Multi-dimensional Poverty: Conceptual and Measurement Issues

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1. Introduction

Our understanding of the concept of poverty has improved and deepened considerably in the last three decades or so following Amartya Sen's seminal work. We possess presently the analytical tools to identify and locate the poor, to describe their characteristics and to measure the extent of poverty at different levels of aggregation. Yet, in spite of spectacular methodological advances in the analysis of poverty a number of conceptual and measurement issues remains to be addressed or further clarified. Ravi Kanbur (2002) has argued that the research on distributional issues in economics and development economics in the last thirty years can be divided roughly into two periods the 1970's to the mid 1980's and the mid-1980's to the end of the last century. The first fifteen years were a "period of great conceptual leaps and ferment" while the second fifteen years were

marked by "consolidation, application and fierce policy debate". Very recent methodological contributions suggest that we are entering a period of resurgence in research attempting to sharpen and broaden our view of poverty.

The objective of this paper is to review a number of issues related to poverty, while taking stock of the ongoing research. Most of the remaining unresolved issues in poverty analysis are related directly or indirectly to the multi-dimensional nature and dynamics of poverty. Before the Development Community can become more successful in designing and implementing poverty-alleviation strategies, within the context of growth, we need to identify and understand better the various dimensions of poverty and how the latter interact over time and across space. Some households are endowed with portfolios of attributes that keep them in a poverty trap under which they remain permanently (chronically) poor, while others with somewhat different portfolios move in and out of poverty or can escape altogether falling into a state of poverty. Section 2 discusses issues related to the concept of multi-dimensional poverty; Section 3 reviews a number of multi-dimensional poverty measures; Section 4 is devoted to an analysis of multi-dimensional poverty and vulnerability over time; Section 5 addresses further issues related to the measurement of multi-dimensional poverty and Section 6 concludes.

2. Issues Related to the Concept of Multi-dimensional Poverty

Poverty has to be defined, or at least grasped conceptually, before it can be measured. The broader the definition of poverty the more difficult is its

measurement. In fact, as will be shown subsequently, the difficulties inherent in measuring a broadly-based, multi-dimensional concept of poverty impose severe restrictions on the number and the type of attributes that constitute poverty. The most comprehensive and therefore logical starting point in an attempt to capture the concept of poverty is Sen's "capabilities and functionings" theoretical framework. According to this framework what ultimately matters is the freedom of a person to choose her functionings. In order to function an individual requires a minimum level of well-being brought about by a set of attributes. The standard way of assessing whether an individual is above or below the poverty threshold is income. The logic and rationale behind the money-metric approach to poverty is that, in principle, an individual above the monetary poverty line is thought to possess the potential purchasing power to acquire the bundle of attributes yielding a level of well-being sufficient to function.

The standard procedure in real income comparisons is to use market prices to aggregate different goods and services consumed or enjoyed by a given individual, these weights (prices) being anonymous (Sen, 1978; Atkinson and Bourguignon, 1982). This procedure replaces the actual (unknown) individual welfare function by an indirect utility function defined over the income of the person and the price vector (Atkinson and Bourguignon, 1982). The drawback of the income approach is that some (non-monetary) attributes cannot be purchased because markets do not exist, for example, with some public goods. It is also clear that in many settings-particularly in developing countries- markets operate very imperfectly as in the case of formal rural credit markets from which many small farmers are sealed off because of inadequate collaterals. The use of income to pinpoint poverty

presupposes that a market exits for all attributes and that prices reflect the utility weights all households within a specific setting assign to these attributes. Therefore income as the sole indicator of well-being is limited, if not, inappropriate as it typically does not (or cannot) incorporate and reflect such key dimensions of poverty as life expectancy (longevity), literacy, the provision of public goods and even, at the limit, freedom and security. The state of well-being is strongly correlated with the quality of life but less so with income. Note that the conventional definition of household or individual income according to the national income accounts and household surveys does not even include the imputed value of social benefits (e.g. health and education).

Another drawback of the income approach to capture poverty is that even if it were possible to specify the minimum thresholds of each and all basic needs and put a price tag on them and aggregate across minimum thresholds to derive the monetary poverty line, there is no guarantee that individuals with incomes at or even above the poverty line would actually allocate their incomes so as to purchase the minimum basic needs bundle. In fact there are numerous examples of household heads who receive an income above the poverty line and allocate it to satisfy wants for, say, alcohol and tobacco at the expense of satisfying the minimum caloric requirements of their children. In the money-metric approach such households would be classified as non-poor whereas in reality at least some of their members are deprived of some basic needs and therefore should be considered poor. This illustrates the difference between basic needs and wants. The welfare functions of such households- at least as reflected by that of a dictatorial head- yield perverse

outcomes in the sense that high enough incomes to potentially escape poverty are allocated to yield deprivations and poverty.

