



Priority-Based Multidimensional Poverty

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Abstract:

In this paper, we propose a new methodology of multidimensional poverty measurement based on self-stated responses to household spending priorities. This information is first used to reveal what the relevant deprivations are. Then, the stated top priorities allow us to identify the poor. Finally, for each household, the deprivations are aggregated according to relative weights computed from the data on priorities.

This allows us to: (1) eliminate ‘Command’ variables in favour of ‘Intrinsic’ wellbeing variables; (2) deal with needs heterogeneity, (3) avoid the arbitrariness typically arising in multidimensional poverty indices.

Finally, we propose an empirical application to Seychelles that: (1) elicits what the main deprivation dimensions are, (2) delivers a realistic estimated incidence of poverty, (3) show the targeting consequences of using multidimensional poverty indicators rather than one-dimensional poverty indicators.

Keywords: Poverty, Multidimensional Welfare, Priorities.

JEL codes: I32, O15, C83.

1. Introduction

1.1. *Multidimensional poverty indices*

Even if one-dimensional poverty and deprivation measures based on income dominate the economic literature, many authors argue that multiple wellbeing attributes must be accounted for.¹

In this paper, we propose a new methodology of multidimensional poverty measurement. Our approach is based on using self-stated responses to household spending priorities. This information is first used to reveal what the relevant deprivations are. Moreover, the stated top priorities allow us to identify the poor. Finally, for each household, the deprivations are aggregated according to relative weights computed from the data on priorities. We justify this procedure by a set of axioms.

Using the priorities data in such a way allows us to: (1) eliminate ‘Command variables’ in favour of ‘intrinsic wellbeing variables’, which corresponds better to the ‘basic needs approach’, (2) deal with needs heterogeneity, and (3) avoid the arbitrariness that typically arises in many stages of the specification of multidimensional poverty indices.

¹ See for example Osberg and Sharpe (2002), Duclos, Sahn and Younger (2006a, 6b), Bourguignon and Chakravarty (2003), Atkinson (2003), Deutsch and Silber (2005).

In the literature, poverty analyses can be extended to multidimensional contexts by specifying properties of household utilities and to aggregate them, allowing for poverty thresholds in terms of utility levels.² However, instead we follow the non-welfarist approach that expresses poverty directly in terms of observable welfare attributes rather than unobservable utilities.

Amid the authors that have proposed Multidimensional Poverty Indices (MPI) in the literature, Chakravarty and Bourguignon (2003), Alkire and Foster (2009, 10, 11), Alkire and Santos (2010) and Belhadj (2012) all aggregate individual poverty features into a synthetic ‘individual poverty score’. These scores are summed up at country level to yield formula for poverty.

However, in practice in many middle-income countries, the applied MPIs used in the empirical literature may not appear as being terribly relevant. Indeed, in these countries the general living conditions may be good enough so that in practice almost nobody is observed in household surveys as living in a shack, having toilets outdoors, having a house with dirt soil or malnourished children, etc.³ But in these countries there are still poor people that are legitimate targets for social policy. These poor are missed by the MPIs, because the used deprivation indicators are not well in phase with the actual needs as felt by the households themselves.

Another shortcoming of these MPIs is that they are aggregating heterogeneous basic deprivation indicators, while it is not always clear what the justification of adding such indicators is, as income per capita and life expectancy for example, and using arbitrary

² Atkinson and Bourguignon (1982), Muller and Trannoy (2011, 2012), Decanq, Fleurbaey and Maniquet (2013).

³ This is the case for example in Seychelles (Muller, 2012b).

weights.⁴ Various issues of arbitrariness typically arise with the construction of these MPIs: Which deprivation dimensions? Command variables or basic needs variables? How to deal with needs heterogeneity? Which aggregation weights? Moreover, it may be debatable that, when it is done, counting heterogeneous dimensions constitutes an accurate basis for incorporating multidimensionality in poverty analyses. Instead, in this paper we propose to use information on spending priorities, in part because they may be related to the fulfilment of basic needs.

1.2. Basic needs

The basic needs approach emphasizes human development as first fulfilling a set of fundamental needs, rather than placing all the attention on income factors. This implies to separate basic needs from less urgent needs.

Degrees of wellbeing needs

Separating the sets of dimensions for identifying the poor and quantifying poverty levels can be justified by the existence of two (or several) degrees of wellbeing priorities. This is often what is done in the development literature dealing with ‘basic needs’ (as in DasGupta, 1993). For example, it has been claimed that such ‘advanced needs or rights’ - such as democracy, culture, television, holiday - make only sense for people that are already able to feed themselves, have reached decent health statuses and

⁴ See Cavapozzi et al. (2013) and Decancq and Lugo (2013) for discussions of the weights. Poverty measures that follow Alkire and Foster methodology are implemented by Alkire and Santos (2010) based on ten variables linked to living standards, health and education. A weighted score is calculated from adding deprivation indices in these ten dimensions. Then, a multidimensional poor is characterised as someone deprived across at least thirty percent of the weighed score.

have moved away from the strict concerns of immediate survival or acute sufferings. There is an abundant and varied philosophical, psychological, sociological and economic literature on hierarchies of needs, starting with Aristotle's Nichomadean ethics.⁵

For example, Streeten (1981) claims that 'the basic needs concept is a reminder that the objective of the development effort is to provide all human beings with the opportunity for a full life.' He defines basic needs in terms of commodities. Instead, Sen (1984, 1987), considers that some functionings can be achieved not only when some elementary life basis is guaranteed. For example, one may not be able to work or enjoy normal social life when one is severely ill or badly undernourished, or have no clothes.

Practical definitions of basic needs

The basic needs approach, introduced at an ILO conference in 1976 (Jolly, 1976), is at the core of most measurement attempts of absolute poverty in LDCs. It requires the measurement of minimum resources for long term physical wellbeing, or at least survival. It has shaped poverty alleviation policies of governments and aid agencies all over the world, although different agencies and administrations often use different definitions of these needs.

The basic needs required for physiological survival seem to be: nutrition, drinkable water, medical care, shelter, and perhaps clothing or other environmental resources.

⁵ Aristotle (IVth century B.C.), Maslow (1943), Vlastov (1962), Rawls (1972), Streeten (1981), Sen (1984, 1987), Silber et al. AV, Muller (2016).

They can be proposed by rough aggregate indicators, such as the percentage of households having access to clean water, the proportion of undernourished persons, the number of doctors per 100 000 individuals, etc. The distribution or the availability of these kinds of wellbeing inputs often elicits major social policy questions.

Urgency has been used as a way to identify basic needs (Scanlon, 1975). Food is urgent for hungry people, as medical care is for ill persons. This urgency may justify separating basic needs from other needs.

Even though basic needs provide a motivation for a certain degree of priority or urgency at fulfilling these needs, no society has so far chosen to devote all its resources to this goal, before of turning to other needs. It may partly be because needs are individuals and the feeling of priority may not be so easy to share with a person that is not deprived, at the cost of her resources. Also, different priorities may be valued differently by different persons. Moreover, satisfies basic needs does not necessary implies that life is enjoyable. So, other goods that would make life enjoyable may enter poverty evaluation too, albeit perhaps in a second stage.

