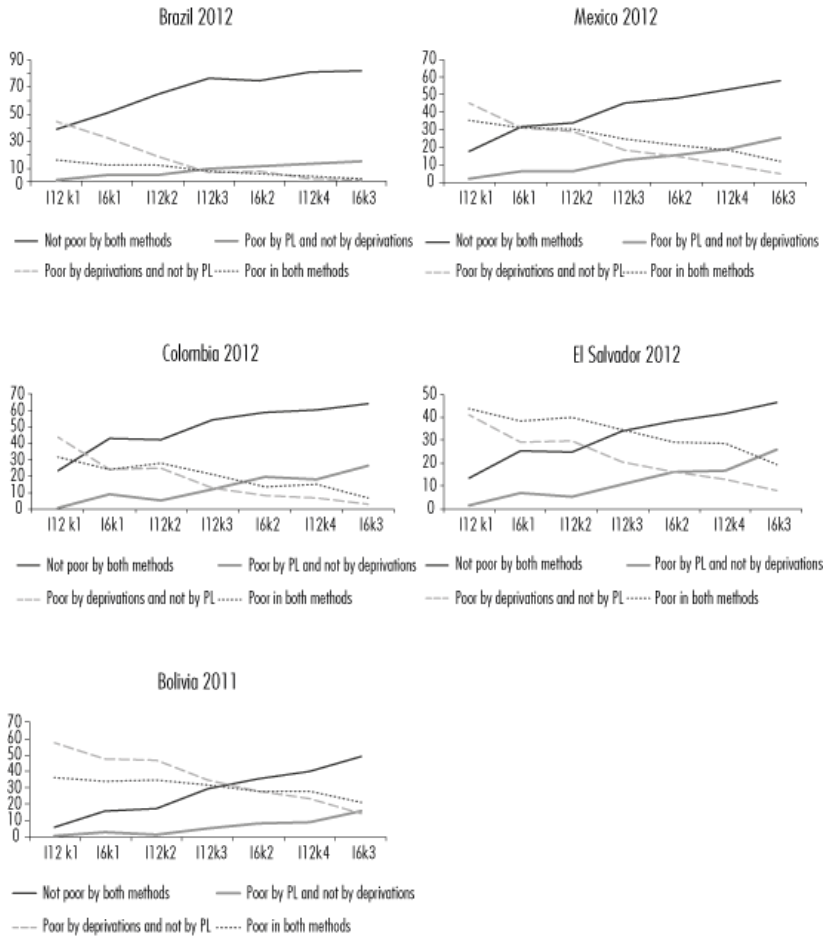
Figure 2. Typology derived from contingency tables of social deprivation poverty thresholds and number of CIRCA indicators for 2012 (percentage of the population)



Note: I12K1=rate with 12 social deprivations (Extended-UBN) and with threshold k=1;
I6K1=rate with 6 social deprivations (UBN) and with threshold k=1.
Source: prepared by the authors.

Figure 3 presents the same incidence levels, but instead of comparing the incidence of each group in the different countries when varying the multidimensional rate, the incidence of the various groups in each country is compared.

Figure 3. Incidence of different types of poverty within five Latin American countries, with varying thresholds and number of indicators (percentage of the population)



Note: I12K1=rate with 12 social deprivations and threshold k=1;
I16K1=rate with 6 social deprivations and threshold k=1.
Source: prepared by the authors.

As would be expected, when varying the poverty threshold for the multidimensional rate and the number of indicators under consideration, the structuring of the distinct groups identified in each country changes significantly.

The behavior of each group's incidence is the same in each country and is given by definition. When increasing the value of *k* and decreasing the number of indicators for the rate, the proportion of poor people derived from both methods decreases, which is offset by an increase in the group of non-poor people according to both methods. Meanwhile, the proportion of people who are poor by UBN, but not by PL, also decreases, and as an offset there is an increase in the proportion of people who are poor by PL, but not by UBN. Within this frame, if the poverty threshold according to social deprivations is quite undemanding (for example, the combination criterion), and additionally a greater number of deprivation indicators are used, the probability that a person will be identified as not poor by social deprivation will be substantially reduced.

