

Poverty and Capability: Toward an Empirically Implementable Measure¹

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ABSTRACT

This paper represents an attempt to operationalize Sen's concept of poverty. Contrary to most studies that take a commodities/consumption orientation to measure poverty, in Sen's approach poverty is an absolute concept. But the threshold level that defines poverty is defined in terms of capabilities that are essential to human life and a methodology to make them operational.

RESUMEN

Este trabajo intenta hacer operacional el concepto de Amartya Sen sobre la pobreza. Al contrario de la mayoría de los estudios que miden la pobreza desde un punto de vista de producto/consumo, Sen considera este concepto como absoluto. Sin embargo, el umbral que define la pobreza se determina en términos de capacidades. Este artículo propone una lista de cinco capacidades básicas, esenciales para la vida humana, y la metodología para hacerlas funcionales.

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1 This paper was first published as Working Paper No. 27 by the Development Economics Research Programme at the London School of Economics in September 1990. I want to express my gratitude to Julio Boltvinik for permission to reproduce the original manuscript.

1. Introduction

THE starting point of most indices of poverty is to determine a threshold level of some crucial variable(s). If the individual economic unit – an individual or, more typically, a household – is found to have a value below the threshold, the unit is classified as being poor. This variable has been defined variously as income; total expenditure; expenditure on a subset of commodities, especially food; minimum amounts of one or more commodities (food, clothing, housing); minimum amounts of some measurable characteristics of food items, amenities provided by housing, etc; utility level derived directly from consumption data or indirectly from income and prices, etc. All these measures are commodities/consumption-oriented. Peter Townsend has attempted to compute an index of relative deprivation by aggregating the responses to a number of questions concerning consumption and the living and working environment, translating the deprivation index into a measure of a threshold level of income. This has been the subject of a debate to which I shall turn later; for the present, suffice it to say that this is a much broader *social* measure than the more frequent commodity/consumption measure, which is more *economic* in nature.

The economic measures themselves are sometimes put into two groups. One is the poverty line (PL) method, where attention is focused on determining z , the level of income (expenditure) that is taken to be the minimum required for adequate living. The other approach is the (dis)satisfaction of basic needs (DBN), as it is called in Latin American poverty studies. Here the emphasis is on getting a minimum list of satisfiers of basic needs which the individual economic unit may or may not have.

In a typical DBN study, these different needs are not cumulative; dissatisfaction of any one of them classifies the household as being deprived. (I discuss how DBN can be translated into PL and vice versa in my paper "Methodological Problems in the Measurement of Poverty in Latin America.") In this paper, I shall take the PL as the typical economic measure.

2. Absolute versus Relative Views of Poverty

The main issue is the basis for determining the poverty line. Should this contain only minimal subsistence quantities of a limited number of commodities? Or should it be related to the overall standard of living of the society in which the poor live? This is the debate over absolute vs. relative deprivation. Many people who refuse to admit that there is any poverty in the advanced capitalist countries would define a subsistence standard in terms that are either time invariant ("today's so-called poor are much better off than the Victorian poor") or space invariant ("Britain's poor are rich compared to those of Burkina Faso") or both. Either way, the absolutists are absolutists in the space of commodities.

Another way in which one can be absolutist is in the space of needs. Thus it is possible to take the view that a few needs constitute the basic living level and that this level can be translated in commodity/income terms differently in different countries, but that these money income sums represent a comparable if not identical level across countries in real terms. Marx took the view that it is the unboundness of needs that distinguishes human beings from animals. The fewer the needs that can be met, the closer to an animal existence one leads.²

2 For a fascinating discussion on these issues, see Agnes Heller, *The Theory of Need in Marx* (London: Allison and Busb, 1976); Patricia Springborg, *The Problems of Human Needs and the Critique of Civilization* (London: Allen and Unwin, 1981); Kate Soper, *On Human Needs: Open and Closed Theories in a Marxist Perspective* (Brighton: Sussex/Harvester, 1981).

Thus in the space of commodities there is a relativism in money terms, and in the space of needs there is absolutism. The issue again comes up whether these needs should be time and/or space invariant. Should they differ from one individual to another, and if so, on what criteria?

The social approach to poverty measurement that Townsend implemented takes a relativistic view of poverty. But the poverty level is defined not in terms of goods or of needs but in terms of resources required for social interaction – that is, for being a fully participant member of the society in which the person lives. “Individuals, families and groups in the population can be said to be in poverty when they lack the resources to obtain the type of diets, participate in the activities, and enjoy the living conditions and amenities that are customary, or at least widely encouraged and approved, in the societies to which they belong. Their resources are so seriously below those commanded by the average individual or family that they are, in effect, excluded from ordinary living patterns, customs and activities.”³

Thus the measure is relative in the needs space as well as in commodity space. In as much as the measure was implemented only for one society (the United Kingdom), its comparability across countries is an issue not addressed. In principle, for each country we would have to investigate the social practices and norms to measure the resource requirements for being nonexcluded. Thus the measure may in principle be noncomparable across countries. In as much as historical change takes place, modifying customs and norms, the same noncom-

parability would apply across time. But besides these philosophical problems, there are some mundane measurement issues regarding Townsend’s measure, to which we shall turn later.