According to Sen capability measures the freedom to achieve alternative functionings. If an individual possesses a large enough endowment or portfolio of capability she can, in principle, choose a specific functioning to escape poverty. As Tsui (2002,p.72)) noted "the capability of a person is an opportunity set of bundles of functionings and not the functionings *achieved*". The concept of capability presumes that individuals are well enough endowed so that they have the freedom to choose an appropriate non-poor functioning. The inherent difficulty with this approach to poverty is that it is in practice very difficult , if not impossible, to measure the capability endowment ex ante. Within limits, as will be discussed subsequently, an achieved functioning can be measured ex post. If only outcomes can be measured, it would imply that in some instances individuals might have had the capability of selecting a non-poor functioning, yet as in the case of a selfish household head mentioned above chose poverty functionings. The distinction between ex ante capability and ex post achieved functioning raises an immediate question: should an individual or household endowed with the potential capability of choosing a functioning satisfying all basic needs yet opting for an alternative bundle within which at least some minimum thresholds of attributes are not met (for example, some of the children in that household could be malnourished) be considered poor? A pragmatic, as opposed to a philosophical, approach would argue that it is the actual outcome that matters and that if, in any case, ex ante capability cannot be ascertained. Poverty analysts can only judge the state of poverty from observing the actual functioning. The fact that a person

or a household had the means to avoid deprivation does not alter an outcome marked by malnutrition and ill-health. If the actual state of living is one of poverty in at least some of its dimensions, the fact that it could have been avoided by the choice of a different allocation of income and other attributes by a given individual does not affect the prevailing state of poverty.

The key issue is how to define the configuration of relevant attributes, including their minimum thresholds, that constitutes an acceptable, i.e. non-poor, level of functioning. It would be that configuration that would allow individuals to "manage and to be" outside of poverty. Most analysts would start with the set of basic needs developed in the seventies and early eighties (see Streeten, 1981). Clearly besides income, such tangible basic needs as nutrition, health, education, shelter, clothing and access to information would be high on the list of crucial attributes used to judge whether a person was or was not poor. There are other possible dimensions of poverty that are not as clear-cut and for which a minimum threshold is almost impossible to determine such as different kinds of freedoms (of oppression, of religion, of expression), security, and the degree of discrimination and social exclusion below which an individual is thought to be deprived.

 Except perhaps for nutrition, it is hard enough to set minimum levels for such basic needs as shelter (number of square meters per person, quality of roof and floor) let alone agreeing on the minimum acceptable level of human rights below which an individual should be considered deprived. It is doubtful that we can agree and rely on robust indicators of such intangible yet essential dimensions of well-being as freedom, security and discrimination. To compound the difficulty, norms as to what is acceptable

to function with dignity tend to be highly context-specific and vary widely from one society to another and from one setting to another. The measurement of these attributes faces almost insurmountable practical and operational problems yet they cannot be ignored as their deprivation could push individuals into a state of poverty. A person who lives under an oppressive regime, who is discriminated against or socially excluded is constrained in its functioning and in that sense can be conceived as poor.

The determination of threshold levels for the myriad of dimensions of poverty, besides being context-specific, is very much in the eyes of the beholders. Should these levels be set at the local community level by community leaders or at the regional or even national levels by political leaders? Or, alternatively, should analysts ask individuals directly (say, through participatory poverty assessments and focus groups) what they perceive subjectively to be minimum thresholds of attributes below which they would feel deprived? The poverty estimates are very sensitive to the method used to establish these standards. If national standards are set in terms of one bundle of basic needs applying to all residents of a given country then, in principle, inter-regional welfare comparisons can be made. On the other hand, reliance on local bundles preclude such inter-regional welfare comparisons. The conflict between the *consistency* criterion and the *specificity* criterion that plagues the conventional income-metric approach to poverty analysis applies equally well to a multi-dimensional approach to poverty analysis.