Being able to distinguish degrees of needs is also useful because it may allow for the definition of a target population for poverty alleviation policies by only using limited information.

Moreover, allowing different priorities degrees of attributes may make policy design easier under budget restrictions and increasing returns to scale in production of social services. In that case, it may be more efficient to focus on a limited set of attributes

rather than spreading interventions too thinly with too few results. This also allows for two-stage budgeting under weak separability of the social objective. **Donner exps application** It seems that this is also how most social systems operate, whether traditional or modern ones. They are structured around a nomenclature of needs that roughly correspond to the division of administrations in departments in ministries of health, education and social security.

1.3. The new method

We now discuss our new method. Spending priority data is used in the specification at three stages: the revelation of what the deprivation dimensions are, the selection of top priorities for the identification of the poor, the aggregation of the deprivations by using information about these priorities. The data on spending priorities come from the survey question:

“To what would you spend a small additional sum of money?”

Other question framing could be used, although we focus on this one in this paper⁶. We believe that the question asked helped us eliciting priorities through the reference to concrete spending decisions. For example; even if some welfare attributes are not market goods, say health status, they can generally be improved by acquiring related goods and services, e.g., health care services, and applying some technological process. In that sense, the reference to expenditure is not used for anchoring the welfare measure

⁶ A potential issue is the sensitivity of answers to some implicit or explicit additional amount proposed, or to many usual framing effects in surveys. Also, one could distinguish the effect of potential changes in wage income, for example, and the potential changes in constrained consumption expenditure. One could also examine the effect of taking money away from the respondents. What we propose is therefore to examine one option among many.

on income or expenditure, but rather as a collection device for eliciting some dimensions of deprivation.

There are multiple advantages to our approach. It eliminates ‘Command variables’ in favour of ‘intrinsic wellbeing variables’: basic needs. It avoids the arbitrariness that typically arises in many stages of construction of multidimensional poverty indices. It is easier to elicit deprivations by looking at expenditure priorities. It avoids issues of needs heterogeneity by using self-stated deprivation information. Finally, it allows the use of exclusively discrete information, at least for evaluation poverty incidence.

The interviewed households themselves can sometimes deal with needs heterogeneity when they assess subjectively their own needs, which they usually know better than anyone else. In such situations, using direct self-stated deprivation information, even if discrete and simple, may yield more sensible results than trying to calculate deprivation indices by comparing measures of dimension-specific household expenditure with dimension-specific subsistence minima. This is the approach we follow, as a simple way of dealing with heterogeneity in needs. It is in a sense more general than using individual wellbeing indicators, and we make it practical by pointing households at their own spending priorities in a specific questionnaire.

In Section 2, we present the methodology for our new multidimensional poverty measures, which are based on household spending priorities. In Section 3, we report an empirical application to Seychelles and Mauritius. Finally, Section 4 concludes.

2. Priority-Based Multidimensional Poverty Indicators

2.1. *Axiomatics and notations*

A study of the interaction of these axioms, when there are several levels of goods, allows for the dissociation of the identification of the poor and the quantification of poverty intensity for multidimensional poverty, is in Muller (2016). Defining degrees of priorities for wellbeing attributes is a special case of such general setting. Many different combinations of axioms may be considered in this framework. However, for our current concern, they should all elicit the following features.

First, the complete set of relevant wellbeing attribute to consider must be defined. Already at this stage, using information on priorities can play a role. For example, one may restrict the attention to the attributes that have been stated as a priority by at least one person. Second, there are ‘technical’ axioms, which we do not discuss here, that are common to most attempts of defining poverty measures: axioms for continuity, derivability, normalization, population scale invariance, etc. Third, one should use less information for identifying the poor than quantifying total poverty quantity. In our case, this suggests to consider a subset of ‘priority’ wellbeing attributes for identifying the poor, and possibly larger set for quantifying total poverty. They correspond to some kind of partial focus axioms that can be applied to three levels: poverty incidence, poverty intensity or global multidimensional poverty. Fourth, some axioms should restrict the way the individual deprivations on the selected attributes can be gathered to form individual poverty scores. Typically, transfer axioms or properties specifying poverty severity varying with some wellbeing attributes can be mobilised at this stage.

Fifth, decomposition axioms (or Pareto axioms) can be used for guiding the aggregation of individual poverty scores.

In this paper, we shall refer to other works for the precise axiomatic discussion for deriving formulae of poverty measures, so as to focus in this paper on pragmatic and concrete issues. However, a few notations are useful to clarify later on our formulae for multidimensional poverty.

Let us consider a population of n individuals. Individual i is characterised by a m -rows vector of deprivation indices, d_i in \mathbb{R}_+^m . We assume that all the deprivation indices are non-negative since it is generally the case in applied work⁷. However, this restriction does not play a role in the discussion. Let M^n be the set of all $n \times m$ matrices of nonnegative numbers. In order to consider all possible population sizes, one may want to define M as the union of all sets M^n , for all population sizes n . This set describes all the relevant poverty situations, one may want to examine.

The matrix D of deprivations is defined by its row-vectors d_i , $i = 1, \dots, n$. Its typical element is d_{ij} , the quantity of the wellbeing deprivation in dimension j suffered by individual i . Thus, the j^{th} column of D describes the sample distribution of the j^{th} deprivation attribute and is denoted d^j . A ‘meagre attribute’ j for individual i is defined by $d_{ij} > 0$, a ‘non-meagre attribute’ by $d_{ij} = 0$.

⁷ Note that our approach is thus more general than just specifying indicators from wellbeing attributes. In particular, it includes the case where z is the m -vector of the m dimension-specific poverty lines (z_j , for $j = 1, \dots, m$) and an individual i is said ‘poor in the j^{th} attribute’ if $x_{ij} < z_j$, where x_{ij} is the j^{th} welfare attribute of individual i ,

2.2. *Identifying the wellbeing attributes*

A major step in defining multidimensional poverty indicators is the selection of the relevant wellbeing dimensions to consider. Thorbecke (2011) emphasizes that this selection is ultimately dependent on the purpose they should serve. First, each considered welfare dimensions must be meaningful and well-recognized as central to poverty. This is for example the case for income and health status, or any basic needs. Second, some corresponding data must be available. There is no use, at least for policy guidance, to develop indicators that could not be calculated. Finally, only dimensions for which non-negligible poverty issues have been measured need be included. Incorporating a dimension for which nobody can be considered poor should not change the level of the multidimensional poverty indicator.

In theory, wellbeing attributes should be intrinsically good and directly deliver wellbeing or utility. However, in practice, some variables used as wellbeing attributes in the literature, such as income and perhaps education, are rather justified by the fact that they command over commodities, while other variables may instead directly produce well being. Nonetheless, there may still be good reasons for using variables that command over well-being attributes in multidimensional poverty analyses. First, these variables can be observed, while more direct measures of wellbeing or satisfaction may not come handy. Second, they summarize a great deal of information, as it is case for total expenditure that encompasses many elementary consumption goods. For example, the HDI or the MPI in UNDP (2010, 2011) mix information on income, education and longevity, which are all variables allowing commands. Besides, some of these command variables may also provide direct wellbeing benefits.