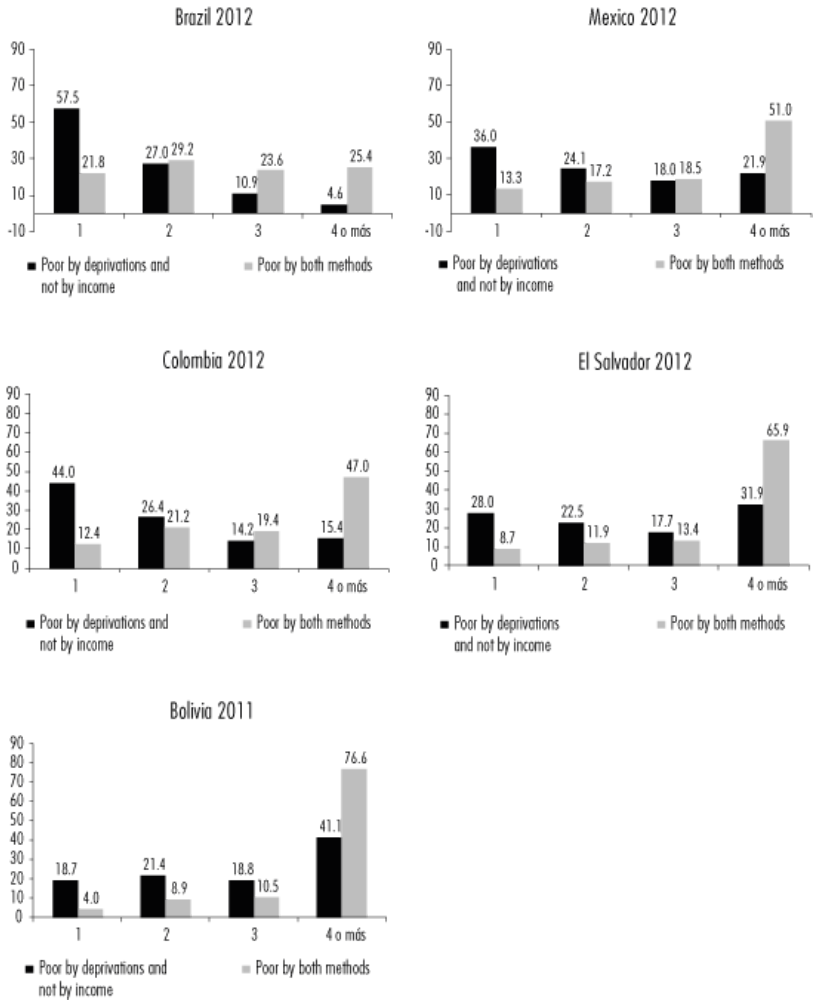
This explains what is observed with the specification I12/K=1, where the group of people who are poor according to income and not poor according to deprivations almost disappears. In this way, this specification is less capable of capturing the effects of economic crises. Essentially, it is probable that many of the people who fall in monetary poverty experience few non-monetary deprivations for some period of time. Additionally, a very low *k* and a greater number of non-monetary deprivation indicators can lead to an underestimation of the group of people who are not poor according to income but poor according to UBN.

Intra-group homogeneity

When defining groups of people who experience deprivations according to the integrated method, it is expected not only that each group will be distinct from the others, but that each group will exhibit a certain degree of internal homogeneity in terms of certain critical attributes. This affirms that the subjects classified as belonging to one group unambiguously belong to that group, and not to another.

Figure 4 presents the incidence of social deprivations in the group of people who are "poor by social deprivations and not poor by income," and those who are "poor by both methods," using the specification *k*=1 and a rate of 12 deprivations. The percentages presented come to a total of 100% within each group. The data show substantial variability in the incidence of social deprivations within each group. For example, those who are poor according to income and only experience one social deprivation comprise more than half of the group in Brazil, 44% in Colombia, 36% in Mexico, 28% in El Salvador and 18.7% in Bolivia.