There are currently two main methods of setting the poverty line in the conventional money-metric procedure, i.e. the Cost of Basic Needs (CBN)

and the Food-Energy-Intake (FEI) methods. The CBN approach has the advantage of ensuring *consistency* (treating individuals with the same living standards equally) while the FEI approach has the advantage of *specificity* reflecting better the actual food consumption behavior of individuals around the caloric threshold given their tastes, preferences and relative prices.

It has been cogently argued by Ravallion and Bidani (1994) and Ravallion (1998) that in order to make valid welfare comparisons the reference basket (bundle) yielding the caloric threshold should remain constant. The monetary poverty line (z) at any point in time is then obtained by multiplying the constant quantitative reference basket by the variable price vector to obtain z at current (nominal) prices and then deflating it by an appropriate price index (often the consumer price index) to express z in real terms. The conflict between the two criteria becomes apparent when it is realized that a national basket is adopted to allow welfare comparisons when, in fact, tastes, preferences, prices and diets may differ considerably from one region to another. The selected national CBN basket might only be consumed by a small minority of the households around the poverty line and is often significantly different from the actual basket consumed by individuals whose income is near z. Hence for the sake of welfare comparisons the actual behavior of the poor is ignored if not altogether dismissed. It is as if realism was sacrificed on the altar of welfare consistency.

This clash between these two criteria is even more pronounced in multi-dimensional poverty analysis than in the simpler income approach because of: 1) the broader set of attributes (in particular the non-monetary ones)

taken on board in the former; 2) the enormous difficulties of establishing objective standards for such elusive concepts as freedom; and social exclusion; and 3) the likely greater inter-regional and inter-community variability of non-monetary attributes.

Now let us assume that notwithstanding all the difficulties discussed above, agreement has been reached on a list of attributes related to poverty and their threshold levels. How can such information be used to derive measures of multi-dimensional poverty and make poverty comparisons? Starting with the simplest case, i.e. that of an individual who is below each and every attribute threshold level. Such person would be classified as unambiguously poor. Analogously, comparing two individual poverty profiles (A and B) where the attribute scores for all of the n dimensions in the profile of A are above that of the profile of B, it can be inferred unambiguously that A is better off in terms of well-being (less poor) than B. This last example reflects first order stochastic dominance to which we return shortly.

Absent first order stochastic dominance, where an individual is deprived in terms of some attributes (is unemployed and receives an income below the monetary poverty line) but not for others (possesses an educational status above the threshold), how can we determine whether this person is poor? Similarly if the profiles of individuals A and B intersect so that A scores better on some dimensions and vice versa, how are we to judge who is less poor? A utility (welfare) function is needed to answer these questions. Such a utility function would include the relative weights to be assigned to the various attributes and the individual and joint welfare contributions of the set of attributes. In the income approach the weights are anonymous and given

by the market prices. As pointed out earlier this approach is flawed as 1) it does not provide price signals in the cases of goods and services for which there are missing markets (can one conceive of a market for freedom?); 2) the prevalence of imperfect markets and government intervention in much of the developing world results in artificial prices that do not reflect scarcity value; 3) market prices are essentially efficiency prices and do not reflect distributional considerations (the marginal utility of a good satisfying a basic need rises with income).

Hence to ascertain poverty and make poverty comparisons within a multi-dimensional framework requires the approximation of a welfare function that includes the specification of the relative welfare weights, and conveys information about the direct marginal benefits of each attribute and about the interaction among these attributes. In particular this last requirement represents a tall order. It is difficult enough estimating the direct (individual) benefits let alone the multiple and often complex interactions among sets of attributes. The latter can be substitutes or complements. If dimensions are substitutes it means that a person can trade-off one attribute for another (say more food for less clothing) and remain on the same iso-utility curve. On the other hand if attributes are complements, an increase in the amount of one raises the marginal utility of the other (more education increases the present discounted value of the future stream of income). It is also possible that some combinations of poverty dimensions are neither substitutes nor complements.

3. Multi-dimensional Poverty Measures

It is difficult enough to ascertain the degree of substitutability or complementarity on a pair-wise basis let alone among combinations of n dimensions taken 3, 4, up to n at a time. Such a complete mapping of combinations of attributes into the utility space appears daunting if not utopian. This is the reason why efforts at measuring multi-dimensional poverty until now have limited themselves to dealing with at most four (and most typically only two) dimensions in their empirical applications- while showing that in theory their methods could be extended to cope with n dimensions. Let us now review these attempts and in the process highlight some related issues.