However, these justifications for using instruments commanding other wellbeing variables are only practical. If it is possible, one should rather define poverty in terms of direct satisfaction of basic needs. As a matter of fact, relevant normative information is often easier to elicit in terms of dissatisfaction of some basic needs. For example, one can refer to the budget necessary for acquiring some specific goods or services. This is our approach.

Our new approach is first based on accounting for priorities in meagre welfare attributes, as stated by the households themselves; and second, when considering the list of dimensions, on disconnecting the identification of the poor from the quantification of the poverty level.

As mentioned below, there are many theoretical ways to consider household priorities (See Muller, 2014 for a detailed discussion). However, in this paper we adopt a practical approach by merely considering them as relevant building-block information for constructing a poverty indicator. In the data that we collected, we use the answers to the question ‘To what would you spend a small additional sum of money?’ as our information basis to define each household welfare priority. Then, different surveyed households may cast different answers.

Finally, note that if subjective information about priorities is the source of the architecture of our poverty indicators, the precise measures of deprivations are generally constructed from objective information, which is less sensitive to the psychological fragility of subjective responses.

2.3. Identifying the poor

In traditional monetary poverty analysis, a person is deemed poor if her/his living standard falls below a given monetary poverty line. Instead, in the ‘Intersection approach’ of multidimensional analyses, one states that a poor is an individual who is poor in all wellbeing dimensions. Unfortunately, this approach often leads empirically to very small estimated numbers of poor persons. Moreover, one would like to consider as poor some households who may not have a very low income level, while they may be deprived on other grounds. An important justification of constructing multidimensional indicators is indeed to rescue miserable households who would not pass a means test of income used for allocating social benefits.

In the alternative ‘Union approach’, adopted by Bourguignon and Chakravarty (2003), a person is poor if she falls below at least one of the dimension-specific poverty lines. This approach is often preferred as it avoids missing a relevant destitute individual. One issue with this approach in empirical analyses is that encompassing many welfare dimensions generally yields exaggeratedly high poverty incidence estimates.

Atkinson (2003) points out that the Intersection approach corresponds to so-called ‘ALEP substitute’ attributes, while the Union approach corresponds to ‘ALEP complement’ attributes.⁸ He also shows that only counting deprivations as a basis for

⁸ The individual poverty function p is the kernel of poverty indicators defined from integrals of this function over the population of the poor. ALEP substitutes are defined by $p_{jk} > 0$, for the individual

poverty measurement, as in Alkire and Foster (2011), may correspond to indicators such that correlation increasing switches may increase or reduce poverty, which would therefore conflict with Union or Intersection approaches.⁹ In this paper, we pursue another direction to relax Intersection and Union approaches. Although, we still define the poor from a Union criterion, the Union operation is carried out only for a subset of wellbeing attributes, and this subset can be determined by and for each individual. Moreover, we separately specify the quantity of poverty suffered by the poor, using all the welfare attributes, in a fashion disconnected with the Union criterion.

Whatever the ultimate source of priority answers, one may choose to identify the poor by checking if they are first deprived in the wellbeing dimension that is given the highest priority, and then, if not, if they are deprived in the dimension with the second highest priority, and so on until the last relevant priority dimension. However, when the ranking of priorities is fixed a priori and is the same for all individuals, this way of doing is exactly equivalent to the Union approach of identifying the poor. Such conclusion is no longer valid if the ranking of priorities is not determined a priori, or if it varies with time or with the contexts to compare, or if the ranking is heterogeneous across individuals.

poverty function $p(x_{i1}, \dots, x_{ij}, \dots, x_{ik}, \dots, x_{im})$, where x_{ij} is the j^{th} welfare attribute of individual i . ALEP complements correspond to $p_{jk} < 0$.

⁹ Alkire and Foster (2011) and Aaberge and Peluso (2011) count deprivations in order to assess multidimensional poverty. In each dimension, they use a poverty line to determine the individuals that are deprived with respect to each given attribute. In addition, the poor are identified by counting the dimensions in which they are deprived and comparing the resulting count to a chosen threshold k for counts. Another shortcoming of this approach is that, as soon as $k > 1$, an individual with extreme deprivation in one dimension only, e.g., food intakes, may not be considered as poor.

As we mentioned before, as soon as a few dimensions are considered, the Union approach may yield unrealistically high poverty estimates. We deal with this issue in two ways. First, we estimate from the household's answers what is a central tendency of the number of priorities to consider when defining the poor. In many situations, this approach is likely to deliver a reasonable number of dimensions to consider. This should attenuate the extreme results of Intersection and Union approaches based on all possible dimensions. Second, we use a *different set of dimensions* to identify the poor and to quantify poverty. That way, keeping only the highest priority deprivations to identify the poor has the advantage of keeping corresponding estimated Union-approach head-count index in the range of realistic levels. Besides, extending the number of dimensions to consider in order to quantify poverty levels allows for a more complete capture of household living conditions. Doing so also makes the omission of one or several minor dimensions in the poverty index less dramatic, which corresponds to a typical feature of data. As a matter of fact, it justifies most poverty analyses that are typically carried out without observing well all wellbeing attributes.

An important parameter is therefore the number of high-priority dimensions that should be used for identifying the poor. Diverse practical rules can be used to determine the value of this parameter. A simple one is to estimate it from the household responses when several priorities are asked. For example, a truncated count model can be estimated and the estimated model can be used to estimate a central tendency of the number of high-priority dimensions. This is likely to mitigate another arbitrary step in the usual MPIs based on a priori given sets of dimensions.

That is not all. Estimates from count data models, or from other estimation methods, can be obtained conditionally on individual or household characteristics of interest, for example by region for geographic targeting, or by activity categories for employment policies. In that sense, the multidimensional poverty notion can be finely tuned to fit some characteristics of interest of the population. **To do it + P-values**

In particular, this allows for the variation of poverty criteria across strata, an important flexibility requirement, for example frequently employed for poverty profiles where poverty lines vary across regions.

To sum up, our rule for identifying the poor is the Union rule *defined on the highest stated priority dimensions*. An estimated threshold is used to define the highest priority dimensions. Besides, the data should often show obviously what they should be in practice.

Once the population of the poor has been identified, individual poverty scores can be constructed, typically in the form of linear combinations of destitution variables. The shape of individual scores can also be sometimes justified by axioms used for aggregating individuals and deprivation indices altogether. We now discuss the aggregation of these individual deprivations over the whole population.

2.4. Aggregating individuals

In order to deal properly with aggregation issues, it is useful to examine which axioms should be imposed on the multidimensional poverty measure. Bourguignon and

Chakravarty (1998, 2003) propose a systematic series of axioms that are formally defined in the Appendix and are convenient tools for deriving functional forms.¹⁰

Most of these axioms are common and familiar to specialists. A few of them deserve additional comments. The Strong Focus axiom (SF) forbids that an individual could give up some amount of a non-meagre attribute to improve the level of a meagre attribute. This axiom is defined by imposing that the poverty measure does not change when the non-meagre attributes of any individual improve, including for the poor. The Weak Focus axiom (WF) only assumes that the poverty measure is independent of the attribute levels of the non-poor.