In his Geary lecture, “Poor Relatively Speaking,” Amartya Sen attempted to clarify the absolute/relative distinction.⁴ His view is that there is some space in which the poverty level has to be defined in absolute (i.e., time and space) invariant terms, but this is not the space of commodities. What, then, shall this space be?

In his Hennippman lectures (“Commodities and Capabilities”) Sen has argued that this space is the space of capabilities.⁵ Sen then extended this beyond the measurement of poverty to the notion of the standard of living itself in his Tanner lectures.⁶ The concept of capabilities led to a lively discussion by John Muellbauer⁷ and Bernard Williams.⁸ It is in the light of their discussion that I wish to take up the problem of empirically implementing a poverty measure based on capabilities. In the course of doing this, it will be useful at a later stage to take a detour and examine the similar problems of implementing other measures of poverty, especially that of Townsend.

3. Capabilities, Commodities and Functioning

The three crucial layers in Sen’s theory are capabilities, functioning, and commodities. In the background to these are material characteristics of goods, personal characteristics of members of the economic unit, as well as their tastes, and the environment in which they live, be it physical,

3 Peter Townsend, *Poverty in the United Kingdom: A Survey of Household Resources and Standards of Living* (Harmondsworth, Eng.: Penguin, 1979): 15

4 Amartya Kumar Sen, *Poor, Relatively Speaking* (Oxford Economic Papers, 1981).

5 Amartya Kumar Sen, *Commodities and Capabilities* (Amsterdam and New York: North Holland, 1985).

6 Amartya Kumar Sen, “The Standard of Living,” in Geoffrey Hawthorne, ed., *The Standard of Living: Tanner Lectures of Amartya Sen* (Cambridge: Cambridge University Press, 1987).

7 J. Muellbauer, Comment in Hawthorne 1987 (ibid.).

8 B. Williams, Comment in Hawthorne 1987 (op. cit.).

social, or political. Capabilities have to be satisfied in order to allow people to function in any of the many ways they can choose. But to know that individuals have these capabilities guaranteed to them, we have to know the necessary resource requirements as determined by the environment, their personal characteristics, and the material characteristics of goods. Once we know that people have their capabilities guaranteed, what we observe are their functionings. In evaluating functioning, Sen deliberately avoids a utility metric, and thus the problem of aggregating functioning to obtain a similar measure of well-being remains. I come to this thorny issue later.

In his discussion of Sen's Tanner lectures, John Muellbauer offers a conceptualization of Sen's scheme. This is given in Figure I. We see here that the environment and personal characteristics condition the material characteristics/goods required to guarantee capabilities. Once these capabilities are guaranteed, then it is functionings that are observable data. In Muellbauer's representation, there is a utility function of the functioning. This in turn depends on tastes.

To clarify matters a bit further, I have drawn Figure II, which illustrates the standard textbook case of a consumer maximizing utility. In this world, functioning consists primarily of the consumption of goods and leisure. There is no room for capabilities here because the only enabling element is freedom of choice. The neoclassical consumer plays a game against nature and s/he is a price taker. As long as there is freedom of choice, s/he can optimize. The only constraint is the resources available. In neoclassical theory there is no view that any level of resources can be insufficient or, for that matter, superabundant. The individual does the best s/he can given the resources. If an optimum is reached, that is that. The level of utility achieved may be high or low, but since no minimum is specified it can never be inadequate. If there are restrictions on choice, the level of utility achieved may be suboptimal, but that is the only unwelcomed outcome in neoclassical economics.

This is why capabilities never appear in neoclassical analysis. To clarify this matter and put resources explicitly in the picture, look at Figure III, which is an adaptation of Muellbauer's picture but reflects, in my view, Sen's model better. Figure III is more elaborate than Figure I for several reasons. To begin with, in the environment box, the (macro) economic environment has been added; and in the personal characteristics box, endowments, skills acquired, and disabilities (negative endowments) are separately specified. The reason for including skills is to make clear that the resources available to the individual depend on skills and disabilities as well as endowments but the economic environment (among others) will influence available resources -- for example, via the prevailing level of unemployment or inflation. A box has been added on the right-hand side of the diagram. This specifies the resources required to guarantee capabilities, given the environment and the personal characteristics as well as the available goods and their characteristics. Here I have allowed for the possibility that resource requirements may be computed directly in terms of goods (given their prices) or of characteristics of goods (given their shadow prices).