In one of the earliest efforts at analyzing multi-dimensional welfare, Atkinson and Bourguignon (1982) focused on the case where the government is concerned both with monetary variables, such as income, and with non-monetary variables. More specifically they tried to: "assess the extent of international inequality allowing for differences between countries both in incomes and in life expectancies, with the judgment depending on the distribution of each variable taken separately and on the way they vary together". (Atkinson and Bourguignon, p.183). As they point out in the study of multiple deprivation, an essential issue is to determine how different forms of deprivation (such as low income, poor health and inadequate shelter) tend to be associated and drawing a contrast with what one would observe if they were independently distributed.

Bourguignon and Chakravarty (2003) take as their fundamental and starting point in the development of multi-dimensional poverty measures that poverty consists of a shortfall from a threshold on each dimension of an

individual's well-being. In other words, "the issue of poverty arises because individuals, social observers or policy makers want to define a poverty limit on each individual attribute: income, health, education, etc...." (p. 28) They proceed to build a multi-dimensional measure of poverty assuming only two attributes. The first issue is whether a person should be considered poor if she falls short of the thresholds for all attributes, or only one. In the two-attribute case if $x_{1<}z_1$, and $x_{2<}z_2$, the person would be poor in both dimensions and therefore unambiguously poor. Alternatively, the shortfall might be in only in one dimension, in which case the determination would depend on the nature of the relationship between the two attributes. If the attributes are substitutes and an individual has a sufficiently high level of the first attribute above the threshold to more than compensate, in terms of welfare, for the shortfall in the second attribute than the person cannot be classified as poor.

In the literature the distinction between being poor in two (and at the limit all) dimension(s) and in only one dimension has been referred to as the *intersection* and *union* definitions of poverty. This can be illustrated using an example drawn from Duclos, Sahn and Younger (2005): if well-being is measured in terms of income and height (as an indicator of health) then a person could be considered poor if her income falls below an income poverty line *or* if her height falls short of a height poverty threshold. This case would be defined as a *union* definition of poverty. In contrast, an *intersection* definition would consider an individual as poor only if she were to fall below both thresholds.

Bourguignon and Chakravarty (2003) analyze the implications of various degrees of substitutability and complementarity between attributes on the utility space. They build a class of multi-dimensional poverty measures which is a multi-dimensional extension of the FGT (Foster, Greer, and Thorbecke, 1984) measure that satisfies a number of desirable axioms and which is consistent with key properties of interacting attributes. Among others, they argue that in the case of substitutes the drop in poverty decreases less with an increase in attribute j for persons with larger quantities of the other attribute k. For example the reduction in poverty caused by a unit increase in income is less important for people who possess educational levels close to the education poverty threshold than for individuals with very low education. In contrast the drop in poverty should be larger for individuals endowed with more education if these attributes are supposed to be complements.

The family of bi-dimensional poverty measures they derive is limited to the case where both attributes are below their poverty thresholds (i. e. the *intersection* definition) and are substitutes- assuming different degrees of substitutability. The measure is simply the summation of the shortfalls appropriately weighted raised to the power α, where α can be interpreted as a poverty aversion parameter as in the uni-dimensional FGT measure. Although they argue that, in theory, these families of poverty indices could be generalized to any number of attributes, this would require assuming the same elasticity of substitution between attributes which seems most unrealistic. To illustrate the applicability of the measures the evolution of rural poverty in Brazil in the 1980's is analyzed. The two dimensions of poverty that are scrutinized are income and educational level. During the

period, income poverty increased while educational poverty fell. As one would have expected the poverty outcome in the B-C multi- (bi-dimensional) measure is very sensitive to the relative weights and degree of substitution assumed between income and educational level below their thresholds.

Duclos, Sahn and Younger (2005) develop a dominance approach to multi-dimensional poverty. They extend the concept of a poverty line in one dimension to a poverty frontier in multiple dimensions. The question they raise and proceed to answer with the help of a few concrete examples is "what is the area of poverty frontiers over which we can be sure that poverty is lower for A than for B?" They show that it is possible for a set of univariate analysis done independently for each dimension of well-being to conclude that poverty in setting A is lower than poverty in setting B (say rural vs. urban Vietnam), while a multivariate analysis concludes the opposite, and vice-versa. The reason behind the above contention lies in the interaction among the various dimensions of well-being included in the poverty measure and their (multiple) correlations in the sampled populations. A reasonable poverty measure should allow the level of deprivation in one attribute to affect the assessment of how much poverty declines if there is an improvement in another attribute.