The One-Dimensional Transfer principle (OTP) assumes that poverty does not increase under a progressive transfer. It is the usual axiom imposed for one-dimensional monetary poverty measures such as the FGT severity poverty measure or the Watts poverty measure.

How are these axioms related to aggregation and individual deprivation? Bourguignon and Chakravarty show that the Subgroup Decomposability jointly to the One-Dimensional Transfer principle imply that any differentiable poverty indicator P can be written as a weighted mean of individual poverty contributions associated with each individual i and each attribute j .

$$(*) \quad P = 1/n \sum_i \sum_j w_{ij} g_j(d_{ij}),$$

¹⁰ Strong Focus (SF), Weak focus (WF), Symmetry, Monotonicity, Continuity, Principle of Population, Scale Invariance and Subgroup Decomposability, One Dimensional Transfer Principle (OTP), Multidimensional Transfer Principle (MTP), Non-Decreasing Poverty under Correlation Increasing Switch (NDCIS).

where w_{ij} is the priority weight of deprivation j for individual i and g_j is a positive numerical function to determinate.

Under these axioms, what matters for defining a multidimensional poverty measure is therefore mostly to define the interacted individual-attribute contributions.

One major practical issue is that much of empirical data is available under discrete form. This much limits the practical interest of specifying precisely the functions g_j , and simple function forms (e.g., the identity function) can probably be the only useful ones in most empirical situations.

One advantage of using such additive poverty measure is that it allows us to identify the contribution share of each attribute to global poverty, as well as the contribution share for any subgroups of individuals, and even the contribution share of any combinations of attributes interacted with individual subgroups. In this setting, one can also use homogeneous positive weights w_j , which are specific to each attribute j , in order to account for differences in the importance of each attribute deprivation, without mixing it with unobserved individual heterogeneity.

Of course, a still simpler way to assess poverty is just to count the poor. Let us consider the Union approach. Let the dummy variable to identify the poor for individual i with a vector of destitution d_i be $p_0(x_i, z) = I_{\{ \exists j \text{ in } \{1, \dots, n\}, d_{ij} > 0 \}}$. Then, the number of the poor in this approach is equal to $H = \sum_i p_0(d_i)$.

Even though such a simple aggregation of deprivation indices is criticised in Ravallion (2011, 2012). In particular, he is much concerned about the arbitrariness of hypotheses, a pervasive feature of the literature about multidimensional poverty. First, the choice of the welfare attributes itself is generally arbitrary. Second, the weights used to construct the aggregate poverty score are also generally arbitrary. Although, many methods of calculating the weights have been suggested, it seems fair to say to none has reached general consensus.¹¹ The weights are sometimes assumed to be identical across dimensions, sometimes obtained from ancillary data and sometimes imposed using normative opinions. However, the knowledge of which weights should be used remains elusive.¹² We propose an original way of generating weights, which is to refer to the household self-stated welfare priorities. In the next sub-section, we discuss the use of priorities data for specifying the dimensions involved in assessing poverty.

However, even if the estimated proportion of priorities can be derived from the data, the precise derivation rule still requires some non-arbitrary justification. This can be done, as for the definition of the two obtained sets of priorities, by invoking some vote principle aggregating the household opinions. Several simple vote systems could thus yield relevant central tendencies in the proportion of priorities (**references**).

¹¹ See for example, Bossert, Chakravarty and D'Ambrosio (2009), Decancq and Lugo (2010)

¹² Belhadj (2012) proposes an approach based on Fuzzy sets theory to account for such ambiguity. Namely, he defines an identification (of the poor) function such that: (i) an individual that is not deprived in any attribute is non-poor and the function takes the value 0; (ii) an individual that is deprived in all the attributes is poor and the function takes the value 1; (iii) in the other cases the identification function can take a positive value strictly inferior to 1. Then, the author derives a formula for the weights and the poverty index by making the aggregation depend on the identification function.

2.5. Practical aggregation using priority data

We examine the different weights of each deprivation in the formula of the poverty measure. One possibility is to consider weighted scores that are additive in all deprivation indices, with decreasing weights according to decreasing priorities.

However, priority data is not as easy to aggregate without ambiguity as may be thought. In particular, one cannot state that a person's first priority is necessarily more important than another person's second priority, for example. Axioms about cardinality and interpersonal comparisons, as for usual welfare analyses, may have to be invoked here too for convenience.

One may want to specify 'priority weights' by deriving them from the statements of individuals in the population. For example, the percentage of households stating a given priority can be used as a natural way of specifying weights. One can also imagine some vote rules that would yield the same result, and would help us getting around comparability and cardinality issues. As a matter of fact, using observed frequencies of priorities mimics the result of a proportional vote of relevant households on their priorities. This procedure can be also be interpreted as reflecting expectations about priorities when drawing households at random.

Availing of a vote procedure may be attractive for a social planner that would like to take the information on priorities into account, while respecting individual sovereignty. Such procedure could also incorporate other relevant useful information such as some characteristics of these virtual voters.

Another perspective is that of the priorities of social planners themselves. One way to proxy these priorities is, for example, to use the share of public budget allocated to different social sectors as weights, or alternatively to use the corresponding share of GDP (or of aggregate consumption) from national accounts.

As a consequence, our pragmatic indicator of multidimensional poverty incidence is the following proportion of the poor based on the highest p priorities:

$$IM = 1/n \sum_i \{1 - \prod_{\{j \text{ in } PR_i\}} (1 - I_{ij})\},$$

where $I_{ij} = I_{[d_{ij} > 0]}$ and PR_i is the set of priorities retained for individual i . This latter case corresponds to the Union approach based on the aggregated household priorities and aggregated to the whole population. IM is merely the proportion of the population that does not satisfy at least one of their priorities.

Proof: Since d_{ij} is the dummy indicator corresponding to deprivation in dimension j suffered by individual i , we have $I_{ij} = I_{[d_{ij} > 0]}$, which is 1 if the individual i is deprived in dimension j , and 0 otherwise. Then, $\prod_{\{j \text{ in } PR_i\}} (1 - I_{ij})$ is equal to 1 if the individual i is non-deprived in all priority dimensions, and otherwise. As a consequence, $1 - \prod_{\{j \text{ in } PR_i\}} (1 - I_{ij})$ is equal to 0 if the individual i is non-deprived in all priority dimensions, and to 1 if i is deprived at least in one priority dimension. The indicator is the mean of these indices. QED.

Then, once the population of the poor is well defined, it is possible to refine the poverty indicator by accounting for a certain ‘quantity’ of poverty or ‘poverty intensity’ for each of the individuals identified as poor. For example, a formula such as above could be used as a multidimensional poverty indicator that satisfies many useful properties.