The essence of the argument then is to compare the resources required and the resources available. The environment again enters the scene here via, for example, guaranteeing choice or increasing costs by allowing discrimination by race or gender. If resources are sufficient to guarantee capabilities, then we can speak of functioning and, by implication, of a standard of living. If resources are insufficient, then the individual obviously has a truncated set of functioning; hence the broken line. But in this case, Sen's insistence would be that we don't take either the available resources or the existing environment as given. This is why I have allowed for steps to improve resource position or to change the environment. These are feedback processes which endogenize resources and environment, taken as "given" in neoclassical economics.

FIGURE I

MUELBAUER'S CONCEPTUALIZATION OF THE CAPABILITY APPROACH

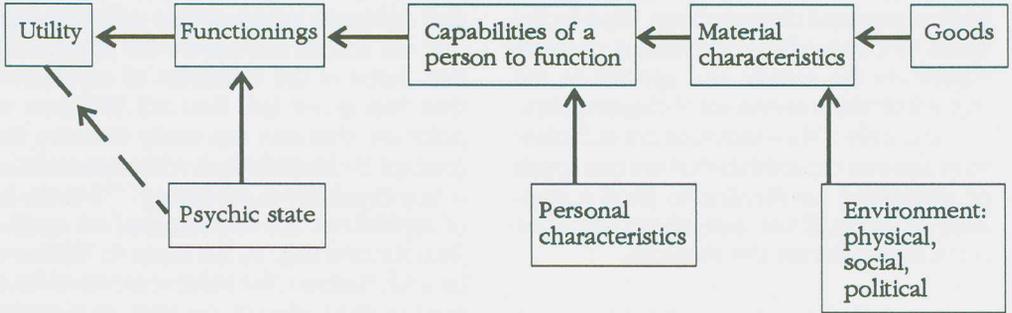
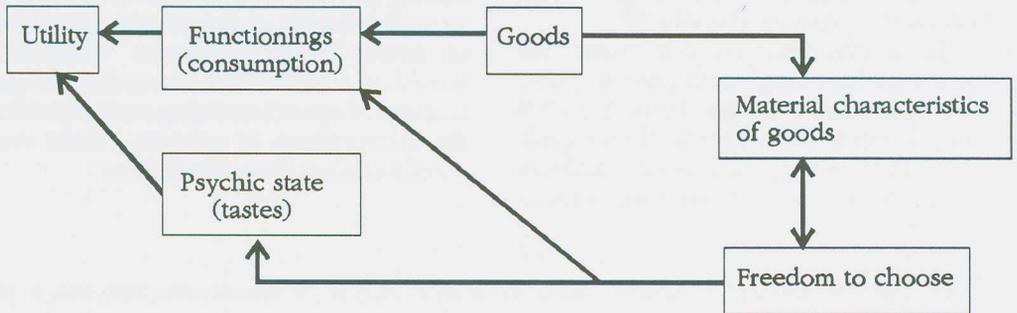


FIGURE II

A NEOCLASSICAL MODEL WITHOUT CAPABILITY



The analogy with the poverty literature should now be clear. I interpret Sen as saying that there has to be a set of capabilities which every society should try to guarantee to every individual member. Given the environment and the available goods, this generates a minimal resource requirement for each individual, given his/her personal characteristics. Thus in the space of commodities, we have a measure relative to the society and specific to the individual with a certain set of characteristics.

It is only if the resources are sufficient to guarantee capabilities that we can speak of evaluating functioning to yield a standard of living. If not, something has to be done to ameliorate the situation.

4. Capabilities: Many or Few

Having said this, the task of operationalizing the capabilities approach still remains. It is natural to think of these capabilities as a small number of basic items, rather as we think of basic needs. At one stage during the Tanner lecture, Sen quotes Pigou's list: "the minimum includes some defined quantity and quality of housing accommodation, of medical care, of education, of food, of leisure, of the apparatus of sanitary convenience and safety where work is carried out, and so on."⁹ Adam Smith, on the other hand, cared not so much about such an objective list of minimum needs as the social consciousness of not being "ashamed to appear in public."¹⁰

In his discussion of basic needs, Sen makes the following more general point: "The main issue is the goodness of the life that one can lead. The needs of commodities for any specified achievement of living conditions may vary greatly with various

physiological, social, cultural and other contingent features. *The value of the living standard lies in the living* and not in the possessing of commodities which has derivative and varying relevance."¹¹