An increase in income for a severely deprived person in terms of health and education should cause a larger reduction in poverty than the same increase in income going to a less severely deprived individual. Clearly, "one at a time" comparisons of poverty in terms of income, education, health, etc. cannot capture these interdependencies. Populations that exhibit higher

correlations among attributes of well-being will be poorer than those that do not, relative to what one would expect on the basis of univariate comparisons alone.

The dominance measure Duclos, Sahn and Younger (2005) propose is essentially a two-dimensional generalization of the FGT index. An important feature of the D-S-Y measure is that it is influenced by the covariance between the two elements. Another interesting feature is that separate poverty aversion parameters can be selected for the two dimensions. Again, the measure is based on the assumption that the two attributes are substitutes. Three interesting empirical applications are presented to illustrate that their approach, can over wide ranges of poverty thresholds, yield two, three and even four-dimensional surfaces where one distribution dominates another- as in the case of urban vs. rural people in Vietnam using incomes and nutritional status as the two elements.

The authors are aware of the limitations of the substitutability assumption and discuss the implications of having instead assumed complementarity. For instance if the production complementarities between education and nutritional status are strong enough "it may overcome the usual ethical judgment that favors the multiply-deprived, so that overall poverty would decline by more if we were to transfer education from the poorly nourished to the better nourished…..Similarly, one might argue that human capital should be granted to those with a higher survival probability (because these assets would vanish following their death)." (p. 9). The issues of substitutability vs. complementarity among attributes and budgetary rules in

allocating funds to fight poverty are of crucial importance within a dynamic framework and are returned to subsequently.

4. Multi-dimensional Poverty and Vulnerability over Time

The present state of well-being for any given individual will influence her future state. This is particularly true for the poorest. Each household, at any point in time, is endowed with a given portfolio of attributes allowing it to function more or less well. Some portfolios are so deficient, i. e. members of the household are so deprived in key dimensions, that they are particularly vulnerable to shocks. In turn even transitory shocks can have permanent and persistent effects on the future level of well-being. This means that certain configurations of attributes today can generate a condition akin to a continuing multi-dimensional poverty trap. It is precisely the interaction among (deprived) attributes that can bring about this condition.

Vulnerability can be defined as facing uninsurable risks. Christiaensen and Boisvert (2000) contrast poverty and vulnerability in the following way. Poverty is concerned with not *having* enough *now*, whereas vulnerability is about having a high probability now of suffering a future shortfall. Their notion of vulnerability is the risk of a future shortfall and is expressed as a probability statement regarding the failure to attain a certain threshold of well-being in the future. In the uni-dimensional income approach vulnerability is measured as the probability of falling below the poverty line z, multiplied by a conditional probability-weighted function of a shortfall below this poverty line. Consistent with the FGT poverty measure they use a

vulnerability-aversion parameter α such that by setting α > 1, households with a higher probability of large shortfalls become more vulnerable.

Dercon (2005b) provides a useful conceptual framework to link present risk to future (poverty) outcomes. Households face a multitude of risks, and given their options and characteristics (that, in turn, depend on their portfolios of attributes), they will make risk management decisions. This decision-making process ex ante has implications for outcomes in the short and long run. Next shocks may occur- effectively a new realization of the state of the world- and people's response or lack of response will have implications for outcomes in terms of the various levels of dimensions of well-being. The most prevalent source of risk within the Third World is that faced by rural households engaged in agriculture. The risk is related to the rainfall and climatic pattern and the typical form the risk takes is in terms of a drought. Other high risk factors are family illness and deaths. In the urban areas important risk factors are fear of unemployment and of social exclusion. There are, of course a plethora of other risks including the possible transitional negative impact of globalization on community social protection and solidarity networks.

A state of deprivation in some key attributes such as health, education and income can increase vulnerability and lead shocks to have cumulative and persistent effects over time. Whereas in a static framework (at one point in time) different dimensions of poverty can be thought of as substitutes using a consumption lens, where trade-offs are possible and iso-poverty maps can be drawn, in a dynamic production framework many of these attributes are complements. Dercon (2005a) provides numerous examples of how certain

interactions among attributes affect future poverty, e.g.: 1) high infant and child mortality rates, i.e. the risk that children will not survive beyond a certain age, increases the fertility rate and further impoverishes the household; 2) poor nutrition, particularly in a child's early life leads to stunting and often persistent health effects and lower educational performance and cognitive ability (an erosion of human capital); 3) lack of insurance and credit markets implies that recovery of assets used in temporarily smoothing consumption after a crisis or destroyed by it may take a long time; 4) negative income shocks causing households to withdraw children from schools may result in a permanent loss of human capital even if these children return to school later. It can be argued that when levels of well-being are permanently affected by transitory shocks a poverty trap ensues (Dercon, 2000a).