Figure 4. Occurrence of social deprivations in selected groups, k=1[a]
(percentage of the population within each group) [b]



Notes: [a] K=1 means at least 1 deprivation in the rate of 12 social deprivations; [b] The percentage of the population within each group affected by 1, 2, 3, 4 or more social deprivations. The percentages make a total of 100% within the group "Poor by deprivations and not poor by income" and within the group "Poor by both methods."
Source: prepared by the authors.

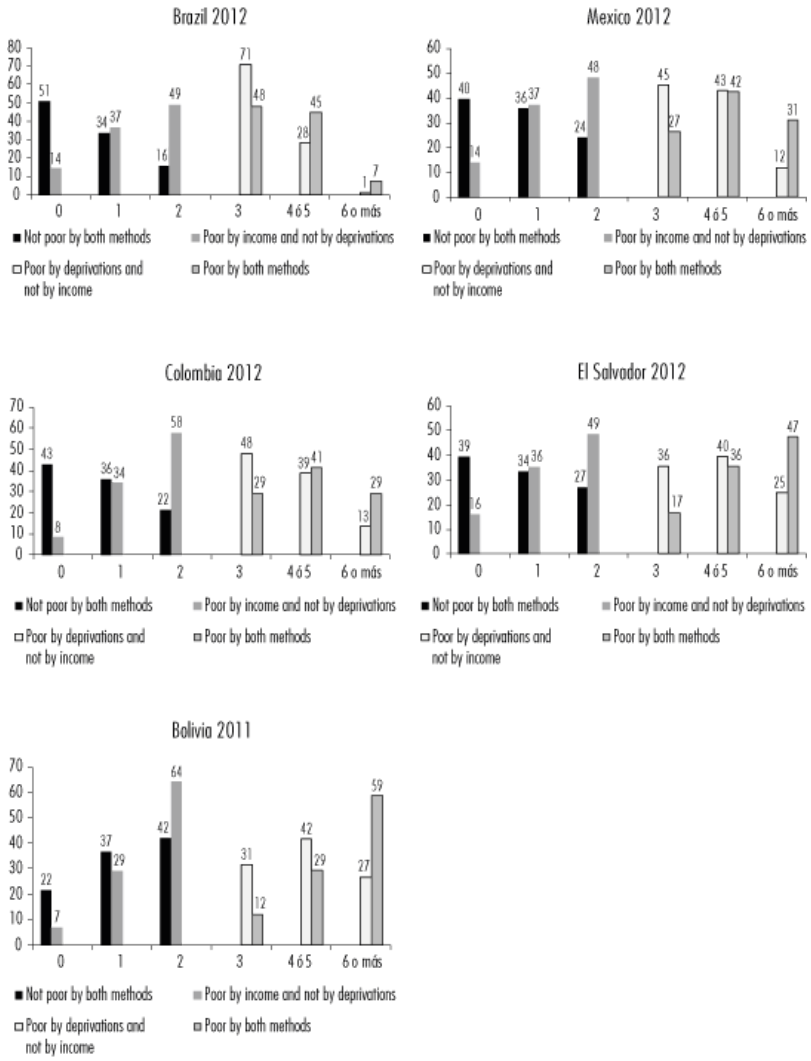
For their part, those who experience 3 or more social deprivations (adding up the groups with 3 deprivations and with 4 or more) reach the level of 15% in Brazil, 29.6% in Colombia, 39.9% in Mexico, 49.6% in El Salvador and 59.9% in Bolivia. In this way, within each group there is a gradation of the intensity of poverty given by the number of deprivations that are experienced, suggesting that the group of people who are "poor by inertia" in the Kaztman framework encompasses people in a diverse set of conditions.

There is also a heterogeneity observed between those who are poor according to both methods: those who experience 4 or more deprivations represent 25% in Brazil, 47% in Colombia, 51% in Mexico, 65.9% in El Salvador and 76.6% in Bolivia, which evidences a gradation in terms of the intensity of poverty. It can be expected that within this group, there is also a gradation in terms of the depth of deprivation by income.

Interpreted in another manner, these numbers raise the issue not only of the adequacy of the integrated method's typology, but they also problematize both forms of measurement. On one hand, the fact that a subject is not poor according to PL but experiences 1 of 12 deprivations leads to the problematization of how precise identification is on the side of deprivations, when a combination criterion (k=1) is used. On the other hand, the fact that a subject experiences deprivations in 3 or more non-monetary indicators, and at the same time is not poor according to PL, raises questions about identification by PL.