While this makes clear a separation between basic needs (Pigou) and capability (of not being ashamed/Adam Smith) and between commodities and capabilities, we still do not have a list of capabilities. Some of the examples of capabilities that Sen gives led Bernard Williams to point out that one can easily trivialize the concept by identifying it with commodities -- "my capability to eat caviar."¹² Sen thinks of capabilities not as a minimal set smaller than functioning. In his reply to Williams, he said, "Indeed, the achievements of functioning must always be seen as n-tuples (sometimes representable as vectors but not always), and capabilities have to be seen as *sets* of such n-tuples."¹³

This way of putting it makes the list of capabilities very long. But on the other hand, just before the response quoted above, Sen says in relation to a discussion of poverty, "The relevance of what Williams refers to as basic capabilities becomes particularly clear, not so much in ranking living standards, but in deciding on a cut-off point for the purpose of accessing poverty and deprivation."¹⁴

Does this imply that there is a set of basic capabilities like basic needs for assessing poverty and, beyond that, there is an unlimited set of capabilities that helps us assess living standards? While this would be a convenient distinction for our purpose of operationalizing capabilities for the measurement of poverty, I think one should explore this a bit further.

9 A.C. Pigou, *The Economics of Welfare* (London: Macmillan, c. 1920), p. 759, quoted in Sen 1987, *ibid.*, p. 14.

10 Adam Smith, *The Wealth of Nations*, Cannan ed. (London: Methuen, c. 1776).

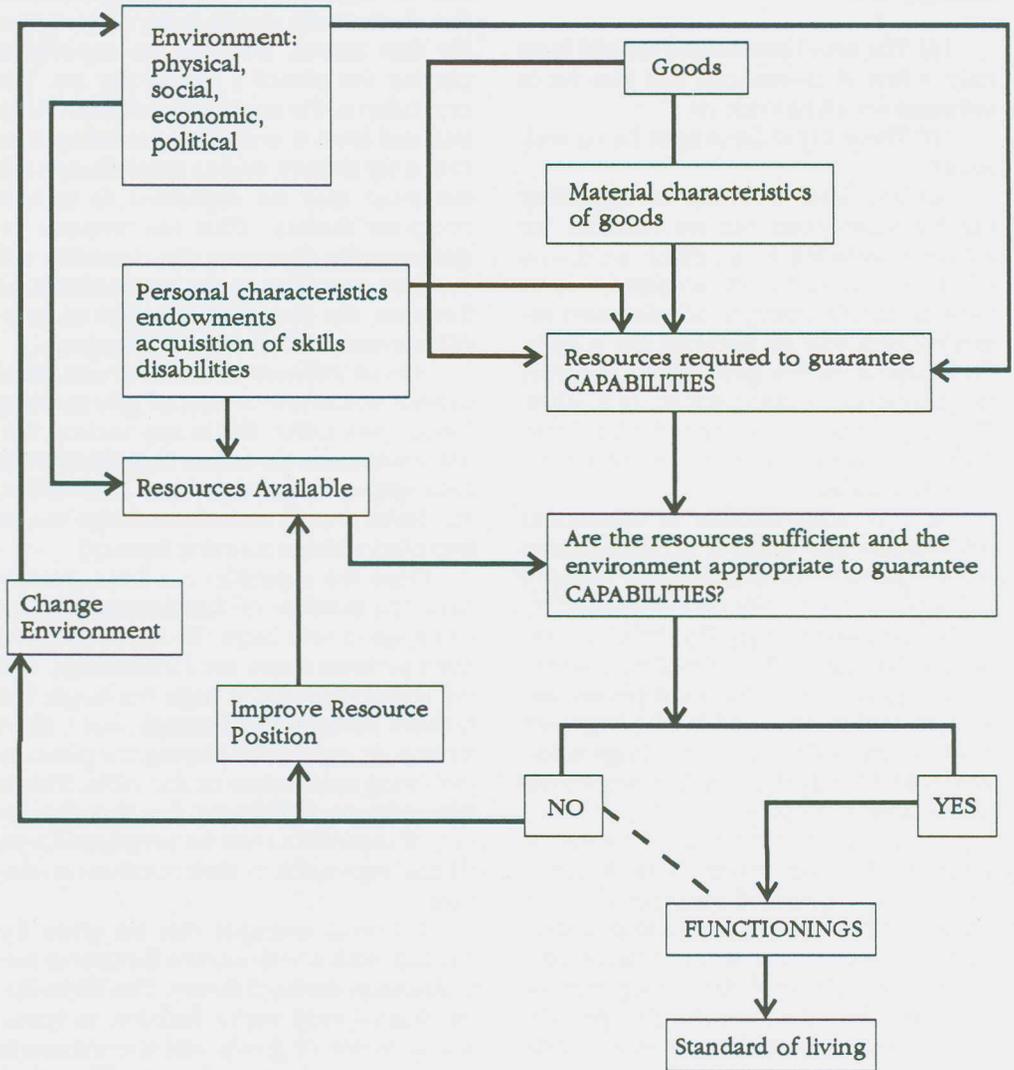
11 Sen 1987, *op. cit.*, p. 25; emphasis added.