The fact that dimensions of well-being can be substitutes in the short run while being complementary and re-inforcing in the long run has fundamental implications for the measurement of poverty. First, assume that a well designed household survey allowed us to determine the various degrees of substitution among attributes based on a cross-sectional approach. One finding might be that the same level of multi-dimensional poverty can be achieved with different combinations of education and income. An individual (A) with slightly more education and less income than B might be on the same iso-poverty curve as B. However, the existence of a static cross-sectional trade-off between these two attributes does not and should not imply that B could purchase (instantaneously) more education and trade places with A. Clearly over time B could use part of his income to acquire more human capital but in the short run such a trade is hypothetical at best.

Trade-offs among other basic needs such as between food and housing are, of course, possible in the short run.

A first implication of the above is that different combinations of attributes yielding the same poverty level in the short run can have different impact (influence) on poverty outcomes in the future. For example, if A and B are on the same iso-poverty surface and if A's household is relatively healthy and well educated but deprived income-wise, it may be less vulnerable and better able to withstand a shock than B's household that possesses a higher income but is more deprived in terms of health and education. In other words, present measures of multi-dimensional poverty, in comparing individuals, ignore the differential risk and vulnerability conditions of alternative portfolios of attributes yielding the same level of poverty today. In other words, there exists a path-dependence between the form poverty takes today and future poverty outcomes. B may be judged as less poor than A today, but given his endowment of attributes and his greater vulnerability to shocks B is likely to be poorer than A in the future.

A second implication is that a better understanding of the complex interactions of attributes over time is crucial in the design of effective programs and budgetary allocations meant to relieve poverty within a growth and development context. If good health and education are a sine qua non to raising labor productivity and finding employment, they should be given a high priority in the budget. A more subtle point relates to social programs and insurance schemes that could reduce households' vulnerability to shocks and thereby affect poor households' ex ante behavior vis à vis crises. The risk-aversion displayed by the poor in their decision-making

processes is a rational reaction to their perception of the distribution of the states of nature resulting from their decisions and actions.

The essence of vulnerability is the uncertainty of future income streams and the associated loss of welfare caused by this uncertainty. As Ligon and Schechter (2003) put it the critical issue is that " a household with very low expected consumption expenditures but with no chance of starving may well be poor, but it still might not wish to trade places with a household having a higher expected consumption but greater consumption risk". A subsistence farmer facing the choice of alternative technologies will select an inferior technology in terms of expected yield *if* there is a non-zero probability of a catastrophic outcome (that would threaten the household's survival) with the superior, higher-yielding (on average) technology. Likewise, poor farmers tend to devote a larger proportion of land to safer, traditional varieties than to riskier varieties. Dercon (1996) shows that in the context of Tanzania the crop portfolio of the wealthiest quintile yields 25 per cent more per adult than that of the lowest quintile. Dercon (2005a) provides numerous additional examples and concludes that "there is increasing evidence that uninsured risk increases poverty, through ex ante behavioral responses, affecting activities, assets and technology choices, as well as through persistent and possibly permanent effects from transitory shocks via the loss of different types of assets".

The costs of social insurance schemes that would alter the ex ante behavior of poor and vulnerable households could be a fraction of the additional benefits derived from overcoming their risk-averse strategies. Similarly, asset decapitalization to smooth consumption in response to shock can be

undertaken on a scale that leads to dramatic loss in long term well-being. According to de Janvry and Sadoulet (2005) these adverse consequences can be driven by three phenomena where: 1) decapitalization below a threshold leads to irreversible consequences (as in the case where the nutrition of a child under five is reduced and brings about irreversible physical development and even death); 2) decapitalization that leads to very high re-entry costs with irreversible consequences for those who are deterred from re-entry; and 3) decapitalization that results in critical loss of economies of scale such as reducing a herd below a minimum size. In a number of instances social programs and safety nets can be designed that would alter the attitudes of the poor with respect to risk, i.e. reduce their degree of risk-aversion, and thereby change their ex ante behavior.