A formula to insert

However, in practice, most available deprivation indicators are categorical or even discrete. In that case, specifying more or less ‘poverty severity’ sensitivity by using a poverty severity function in the formula of the poverty indicators is not likely to yield terribly convincing empirical results. Our approach here is instead to introduce further deprivation indicators corresponding to all levels of priority rather than account for their counts as in Alkire and Foster. Our ‘poverty quantity’ indicator MP is a weighed sum of deprivation indicators, albeit focusing only on the poor as defined by their highest priorities. We obtain:

$$MP = 1/n \sum_i [\{ 1 - \prod_{\{j \text{ in } PR_i\}} (1 - I_{ij}) \} \{ \sum_j w_j I_{ij} \}],$$

where w_j is the ‘priority’ weight allocated to attribute j . Obviously, one could also allow for priority weights w_{ij} varying with the considered individual i , although this may often be beyond the data possibilities.

Our multidimensional poverty indicator, MP, is therefore generated by first computing at individual level the sum of all deprivation indices over all dimensions, weighted by the aggregate priority weights for every dimension. Then, the obtained individual score

is multiplied by the dummy variable identifying the multidimensional poor, as above, again accounting for priorities in the design of the corresponding Union criterion. Finally, the results are summed over all individuals and divided by the population size.

Rawls (1972, p 5) argues that the conception of justice must be public. This suggests using priority weights that would represent well the general interest and would be easy to grasp by citizens. As we mentioned above, a natural candidate for this is to use the relative frequencies of the different responses, as a basis for computing the w_j 's. In a more general sense, it seems important for the politically legitimate implementation of poverty alleviation policies that the multidimensional poverty measure corresponds to public norms in a robust, representative and objective way.

Consistently with these concerns, we choose to specify the weights w_j as equal to the proportion of monetary poor households who stated j as their first priority. Of course, other rules could be used for the weights, while we show the estimates only for this example.

AV if doable in fact If PR_i and w_{ij} were allowed to vary with i , we could obtain an interesting, but complicated analysis, which deserve a full investigation in itself.

In the present paper, we focus on simple practical rules where these parameters are uniform over all the individuals. That is: the set of priorities and the weights are identical for all individuals. Such simplification is mostly motivated by the need to communicating simple formulae to governments and policy makers. In that case, the indicator MP is fully defined by some choice of the priority set PR and of the weights w_j .

Not trueThe fact that our index is a weighted mean of deprivation indices implies that it is subgroup decomposable. This is important because among the interests of deriving a measure of multidimensional poverty is the possibility of assessing the contribution of each component of welfare in the form of a ‘share of poverty’.

2.6. Stochastic dominance

THIS SUBSECTION IS TO FINISH; PLEASE SKIP

However, even in situations in which PR is considered as known and the w_j are unknown, one would like to obtain unambiguous poverty comparison results. In that case, stochastic dominance approaches imply that it is necessary and sufficient to class the statistics

A revoir

$$\sum_i \sum_j w_j K_i I_{ij} ,$$

where $K_i = \prod_{\{j \text{ in PR}_i\}} I_{ij}$ and for any positive values of w_j .

PB: aV comment traiter le choix de PR dans ces SD

The problem amounts therefore to comparing linear combinations of the **AV** $L_{ij} = K_i I_{ij}$
 $= \sum_i L_i W$, where L_i is an $1 \times J$ row vector for individual i , and W is the column vector of the w_j .

A verif et exploiter

Voir le lien avec budget dominance

m.d. Since the w_j are a basis on $(0,1)$, we have the following results as soon as $n > J$:

Let $\Delta U = \sum_i \Delta L_i W$, where Δ denotes the difference operator between the two situations to compare. Then, Let $\Delta U > 0$ for all W is equivalent to:

$\sum_i \Delta L_{ij} > 0$, for all j ; which is equivalent to: $\sum_i \Delta(K_i I_{ij}) > 0$, for all j ; which is equivalent to: $\sum_i \Delta(I_{[d_{ij} > 0]} \{ \prod_{\{j \text{ in } PR_i\}} I_{[d_{ij} > 0]} \}) > 0$, for all j . **AV**

The occurrence of dummy variables in this formula suggests to define the following populations of interest.

$POP_1 = \{i \mid \prod_{\{j \text{ in } PR_i\}} I_{[d_{ij} > 0]} \} =$ Population of the poor identified by the Union criterion applied to the priority attributes.

$POP_{2j} = \{i \mid d_{ij} > 0 \} =$ Population of the deprived in the j^{th} attribute.

AV Then, the condition $\Delta Poverty > 0$ for all poverty measures in this family is equivalent to

$$\sum_{i \in POP_{2j}} \Delta \{ \prod_{\{j \text{ in } PR_i\}} I_{[d_{ij} > 0]} \} > 0, \text{ for all } j,$$

which is equivalent to

$$\Delta \{ \text{Number of poor among the deprived in the } j^{\text{th}} \text{ attribute} \} > 0, \text{ for all } j$$

A verif

and is equivalent to

$$\sum_{i \in \text{POP1}} \Delta \{ I_{[d_{ij} > 0]} \} > 0, \text{ for all } j$$

and is equivalent to

$$\Delta \{ \text{Number of the deprived in the } j^{\text{th}} \text{ attribute among the poor} \} > 0, \text{ for all } j.$$

We now apply our new indicators to the case of Seychelles.

3. Empirical Application

3.1. The context and the data

Seychelles is an upper middle-income country undertaking a transition from a socialist welfare state to a market-based economy. As a small open and service-based economy, it remains vulnerable to global shocks, which affect tourist arrivals, the main source of foreign earnings. A macro-economic stabilization plan was recently carried out, along to medium-term structural reforms, which were intensified at the end of 2008. These policies coincided with the global economic slowdown that faded away in 2011, but reemerged from 2012.

Inefficient targeting of social transfers plagues Seychelles' generous social security system (Campling et al., 2011). However, the reforms made the social system less costly. Public sector transfers fell from 5.5 % GDP in 2005 to 1.9 % in 2009.

For one-dimensional monetary poverty in 1996, the estimated general poverty line was worth 13554 Rupees per adult-equivalent per year. It corresponds to a broad notion of

poverty based on the opinions of Seychelles households on subsistence minima expressed in terms of total consumption expenditure, including housing expenses. The monetary poverty rate was of 17 % with 12 % of poor households (Muller, 2012a). Monetary poverty was found higher in households led by female, little educated or unemployed heads. In Seychelles, large families and fishermen families are especially found to be affected by monetary poverty.

Insister plusWe designed the 2011 Living Conditions Survey (LCS), which was conducted in collaboration with the National Bureau of Statistics, so as to provide information on basic needs for a large set of welfare dimensions (Muller, 2013). A total of 1,125 households were who had been randomly selected for the 2006/07 Household Budget Survey (HBS) were re-surveyed and interviewed from February to June 2011. The data was collected through 20 minutes interviews conducted in Seychelles Creole. Households are asked their opinions not only about their own deprivations in diverse welfare dimensions but also about their spending priorities. Such subjective information has been used before in poverty analysis, for example for estimating poverty line (e.g., Pradhan and Ravallion, 2000). In this paper, we use answers about spending priorities to provide a comprehensive procedure for multidimensional poverty analysis.