12 Bernard Williams, Comments in Hawthorne, *op. cit.*

13 Sen 1987, *op. cit.*, p. 109.

14 Sen, *ibid.*

FIGURE III
CAPABILITIES AND RESOURCES



At one stage in the argument, Sen agrees with Williams that capabilities should be "co-realizable." But should the same set be co-realizable for everyone, or should some have a few and others many? I would like to argue very strongly that:

(a) The set of capabilities should have only a few elements and that this set is common for all individuals.

(b) These capabilities must be co-realizable.

(c) The *level* at which the capability can be guaranteed can be different for different societies in as much as this is expressed in terms of commodities/resources. (Sen's example of education requiring very little in Tanzania but a lot in the United Kingdom shows this.) The level can go up over time as a society gets richer. Thus education in Victorian England was guaranteed at a much more basic resource level than today.

(d) The small number of capabilities can support any number of functionings but the number of functionings *actually enjoyed* by anyone will be determined by his/her *actual* resources (by definition exceeding the minimal required for guaranteeing capabilities). Thus an improved living standard is measured by the larger set of actual and possible functionings made possible by the improvement in resources, private as well as public.

These four propositions presume a minimal set in the space of capabilities, allow for an unlimited expansion in the number of functionings, and adopt a relativistic position in the space of commodities/resources. They allow us to operationalize capabilities for measuring the poverty level without committing us to separate basic and nonbasic capabilities.

Let me give two examples, one informal and the other formal. Suppose we take as one of our capabilities "the capability to acquire and use knowledge and have access to information." Obviously this relates to a number of specific needs, commodities, and functioning. Literacy, school attendance, travel for research and training

are functionings, and expenditure on books and personal computers are examples of the commodity space correlates of this capability. Now take the idea of the Victorian middle classes that a young girl should be able to play the piano. This was, and is, regarded as an *accomplishment*. But does every young lady, or everyone for that matter, need to be *capable* of playing the piano? I would say no. The capability is the one I gave above. At the minimal level it is met by providing education for literacy, and as times change this minimum may be expanded to include computer literacy. Thus the resource requirement to guarantee this capability will increase over time as the environment (in this case, the economic one due to innovations such as computers) changes.

Across different societies at one point in time, the resource cost of guaranteeing literacy will differ. But in any society, illiteracy will mean the failure to guarantee the capability to acquire and use knowledge, etc. (even though some knowledge can be imparted without needing literacy).

Once the capability has been guaranteed, the number of functioning that this can span is very large. To appreciate and even perform music are functionings, and my living standard is high the larger the number of such functionings. But I *don't need to be capable* of playing the piano or the moog synthesizer or the tabla. This is where Bernard Williams' fear that the notion of capabilities can be trivialized by an infinite expansion in their numbers is relevant.

A formal example can be given by analogy with a well-known functional formulation in demand theory. The Klein-Rubin-Stone-Geary utility function is specified in terms of goods and the minimum required amount of each good. Thus if x_i is the amount of i th good and x_i^* is the minimum quantity required, we have

$$U = \sum u_i \ln (x_i - x_i^*)$$

U is the total utility derived from consumption for the consumer to derive any

positive utility at all from consumption. It is required that $x_i > x_i^*$ for each and every i . Thus the vector \underline{x}^* is co-realizable, or rather it has to be co-realizable before the functioning (consumption) can be evaluated in utility terms. Failure to co-realize these x_i^* is tantamount to saying that the functioning is *valueless*; it cannot be evaluated in any positive way. It yields no positive utility and has no welfare connotation. Capabilities are analogous to these x_i^* although they are most definitely not commodities.

5. Operationalizing the Capabilities Approach

Our first task now is to propose a list of capabilities that we can agree no person should be without. The next task would be to see how we can gather relevant information on personal characteristics of individuals so that we can calibrate the resource requirements of each individual to furnish capabilities. We then need to find out what commodity bundles are necessary to be at the individual's command to match the commodity characteristics to the capabilities requirements. Finally we need to cost these commodities and compare the expenditure to the model values in any society.