  A key question at this stage is whether vulnerability and consequent risk – aversion is part and parcel of multi-dimensional poverty in the sense that certain sets of shortfalls of attributes (deprivations) generate vulnerability or whether vulnerability is a separate dimension of poverty. In a major conceptual breakthrough, Ligon and Schechter (2003) break down vulnerability into two components reflecting poverty and risk, respectively. The first component is supposed to represent that part of vulnerability due to (chronic) poverty, while the second reflects risk and uncertainty and, presumably, transitory poverty. While, this distinction is ingenious and useful in estimating the utility gain that could accrue to the poor if there were a means to remove their risk-aversion through some social insurance program, it could mask the fact that certain types of current poverty (portfolios of deprivations) render those households more vulnerable. In turn, higher risk by altering the behavior of the poor pushes some of them

further into a poverty trap. In this sense vulnerability (risk) and poverty are inherently inter-related.

Elbers and Gunning (2003) show that vulnerability can change dramatically over time as a consequence of both sustained growth and adjustment to shocks. An important implication of their approach is that the usual identification of chronic poverty with structural determinants and transitory poverty with risk breaks down. They show that "a household can be chronically poor because its response to risk lowers consumption permanently" (p.2). This feature of their approach is fundamental in that it incorporates the possibility of households deciding within an inter-temporal framework to reduce their mean consumption to reduce consumption variability and risk. Wood (2003) referred to this trade-off as the "Faustian Bargain". The quest for household security can lock poor people into social structures that reduce vulnerability but which also keeps them poor. Based on ethnographies derived from qualitative research Wood shows why many households "stay poor" in an attempt to "stay secure". One of the important conclusions of the Elbers and Gunning exercise is that if measures of chronic poverty are based on mean consumption over time then a large part of chronic poverty could in fact reflect risk.

5. *Further Issues Related to the Measurement of Multi-dimensional Poverty*

The multi-dimensional poverty measures that have been discussed up to this point are quantitative in nature. Increasingly sociologists and anthropologists are relying on essentially subjective Participatory Poverty Assessments

(PPAs) to try to capture the multi-dimensional nature of poverty. As Amartya Sen's emphasis on capabilities and functioning is becoming the dominant paradigm in poverty analysis, a clear implication is that a definition of poverty based exclusively on the material welfare status of an individual at one point in time misses key features of poverty that can only be unveiled through PPAs.

The qualitative (PPA) approach to poverty assessment is more inductive and subjective than the quantitative approach. The "hands on" iterative interviewing technique generates hypotheses that can be formally and quantitatively tested by the more deductive quantitative methodology that relies on econometric and statistical tools. These hypotheses might be either confirmed or rejected after having been subjected to quantitative testing. If the hypotheses are rejected or only weakly confirmed this information can be conveyed to practitioners of the PPA approach who could then try to generate new (modified) hypotheses to be subsequently tested by quantitative researchers. This iterative process could lead to a productive dialogue between the two schools and the identification of a set of richer findings. (Thorbecke, 2003) [1]

The most subjective approach to the analysis of well-being is found in the "economics of happiness" literature. The latter simply asks individuals to indicate their degree of happiness, usually on a range of one to ten. Both the PPA and happiness approaches can get more accurate estimates of the extent of deprivation people feel with respect to such intangible potential

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[1] For an excellent discussion of the advantages and disadvantages of the two schools of thought and an attempt to reconcile them see Kanbur (2003).

dimensions of poverty as freedom, security, and social exclusion. An interesting feature of those subjective approaches, when they ask whether a person feels poor or unhappy, is that the answers that are given rely implicitly on the utility function of the subject in question. In other words, the individual stating that he does not feel poor uses an implicit set of individual weights and minimum thresholds for the various attributes of well-being and aggregates accordingly to obtain a scalar measure. This resolves the very thorny and essentially arbitrary issue of having to select a set of attributes' weights in the quantitative multi-dimensional poverty measures and indicators. Here again a marriage between the quantitative and qualitative approaches could yield useful information on the relative weights individuals in a given setting assign to different dimensions of well-being.