The collected responses show that deprivations in several welfare dimensions affect a non-negligible population in Seychelles. One third of Seychelles households state that they have some difficulty to obtain daily food, and another 5 % considerable difficulty. About 7 % of households admit to wear worn clothes and 10 % not to have adequate clothing for outing. A proportion of 15 % of persons have stated health problems in the last twelve months, and this proportion reaches 47 % for the elderlies.

That is not all. In Seychelles, almost all households use gas or electricity as the energy source for cooking or lighting. However, as much as 7 % of households admit to have had electricity disconnected because of failure of payment during the past 12 months. Besides, 11 % of households state that they had not been able to pay electricity in time. In the same fashion, almost all households have access to treated water. Yet, 10 % of the households state that they could not afford paying their water bill every month in the last twelve months, and slightly less than 5 % that they suffered water disconnection.

Moreover, one fifth of households encounter difficulties in financing their transport needs. Other 3 % meet considerable difficulties for paying, or cannot at all pay for their transport. Unsatisfied education is probably more salient when there is at least one child of schooling age in the household. Though, adult education is not unknown in the Seychelles, and currently timely with many laid-off public employees during the recent structural adjustment plan who are in need of reconversion. However, 21 % of households state that they cannot afford school items. Moreover, 5.5 % of households say that they don't have the means to buy lunch for their children to take to school. This is worrying in a country like Seychelles where education is mostly free of charge. Now, these statistics may inform more on schooling needs for children than on current education deprivation for adults, which could be better described by constrained adult education levels.

3.2. The priorities data

To discuss table 1

We asked the surveyed households about what their first spending priorities would be if they had a little more money. The needs elicited in this way rank as follows. 31 % respond that they would spend it on shelter and 15 % on food, with the other response categories less often chosen. Asking only the monetary poor households¹³ shows the same pattern of answers on needs priorities. First, comes Shelter with 34.5 % of responses, then Food (12.2%), Water and Electricity (9.1 %), Health (7.0 %), Household appliances (5.6%), Other (3.5 %), Uniform/Shoes/School necessities (1.4 %), Transportation (1.1 %), Holiday (1.1 %), etc. Focussing on the monetary poor has the advantage of availing of priority information from households who are generally in dire straits, and have an accurate perception of what their unsatisfied basic needs are.

We obtain the following rankings of basic needs priorities by the monetary poor: *1. Shelter; 2. Food; 3. Water/Electricity; 4. Health; 5. Education.* Holidays and household appliances and other ‘non-severe-needs’ expenses also matter for these households, while we choose not to assimilate them to basic needs. Note that this is an empirical argument that has led us to the specification of the welfare dimensions, instead of arbitrary choices as usual. We have also avoided ‘command variables’ like income, using instead deprivation variables more directly related to basic needs.

¹³ As defined by comparing their 2005-06 per adult-equivalent total expenditure with the Seychelles national poverty line deflated to correspond to this year.

AD toute la sous-section a partir de la

Table 1 shows the percentage of each answer category. Our inspection of the individual occurrences for the category, both for (1) the whole population and (2) for the income-poor households, as defined by comparing their 1996 per adult-equivalent total expenditure with the Seychelles national poverty line deflated to correspond to this year. We remind that 12 percent of households were found monetary poor (Muller, 2012a).

‘Other’ showed us that it would not change the percentages for the priorities of interest. When asking households about their spending priority if they had a small additional sum of money, 31 % answer that they would spend it on shelter, 15 % on food, 14 % that it would be set aside for worst times, with the other categories less often chosen. The importance of food needs for a non negligible proportion of households alerts on the severity of food destitution in Seychelles.

Table 1: Percentages of priorities

	<i>Whole Population</i>	<i>The Poor</i>
Food	14.08	12.20
Water/Electricity bill	7.50	9.06
Household appliances	4.21	5.57
Health	7.50	6.97
Shelter	32.37	34.49
Uniforms/Shoes/School necessities	1.32	1.39
Private school	0.26	0.35
Clothing	0.26	0.35
Transportation	1.05	1.05
Debt repayment	11.05	9.76
Set aside for worst times	13.95	13.94
Don't know	0.13	0.35
Holiday	1.18	1.05
Other	5.13	3.48
Total	100.00	100.00

To do by strata

Obviously, these answers incite us to give more importance to shelter needs than in any typical poverty analyses in LDCs. Food appears also as a major dimension of the expressed needs. The next priority is water and electricity payments that are grouped in the priority questions. Health and education needs are still important, while they may perhaps be better seen from direct description of the destitution rather than budget information. Indeed, many health and education expenses are free in Seychelles. However, despite mostly free health care and fee education, it is interesting to see that some households still felt highly rationed in their corresponding needs, and would like to correct this situation by additional spending. Clothing expenses are rarely mentioned by the surveyed households. Note that the ranking of the welfare dimensions is obtained from data examination, instead of arbitrary 'expert opinions'.

In their responses, households have naturally avoided 'command variables' like income and rather state their answers directly in terms of diverse destitution variables related to basic needs. Some answers such as debt reimbursement or saving are important but they do not necessary correspond to basic needs.

Which number of priorities? A central tendency for the number of priorities can be extrapolated from estimating count data models using the number of priorities stated by respondents: expected number or median number.

Possibly: conditional on some subpopulation characteristics (regions, activities), or stratified. This is a derived number of attributes, although it still involves a methodological choice.

Vote rules could help going around comparability and cardinality issues: e.g., median value. Vote is attractive to public planners as it respects individual sovereignty

One may want to allow for possible variations of criteria across strata (here, regions for example).

	Truncated Negative Binomial	Tobit truncated in 0 and 3
Expected number of priorities:	1.90	1.84
Expected median	AF	AF
Region 1	.213 (.16)	-.389* (.221)
Region 2	.177* (.10)	-.312** (.130)
Region 3	.077 (.10)	-.135 (.136)
Region 4	.175* (.10)	-.323** (.140)
Region 5	.216** (.10)	-.401*** (.137)
Children	-.046* (.026)	.084*** (.033)
Cons. per adult eqt	8.57e-07* (5.43e-07)	-2.06e-06** (8.79e-07)

Intercept	.52 (.095)	2.05*** (.121)
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To aggregate regions in Mahe and others

Nb: Use these estimates to correct for some bias

The estimated expected number of priorities in the truncated count data shows that a benchmark choice of two priorities only seems to be appropriate for all regions. In contrast, the badly specified model would suggest alternatively one or two priorities, depending on the considered region.

To compute the median by simulations, and the mode by cancelling the density formula

Inserer des estimations d un truncated count model conditionally in several categories of individuals

The multidimensional poor are therefore defined as being the individuals destitute in food or in shelter. This result corresponds to the common knowledge among social workers.

3.3. The deprivation indicators

Faire un second jeu d'estimation avec les réponses aux questions subjectives

On the one hand, the variables that can be used to describe the welfare dimensions are restricted to the available information in the survey. On the other hand, we want to favour basic needs information over the use of command variables. We also want to take advantage of using destitution information to deal directly with needs heterogeneity. In practice, the sample must be reduced to 783 observations because of missing values for some of the used destitution variables.