Figure 5 presents the incidence of social deprivation in the four groups derived from the classic contingency table, based on the 12 deprivation rate, but with k=3. The population percentages with a different number of deprivations total 100% within each group. Though a more demanding poverty threshold k is used here, the internal heterogeneity of the groups persists. For example, when considering the group who are "not poor by both methods" this fluctuates between 51% (Brazil) and 22% (Bolivia), and within the same group those who experience 2 non-monetary deprivations show incidences between 42% (Bolivia) and 16% (Brazil). It should be asked, then, how the latter subjects would be classified if their income were closer to the poverty threshold.

Figure 5. Incidence of social deprivations in selected groups, k=3[a]
(percentage of the population within each group) [b]



Notes: [a] *K=3 indicates a multidimensional poverty threshold of 3 deprivations regarding social deprivations;* [b] *The percentage of the population within each group affected by 0, 1, 2, 3, 4, 5, 6 or more social deprivations. The percentages make up a total of 100% within the group (Not poor by both methods, Poor by income and Not by deprivations, Poor by deprivations and Not by income, Poor by both methods).*
Source: prepared by the authors.

The group of people who are “poor by income and not poor by deprivations” exhibits heterogeneity—the incidence of those who experience 2 deprivations is close to or over 50%. Accordingly, the high rate of people with 4 or more deprivations in this group raises the question of whether it is reasonable that this sub-group not be considered as “consistently poor” (by not presenting monetary deprivation), when those who experience 3 deprivations and are not deprived by income are classified as “consistently poor.” Lastly, in the group who are “poor by both methods,” there could be doubt about the adequacy of classifying those who experience 6 or more deprivations in the same group as those who are only affected by 3 deprivations.

Keeping in mind the problem of intra-group heterogeneity, it should be recognized that there exists a tension between the precision of identification and the operationality of the criteria at hand. The total possible number of configurations of deprivations increases exponentially when increasing the number of indicators under consideration. The aggregation of a group with some degree of homogeneity—though imperfect—becomes necessary to make measurement and public policy actions operational.

4. REFLECTIONS ON POVERTY THRESHOLD *K*

The exercise performed here for 2012 exhibits the sensitivity of poverty calculations to variations in the identification criteria, a sensitivity which would also be seen if other years were to be used for analysis. This analysis encourages a conversation regarding some fundamental aspects of the criteria that are used to identify poverty.

First, the results shown in the section which describes agreement between monetary and non-monetary poverty identification suggest that the agreement between identifying poverty using the deprivation rate as opposed to by way of the PL method is—at best—moderate, a finding which matches evidence found in other work on Latin America as well as countries in other regions. This suggests that both measures provide partial information and should be combined in some way.

An alternative combination is to define people as poor when they are consistently poor (i.e. poor by monetary and non-monetary criteria). This would imply associating the notion of poverty with only one of the three possible situations of deprivation which can be identified using the contingency table method. This is the route that Mexico has taken for its official calculations, according to which—in practice—in order to be identified as poor it is necessary to experience deprivation of

income in addition to at least one deprivation by social lack. Another possibility is to use the identification of the combined groups which are considered poor according to both methods as a criterion (Boltvinik, 2013). Nonetheless, this could give rise to very high rates of poverty, making it less operational as information to be used in designing selective policies. The third alternative is to include the monetary dimension in a multidimensional rate, without establishing monetary poverty as a requirement in the identification of poverty.

In any case, the multidimensional rate requires fixing poverty threshold *k*. The evidence presented here indicates the importance of determining *k*, especially for the quantification and typification of poverty within each country. The relative magnitude of the groups with distinct combinations of monetary and non-monetary deprivations within each country changes substantially when varying threshold *k*, which presents a challenge for any sort of combination between both rates.