In general the qualitative approach tends to be highly context-specific. Researchers and interviewers focus on specific villages and communities and obtain a mass of useful and comprehensive information on the socioeconomic structure of each village studied. One revealing difference in the diagnosis of poverty between the two approaches is that some households who are clearly below the poverty line on objective money-metric grounds when interviewed by PPA analysts claim that they do no consider themselves poor and vice versa. The likely explanation can be found in the extent of income and wealth inequality within the neighborhood and village of those households. By extension, within a multi-dimensional framework a household surrounded by individuals at similar and lower levels of income (below z), and comparable levels of deprivations in terms of education, health, and shelter may not "feel" poor. On the other hand, a household better off (i.e., less poor based on quantitative multi-dimensional

measures) living in a village with a much more unequal distributions of income and other attributes and surrounded by individuals with higher standards of living and less deprivations may "feel" poor even though its consumption is above the multi-dimensional poverty thresholds' surface. This suggests that the perception of poverty is often relative to the living standards of neighbors rather than an absolute concept. Does this mean that a comprehensive and robust multi-dimensional measure should incorporate distributional information in addition to information on attributes' thresholds and shortfalls?

The design of a poverty measure sensitive to the extent of inequality around the poverty surface (including individuals just above it) could help in the identification of the perception of poverty. Also given the crucial importance of context-specific conditions in shaping the perception of poverty it can be argued that the setting of the poverty surface at a more location - specific level would lead to a more accurate appraisal of poverty. The use of a national or even provincial poverty surface in the light of major intra-regional and inter-village differences in socio economic conditions can distort the poverty diagnosis at the local level. Again, this illustrates the inherent conflict between the specificity and consistency criteria. It is not possible to satisfy both simultaneously.[2]

The validity and robustness of poverty comparisons over space and over time based on the uni-dimensional income approach is debatable on a number of grounds. Over an extended period of time, relative prices can

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[2] Tarp et al (2002) provide a good start to the exploration of this conflict within a money-metric approach in the context of Mozambique.

change significantly leading to substitution by consumers among basic goods and services away from those whose relative prices rose and towards those with lower relative prices. It is not unreasonable to argue that the longer the time period over which poverty comparisons are attempted, the more weight should be assigned to the specificity criterion. With the market appearance of somewhat different goods-both qualitatively and quantitatively- triggered by technological progress, consumers' tastes and preferences are likely to evolve as well. In this case, the maintenance of a historical reference bundle over a long period simply to satisfy the consistency criterion could fly in the face of a different contemporaneous basket actually consumed by the near poor today.

The cost of a basket of goods satisfying food requirements grows with GDP per capita for several reasons: such as, changes in the range of goods consumed as income increases, rising prices of basic foodstuffs compared to prices of other goods, increasing proportion of population in urban areas where foodstuffs may be more expensive than in rural areas, and gradual disappearance of subsistence farming. It can readily be observed that basic needs expand with development-particularly at an early stage of development. For example, as the rural to urban migration occurs the new urban dwellers may have to use public transport and be charged for a variety of public services that were essentially either not available or free in the villages they left behind. For all these reasons it may be reasonable, over an extended time horizon to update and re-compute the basic needs basket, and by extension in the multi-dimensional poverty framework, the bundle of non-monetary attributes.

This problem of inter-temporal comparisons applies even more forcefully to multi-dimensional poverty measures. Political and economic regimes can undergo major, even radical, changes affecting civil liberties, security, incentives structures and affect overall socio-economic growth leading to major changes in relative prices (as would be the case of an economy in transition from central planning based on artificial prices to a free enterprise, market economy). Reforms and policy changes, such as structural adjustment programs are likely to entail large scale changes in social programs affecting health, educational and pension benefits. Services previously provided by the state may no longer be available. The changing environment may give rise to new norms and needs that if not met would cause deprivation in those new dimensions. In short, the new set of poverty thresholds for the attributes of well-being could differ significantly from the earlier one and therefore invalidate or, at least, rendering questionable a poverty comparison based on the historical poverty surface.

Some of the same arguments hold relative to spatial poverty comparisons, as well. For example, assuming a similar bundle of minimum thresholds of attributes in comparing a rural and urban setting is fraught with possible pitfalls. Not only are there different sets of basic needs (such as the need for transportation by a new migrant mentioned earlier) but, in addition, the social environments are likely to differ significantly. A rural household is likely to be able to rely on more social capital and a supportive community and solidarity network provided by neighbors, friends and the extended family than its urban counterpart. In this sense it might be less vulnerable to certain types of shocks such as major financial crises affecting the whole country (the Asian Financial Crisis triggered a massive reverse urban to rural

temporary migration in search of better safety nets). For all those reasons, inter-regional and, even more so, international poverty comparisons need to be carefully qualified.

6. Conclusions
To be completed

References
To be added