We now discuss the practical construction of the deprivation indicators for each of the five identified dimensions, under the constraint of the available information. These variables were the result of extensive discussions and consultations within the National Committee for Multidimensional Poverty that has been officially set up by the government of the Seychelles. We believe that it is important to acknowledge the recommendations of national expert bodies, even though these may differ from our personal preferences. Indeed, ultimately the national administration will have to implement the poverty alleviation policies. Then, they need to be convinced and take ownership of the poverty statistics. The measure of shelter deprivation is based on the number of persons per room, which ranges from 0.125 to 7, has a mean 1.05 and a standard deviation 1.07. More precisely, the variable '*shelter deprivation*' is defined as the dummy variable for households with four persons per room or more. 3.69 percent of households are in this situation. A household is deemed '*food deprived*' if he states having considerable difficulties in obtaining food. There are 4.72 percent of such

households. The *'water-electricity deprived'* households are defined as those households who cannot pay either for their electricity bill or for their water bill. 11.72 % of households are in this case. Households *'deprived in health'* are the ones who state that at least one household member suffer from a health problem. They are 26.75 percent of such households, often composed of elderly persons. Households are said *'deprived in education'* if their head has no education or has only primary education. They amount to 35.89 percent of all households.

Fournir une construction alternative built from LCS basic needs answers

No household observed in the LCS survey cumulates the five considered deprivations. Clearly, the Intersection approach to poverty identification is not appropriate for Seychelles since it would yield a poverty estimate equal to zero. On the other hand, the typical Union approach, which identifies the poor households as deprived in at least one dimension, yields a percentage of 42 percent, an exaggerated figure for such a prosperous society like Seychelles.

Cutting down the number of dimensions used in the Union approach, according to their stated priorities, yields more sensible estimates. Thus, omitting education and health reduces the percentage of multidimensional poor households to 17.6 percent. Keeping only the two main priority dimensions, shelter and food, leads to 8.16 percent, a figure that is comparable to the estimated incidence of monetary poor households (12 percent).

There is substantial structure in the joint occurrence of difference dimensions. Shelter-deprived households are sometimes also water-electricity deprived (24 percent of them) and often health-deprived (i.e., ill: 41 percent of them), but rarely food-deprived (6.9 percent) and almost never education-deprived (i.e., uneducated head). However, this is

not enough for strong correlations to emerge, with the larger one being the correlation of food deprivation with water-electricity deprivation (14 percent). This weak statistical link is a further motivation for the multidimensional approach that cannot be well summarized by any dominating dimension. **Verif qand meme**

Idem avec mes basic needs variables

The respective percentages for each basic need, as stated by the monetary poor households as their first such expenditure priority, are used as weights for our multidimensional poverty indicator.

3.3. Poverty estimates

To mentionSEY1

To do by strata

To explain passage between household and indiv data

Education of Head	Amount of Multidimensional Poverty	Incidence of Multidimensional Poverty	Incidence of Monetary Poverty
No Schooling	1.8	6.9	33.0
Primary	3.8	8.3	20.7
Secondary	4.0	10.0	14.1
Vocational/ Polytechnic	3.1	5.8	12.0
University (&pre)	2.7	6.5	0.0
Whole Country	3.6	8.1	17.0

Using the additional information on ‘second-priority’ needs, but only for the poor as defined by the ‘first priority’ needs, makes our approach still more distinct from a pure Union approach that would be based on the same set of spending priorities¹⁴.

Our multidimensional poverty estimator is obtained in two steps. First, we define our score of *Poverty Intensity* for each household:

$$PI = (34.49 I_{[\text{shelter deprivation} > 0]_i} + 12.20 I_{[\text{food deprivation} > 0]_i} + 9.06 I_{[\text{water or electricity deprivation} > 0]_i} + 6.97 I_{[\text{health deprivation} > 0]_i} + 1.74 I_{[\text{education deprivation} > 0]_i}) / (34.49 + 12.20 + 9.06 + 6.97 + 1.74),$$

¹⁴ if the set of dimensions were defined in terms of priorities, which is usually not the case.

for each household i . The poverty intensity PI is a mean deprivation variable, weighted by the priority percentages of each of the five considered wellbeing dimensions, as observed for the monetary poor households¹⁵.

The estimated PI has a mean of 0.076 and a standard deviation of 0.13. For 58 % of the households this indicator is nil, which corresponds to non-poor households in the sense of the Union identification criterion applied to the five priority dimensions. However, as mentioned before, we now restrict our set of poor households to be deprived only in shelter or in food. Thus, our multidimensional poverty function at the household level is $MP_i = IM_i \cdot PI_i$, where the variable IM_i is our multidimensional incidence index for household i , that is, it is equal to 1 for poor households who are destitute in shelter or/and food, and 0 otherwise¹⁶. Finally, the mean of the entire household sample is calculated, possibly weighted by the sampling weight and the household size, as usual for poverty estimators. We now discuss the estimates of the multidimensional poverty measures IM and MP , obtained from using the Seychelles data.

The IM and MP estimators are multiplied by 100 in the tables to make them more legible. Thus, in the tables IM is the percentage of the multidimensional poor, while the reader must keep in mind that MP cannot be simply interpreted as a percentage in a

¹⁵ Other definitions could be substituted if wished. Here, we just give an example of reasonable index construction.

¹⁶ Here, $IM_i = I_{[\text{shelter deprivation} > 0]} I_{[\text{food deprivation} > 0]}$.

population. Preliminary estimates in terms of number of poor households and detailed description of the data and the context are in Muller et al. (2013). **AV et m.d.**

The household poverty function of our estimated multidimensional poverty indicator MP, i.e. MP_i , has a mean of 3.6 percent and a standard deviation of 13 percent. It reaches its maximum at 86 percent. It is non-zero only for 8.1 percent of the observed households, which corresponds to the estimated multidimensional poverty incidence rate given by IM. Some households are shelter-food poor, but not deprived in other dimensions (and vice versa, but much less often). Some households are not only shelter-food poor, but also deprived in other dimensions. The linear correlation coefficient of the household functions MP_i and IM_i is very high (0.90). This is also the case when restricting to households deprived in at least one of the five considered dimensions (0.89). This is because most of the deprivation originates from food and shelter in Seychelles and including the other dimensions in the analysis does not affect much the diagnosis. As a matter of fact, this result is interesting in itself, and could not be found by using one-dimensional poverty statistics. Note that the correlation of our multidimensional household poverty functions with the household poverty functions of the Union poverty rate based on the five priority dimensions is much lower: 0.31 with MP and 0.35 with IM, which confirms that the simple Union criterion would not work well here.