In what ways could the multidimensional poverty threshold *k* be defined? One option is the strictly normative definition, from the perspective of rights, according to which the presence of just one deprivation is enough to consider a certain situation as one of poverty. This alternative is not exempt from discretion in the selection of rights and the thresholds to be observed. Poverty is not equivalent to the violation of any human right (OHCHR, 2003), and this lack of conceptual identity will necessitate making decisions with respect to the rights that are to be included or not. Problems of data availability can mean the exclusion of fundamental rights, such as the right to alimentation. There are also decisions to be made regarding the thresholds that would guarantee such rights. In practice, the contents of international rights can be interpreted as a norm (applied literally) or as a principle, in which case the capacities of States to guarantee such rights are taken into account, while also attending to the idea of progressive modes of application.

The combination criterion founded on the perspective of rights has been used for official multidimensional measurement in Mexico, where each one of the 6 deprivations that constitute the non-monetary side of the multidimensional rate are understood as constitutional rights. Nonetheless, to be identified as multidimensionally poor, one must also experience monetary poverty. In this way, it can be argued that this criterion implicitly relativizes the application of a focus on rights to deprivation in the area of income availability. In turn, this presents the problem that the population simultaneously affected by various non-monetary deprivations, but not considered poor due to income, would not be identified as a case of multidimensional poverty.

On the other hand, the utilization of a combination criterion can be subject to greater errors in calculation when compared to the utilization of a higher threshold. In effect, it is more probable that a person will appear to be poor according to some indicator via an error in calculation, or that such a deprivation would be voluntary and not forced, than that the same would happen with two or more deprivations. The evidence provided here suggests that the combination criterion for the social deprivation rate presents certain problems from an empirical perspective: *1)* it has very low levels of agreement with monetary poverty, *2)* it exhibits little capacity to identify situations of recent impoverishment, and *3)* it presents high levels of intra-group heterogeneity.

Another alternative for how to determine *k* would be to define it in an empirical manner, by evaluating the poverty rate which is obtained for its different values. In these cases, some criterion of external validation is generally used, whether an independent measurement of the same phenomenon, the rate of monetary poverty, or a definition agreed upon by a group of actors regarding the level of poverty that is expected. This gauge of validation should have legislative support and exist under measurement error. The official IPMs for the region that have been developed up to this point use an intermediate *k* value (with a variety of values), chosen for the most part in a positive or empirical manner, though using normative criteria in the selection of the other parameters that interact with *k* (Santos, 2019), and performing a robustness analysis for the structuring of poverty with variations in *k*.

5. CONCLUSIONS

The evidence this work presents favors the use of a method of identifying poverty which combines the monetary dimension with non-monetary dimensions, and in turn, the utilization of an intermediate multidimensional poverty threshold which should be based on an agreed-upon criterion which includes the greatest possible participation of the actors who are involved, and should be submitted to scrutiny by way of an external validation criterion.

The implication of the evidence laid out here is that the calculation of a group of people in a situation of poverty is highly contingent on the conceptualization of poverty that is used. This should not discourage in any way the measurement of poverty, insofar as it is a fundamental exercise in the advancement of human development. What should be understood is the importance of an agreed-upon definition with respect to those who should be considered poor:

> Is it not strange that the discussion of the problem of poverty is plagued with differences in criteria […] It is conceivable—though not necessary—that due to these original differences in the evaluation framework, one can reach a broad agreement on the norms of poverty applicable to a society […] Though even when there exists a considerable degree of social consensus on minimum levels of wellbeing, it is not an easy task for the social science specialist to identify and make explicit such a consensus (Sen, 1978, cited in Altimir, 1979, pp. 7-8).

Along these lines, it would be important to develop the following: *1)* practical tools that allow consensuses to be created regarding the conceptualization of poverty and its thresholds, in addition to spaces for dialogue and conciliation, with representation by the various social actors who are involved in the problem of poverty, and *2)* more systematic and objective ways of "describing prevalent prescriptions" (Altimir, 1979, p. 8), for which there could be further implementation of surveys regarding socially perceived necessities (Mack and Lansley, 1985), qualitative studies, participatory studies and regularly scheduled consultations. It is this explicit and agreed-upon definition of what it means to be poor in the Latin American region today that should continue to be advanced, such that measurements are true to such notions and, to that end, that actions taken towards policy are effective.

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