The most basic capability must be concerned with remaining alive in a healthy state. The central concern of all societies is to prevent avoidable death, as seen in the generous response of strangers to those caught in natural disasters -- flood, earthquakes, droughts. Thus reducing mortality or enhancing life expectancy is a basic goal of any society. It has to furnish the individual with the resources to stay alive. These are likely to include public goods as well as publicly provided goods in the face of the lack of private income to meet unexpected demands in case of disaster. This would mean, however, that those whose health is already precarious due to pre-

vious illness or disability may need greater resources to remain alive. They are not better off because it may take twice as much to keep them alive than it costs for ordinary people. It costs more just for them to stay alive. Sawhill misses this point in her criticism of including health expenditure in a poverty measure.¹⁵

The resource cost of guaranteeing a capability is a function of personal characteristics. This is the sense in which the approach of specifying the requirements of nutrition for pregnant and breast-feeding mothers separately is such an important indicator of society's capacity to provide for its members. Infant mortality and life expectancy at 1 and 5 years of age are social indicators. To some extent we may not be able to get information on personal characteristics of every individual and compute the resource cost of furnishing such a basic capacity as staying alive. In that case, we might use the statistics of mortality/life expectancy at different ages to make up for that missing information. To be meaningful, such data on mortality/life expectancy should be as disaggregated as possible by age, gender, and location of residence.

Along with life expectancy, good health/absence of morbidity is the second basic issue. One must be capable of leading a life free of disease, chronic illness, and any physical/mental impediment that hinders a full productive contribution to society. The costs of providing good health will again depend on the way in which health care is financed and the availability of infrastructural facilities such as hospitals. But all aspects of nutrition, as well as other inputs to ensure good health, have to be measured.

Having given these two examples of capabilities, let me propose a list of five capabilities. (Although I occasionally refer to them below as basic capabilities, I must emphasize that the view taken here

15 See Isabel Sawhill, "Poverty in the USA," *Journal of Economic Literature*, 1988.

is that there are no nonbasic capabilities.) This is all that there is to the number of capabilities.

- (1) Capability to stay alive/enjoy prolonged life.
- (2) Capability to ensure (biological) reproduction.
- (3) Capability for healthy living.
- (4) Capability for social interaction.
- (5) Capability to have knowledge and freedom of expression and thought.

There is some overlap between these, and some analysts may collapse (1), (2), and (3) into a single capability in terms of health, and (4) and (5) in terms of social relations. But let me stick to these five for a while. Notice that these are not needs; hence nutrition, warmth, shelter, and so on do not appear here, nor do commodities such as food, housing, and education. The space of capabilities consists of a small number of absolute requirements. We can then move to the characteristics space or commodities space, but these must be kept separate. But we also need to argue that our five capabilities cover the more important requirements. Let us argue for our list of capabilities.

What do our five capabilities refer to? First of all they are built around birth, life, and death. In the process of reproducing social relations, a society must guarantee physiological reproduction. A society is, after all, made up of all its living members and their manifold interactions. Thus the more people can stay alive and the longer they can live must contribute both to individual happiness and society's welfare. This is of course a view in deliberate contrast to the neomalthusian view that regards the level as well as the growth of population negatively. But this is surely not valid. One cannot wish to enhance per capita income by reducing the denominator (that is, by letting people die quickly); it has to be by increasing the numerator faster. The economy exists to better people's lives, not the other way around. The desire to extend human life is so basic that one must regard the capability to

stay alive and live longer as the most basic of all capabilities.

It is difficult to judge the fulfillment of this capability in each case separately, but there are social, aggregate indicators that signal the failure to guarantee this basic capability. The rate of mortality -- or its reverse, the life expectancy at various age levels -- is one way to judge the provisions of this capability. Interestingly, this also has a gender dimension. One concomitant of economic and social progress is the longer life expectancy of women relative to men.

But the continued life of the existing generation is not enough. Death is inevitable, and reproduction requires a birth to replace a loss by death. Of course, reproduction takes place at the household level for a variety of motivations, but the desire to reproduce the original household is a very strong urge. The capability to reproduce requires various resources especially concerned with the health of women in their reproductive age and of children, especially at a young age. The guaranteeing of such capability does not rule out policies for birth control nor the freedom to choose when to bear children and how many children to have. Since in Sen's view capabilities don't restrict, but rather provide, the freedom to choose functioning, the freedom to decide when, and when not, to have children can in no way be denied by the capability to reproduce. Indeed it implies this choice. Mortality during childbirth, the rate of stillbirth, and infant mortality are all sensitive indicators of social, and individual, deprivation.

These two capabilities have obvious social as well as individual dimensions. They are so basic that often they are not even thought of explicitly. (Much economics talks of infinitely lived consumers who are born adults, often by a process of parthenogenesis.) It is better to get these obvious omissions out of the way at the outset.

The third capability is good health. This means health good enough to be able to perform productive work and play a full part in social life. Such productive work can be paid work, voluntary unpaid work outside the home, or household work. It

also should cover the ability of children and the elderly to be able to pursue education, leisure, and other activities. It requires safety at work, in the household, and at play.