At the aggregate level (i.e., over all Seychelles households), our estimates show that shelter contributes to 56.1 percent of MP, food to 25.4 percent, water and electricity to 9.1 percent, health to 9.0 percent, and finally education only to 0.2 percent. Thus, even when accounting for other dimensions when quantifying poverty, shelter and food

remain the dominating dimensions of multidimensional poverty in Seychelles. Education has a negligible contribution to multidimensional poverty because very few households are simultaneously food-shelter destitute and education destitute (There are only 3 such observed households in the sample). This is due to the Seychelles government social policy that allocates free accommodation to households led by heads with low education level. Of course, such result is specific to the Seychelles.

Table 1: Multi-Dimensional Poverty Profile by Head’s Education level (multiplied by 100)

Education of Head	Multidimensional Poverty	Incidence of Multidimensional Poverty	Incidence of Monetary Poverty
No Schooling	1.8	6.9	33.0
Primary	3.8	8.3	20.7
Secondary	4.0	10.0	14.1
Vocational/Polytechnic	3.1	5.8	12.0
University (&pre)	2.7	6.5	0.0
Whole Country	3.6	8.1	17.0

Q: est-ce que ce sont les chiffres officiels des Seychelles? Je crois que oui

To redo with sampling weights + HHsize + with other basic needs variables too

To do by strata

Table 1 reports Seychelles poverty profiles across household head’s education levels for three poverty measures: MP, IM and one-dimensional monetary poverty. As usually found in most contexts for one-dimensional monetary poverty, the estimates are inversely related to the education level of the head. However, this is not the case when considering multidimensional poverty. Let us overlook the households whose heads

have no education or have university level education as they only correspond to few observed households, and let us focus on the central three education levels. Multidimensional poverty, as measured with MP and IP, is lower for households with primary education heads as compared to households with secondary education heads. To understand this result we have to first realize that shelter and food are the dominating dimensions in both IP and MP. When interacting head's education with shelter deprivation, we find that primary education heads live indeed less often in crowded dwellings. This is the consequence of the abovementioned government social policy towards providing free accommodation to low education adults, instead of using unobserved income as a targeting anchor. Thanks to the policy, for an household head having primary education only somehow protects the household against multidimensional poverty, as compared to having secondary education or more.

3.4. Targeting

We now turn to the data on Social Welfare benefits as collected during the 2011 Living Condition Survey. At the time of the survey, only 12 percent of the surveyed households stated that they were receiving social welfare benefits.

UnclearOur estimates of multidimensional poverty are about twice higher for households receiving social benefits (15 percent of them are multidimensionally poor) than for the population at large (8 percent). This pleads in favour of targeting of benefits towards the multidimensionally poor. However, the efficiency of such targeting is very low.

Table 2: Coverage and Non-Coverage by Welfare Benefits

<i>Receiving Welfare at present</i>	<i>Shelter-Food Poor</i>		<i>Monetary Poverty</i>	
	Not Poor	Poor	Not Poor	Poor
Yes	10.69	21.88	11.22	14.58
No	88.75	78.13	88.34	84.38
Not Stated	0.56	0	0.44	1.04
Total	100	100	100	100

To do by strata, and same modifs

Table 2 shows that only about 22 percent of the multidimensional poor households receive social assistance. Non-poor households receive social benefits only slightly less frequently. Despite this mediocre performance, this is better than targeting towards the monetary poor. Indeed, only 15 percent of the monetary poor households receive social benefits. The latter may come from the fact that monetary poverty has been observed in 2006, while the information about multidimensional poverty and social programs corresponds to year 2011. As a result, some households may have escaped monetary poverty between the two periods, and therefore would not need social support anymore. However, on the whole, the coverage rate of the poor by social welfare programs appears to be mediocre at best. Adopting a multidimensional perspective allows to significantly enhance the appearance the coverage problem, even if the undercoverage of the poor by welfare programs remains the rule.

We also estimated the percentages of household beneficiaries that are poor and the percentage that are non-poor. We find that 85 percent of beneficiaries are not multidimensional poor, in the sense that they are not shelter-food deprived. It occurs as

a statistical coincidence that exactly the same percentage of wrongly selected households is found for monetary poverty. Even if a high degree of leakage of welfare benefits is relatively common around the world, the situation in the Seychelles seems to be particularly serious. The huge majority of households benefiting from social benefits are just not poor according to both poverty approaches, which suggest that social programs in the Seychelles are badly oriented.

Show what happens if there is a mistake in the number or in the set of priorities

Show also what happens with estimated priority weights stratified by subpopulations

Ajouter resultats de estimated SD

4. Conclusion

In this paper, we propose a new methodology of multidimensional poverty measurement. Our approach is based on using self-stated responses to household spending priorities. This information is first used to know what the relevant deprivations are. Then, the top priorities self-stated by the surveyed households allow us to identify the poor. For each household, the deprivations are aggregated according to relative weights computed from the data on priorities. Finally, the household poverty functions are aggregated at the country level, or the strata level, as usual for poverty statistics.

Using the priorities data in such a way allows us to: (1) eliminate ‘Command variables’ in favour of ‘Intrinsic welfare variables’, which correspond better to the ‘basic needs approach’ we pursue; (2) directly deals with needs heterogeneity, and (3) avoid the arbitrariness that typically arises in many stages of the construction of multidimensional poverty measures.

As expected, our estimates of the multidimensional poverty quantity function and the multidimensional poverty incidence are highly correlated. However, they are not correlated with the household poverty function in the Union or Intersection criteria based on the stated deprivations by Seychelles households. In the Seychelles, multidimensional poverty is dominated by shelter and food deprivations, which together contribute to 77 percent of multidimensional poverty. About 8 percent of households turn out to be multidimensional poor, to be compared with the 12 percent of monetary poor households. As opposed to the estimation results for monetary poverty, education is found to be relatively weakly correlated with multidimensional poverty. In particular, low multidimensional poverty is found for households with low education heads. This result is the consequence of government social policies providing free accommodation for households led by low-educated heads. Such insight had escaped from monitoring poverty just by using monetary statistics, which shows the usefulness of availing of multidimensional poverty statistics along with the traditional one-dimensional poverty statistics.

When assessing the performance of the Seychelles welfare social programs, whether in terms of multidimensional poverty or monetary poverty, we find that the coverage of the poor by these programs is dramatically low in Seychelles, while the amount of leakage of social benefits to the non-poor is huge. However, using multidimensional

poverty indicators slightly improves the appearance of the coverage of the poor by these programs. This is because, the decision to include households as beneficiaries of social programs is typically taken by social welfare officers on the basis of the broadly observable situation of households rather than on unobservable incomes¹⁷.

Of course, extensions of our methodology are possible to welfare and inequality issues. Moreover, there is no reason why deriving a multidimensional poverty measure should prevent the analyst to examine well-chosen dimension-specific deprivation indices. On the contrary, we believe that these dimension-specific indicators, such as child mortality or income poverty measures, should still be the basis of poverty-alleviating policies. What multidimensional poverty measures bring is additional information about the correlation of these deprivations, and their relative relevance for poverty alleviation.

+ more policy lessons

+ limitations

+ extensions

¹⁷ Applicants' verbal statements, including sometimes lies, about their income situation is part of the observable information, though.

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Appendix:

A inclure les defs des axioms from Dissociation when ready

Priority axioms to finish

SPELLING