What are usually called basic needs -- indeed everything that Pigou mentions in his definition quoted above, except for education -- are covered under our three capabilities. Ensuring these three capabilities will require food, clothing, shelter, medical care, and safety in the workplace. It will also require publicly provided goods such as hospitals, inoculations, ambulances, fire and police services, water and electricity, and so on. We can almost say that virtually all that is called a basic need (again, with the exception of education) relating to private consumption goods would be covered by the requirement to satisfy our third capability. It is the first two that add to the public goods requirements.

The other two capabilities could be said to be concerned with nonmaterial, or at least nonbasic, needs. I wish to argue that they are basic. The fourth capability, deliberately stated in very general terms, is for social interaction. In his questionnaire, Townsend emphasized the requirement of social reciprocity. Living in society involves give and take, entertaining, and being able to be entertained. This is an important dimension for the socialization of children, of immigrants in a new country, and of people who, for one reason or another, are not in a "normal" household. Consider its lack. Jews were restricted from full mobility in many countries until recently, and the same is true of many ethnic minorities even today. Legal restrictions on where one can live, the a priori exclusion of certain activities, exclusion from certain types of education and education establishments -- these all imply a failure to guarantee this capability. Physical mobility is an important part of this capability, as is the right to associate with others without hindrance. Adam Smith's statement about shame concerns this capability. Without decent shoes, an eighteenth-century person would not enter into social relations. He or she would be ashamed to be seen in public. This

feeling presumes that other needs are satisfied; one is alive and healthy enough to go about, well fed, clothed, but not well dressed and well shod enough to be able to associate socially. It is the social norms and practices of each society that will determine the commodity requirements. Thus it might be nearly impossible in Britain these days to have a social conversation if one did not have a television and watch the soap operas. Lack of a television at home would certainly deprive a school-going child of the full ability to participate in communal conversation.

The fifth ability is further along than the previous four in its nonmateriality, but education would be absolutely necessary to guarantee capability. In daily life -- whether social, economic, or political -- there is a basic requirement that one be able to receive and process information. Literacy and perhaps numeracy are basic to this capability. But again in some societies this may now include the capacity to handle a computer keyboard. Handicaps such as dyslexia increase the resource cost of providing this capability. But this capability also implies the resources to be able to buy or acquire access to newspapers, books, radio, and television. It is a vital input to political life. Training and retraining for work is another aspect of this capability.

It may also seem that by insisting on freedom of expression and thought we are merely trying to swim with the recent free-market, libertarian tide. But as Sen has emphasized, capabilities incorporate the notion of freedom to choose which set of functionings one will engage in. In making it an explicit capability, we recognize that everywhere in the world lack of political freedom means serious economic deprivation for sizeable minorities, if not a majority of the members of a society. This capability presumes all the previous ones but insists that more is needed than being well fed if one has no choice to feed oneself as one likes, or more than to be healthy as a slave.

Although the capabilities are linked in some order and it may appear that the earlier ones are more basic than the latter

ones, I would argue that all five are equally and jointly essential. It is often asserted that the first three more material capabilities are all that is required for poor countries or poor people and that the other two are luxuries. The case is projected thus: as a society gets richer and/or as the number in poverty declines, the capabilities will span an even wider set of possible functionings and a correspondingly richer set of commodities. Take the example I used earlier. The capability of responding positively (whether actively or passively) to artistic stimuli -- music, sculpture, painting -- is not an additional fringe capability. It is better to consider it as an aspect of the fourth capability, for social interaction, and the fifth capability, for information gathering and processing. A society will find it possible to devote resources to train this capacity which is latent in everyone to a greater or lesser extent, but only after it has satisfied more basic educational urges. A rich person's daughter in Victorian England was regarded as uncultivated if she did not demonstrate this capacity, and families devoted considerable resources to acquire such "accomplishments." Such a view of accomplishments is not a philistine one. Everyone ought to be able to respond to music. What is philistine is that only the rich can afford the resources to cultivate this capacity, whether or not a natural talent exists that could profit from such cultivation.

What then determines the extent to which these capabilities are satisfied? What, in other words, determines the set of alternative functionings that the capability must span? It is here that the relative view of deprivation comes into its own. The norm of expenditures in the commodity space that can be taken to be necessary for guaranteeing the capabilities must be determined by social practice. Only the society in which people live can take a view as to what its members ought to have in order to lead a decent life or possess a minimum capability to function as members of that society. Barring deliberate discrimination against people on grounds of race, ethnicity, gender, and so on, it is perfectly open for us to accept that a

society may choose a spartan form of existence as a norm. As the world becomes more mobile, our definition of society becomes more and more universal, and conflicts are bound to occur between one country's social norms and those of another. Such conflict arises most acutely in terms of gender-based issues. What is normal for one society (female circumcision, for example) may be thought to be a gross deprivation according to the norms of another society. This raises very tricky questions of culture and politics. Having raised them, I recognize that there is no answer to them. For our purposes we can take a narrow view of society in terms of the economy in the context of which the fiscal burden has to be computed for better provision of capabilities for all. At least for the present, the national economy is such a unit. So for the practical purposes of computing poverty measures, we identify the society with the national economy.

6. Empirical Implementation of the Capabilities Measure

Having specified a list of five capabilities and made repeatedly clear that one has to be a relativist in the space of commodities, how do we proceed? In particular, how do we bring social norms, customs, and practices to bear in the measurement of minimal resource requirements?

The three approaches presented at the outset, which have all been empirically implemented, provide a good starting point. The PL approach typically takes the average share of food expenditure in total expenditure (a income) as a starting point. This average is taken over all households, not just the poor. In the studies done by ECLAC, calorie and protein norms are specified for each member of a household. These norms vary with age, gender, type of physical activity, and health status (especially in case of pregnant or breast-feeding mothers). Having obtained the total requirements for each nutrient for the household, the problem is to see what combinations of commodities satisfy these

requirements. The ECLAC approach is to obtain via an expenditure survey of a sample of all households a list of frequently bought food items and see what alternative combinations will provide the nutritional requirements. This is then costed at prevailing prices. A minimum-cost basket then provides the resource requirements for food. This is then blown up by the reciprocal of the share of food in total expenditure. This gives the poverty line. Families whose income is below this amount are labeled poor; those whose income is below the required amount of food alone are labeled indigent. The PL method of concentrating on energy and nutritional dimensions relates by implication to our first three capabilities. In setting prior norms, it takes these as time and space invariant although specifically related to personal characteristics. But bundles are chosen a priori after studying social practice. The problems relate to the rigid multiplier set by the reciprocal of the share of food in total expenditure and prices. In principle, both should vary over time, as should the typical commodity bundle. This raises practical issues of intertemporal comparability.¹⁶

The DBN approach (again, as used in ECLAC studies) asks four questions on housing relating to:

- a) the stability of the structure,
- b) a measure of overcrowding,
- c) availability of running water,
- d) availability of sanitary facilities.

In addition there are questions on education:

- e) level of education of head of household,
- f) access to primary schools.

A further question relates to the dependency ratio in the household. A norm is specified for each of these. If a house-

hold fails to meet the norm in any one of the seven dimensions, it is labeled as not having its basic needs satisfied. There is no numerical measure of resources required to meet all these needs, although in some of these questions (especially housing) this could be done.¹⁷

The DBN measure is thus very restrictive in terms of relating to social norms and practices. It relates mostly to capability (3) and perhaps capability (1) in its housing questions (unsafe housing can kill). Its education questions relate to capability (5). It may perhaps be more useful if an estimate of minimal resource requirements for adequate housing could be combined with the minimal food expenditure of the PL method, to obtain a more comprehensive resource requirement. But the absence of the social dimension is more worrisome.

In his well-known study of poverty, Townsend adopted the method of asking questions on a variety of topics. The questions were grouped under nine headings: (1) Housing and Living Facilities (18 questions); (2) Employment (17 questions); (3) Occupational Facilities and Fringe Benefits (20 questions); (4) Current Monetary Income (33 questions); (5) Savings and Assets (17 questions); (6) Health and Disability (9 questions); (7) Social Services (18 questions); (8) Income in Kind (10 questions); and (9) Style of Living (26 questions). As one can see, these 168 questions cover individual, household, and environmental aspects; work; leisure; consumption; income; transfers; and public goods. Much attention, however, was focused on a subset of twelve questions that were taken from the last section on the style of living. These questions related mainly to food consumption, social reciprocity (visiting friends, ability to invite them back), possession of durable consumer goods, and quality of housing. The responses to these questions were highly negatively

16 Those are dealt with further in my paper "Methodological Problems in the Measurement of Poverty," (MPMP) (London School of Economics, unpublished), referred to above.

17 See MPMP, *ibid.*

correlated with income. The responses were scored 4 if the answer was the same as the social norm and 1 below. Then these responses were added up for each household. When aggregated across different household types for each income band, they showed a negative slope with respect to income and could even be said to indicate a critical level of income below which the deprivation score rose sharply.¹⁸

The procedure that Townsend claimed located the poverty threshold became the subject of much controversy.¹⁹ The problems were many. First, for each question where the amount could be quantified -- for example, "How many times have you had a meal this week?" -- the question was couched in terms of a prior norm -- for example, "Have you eaten more than x meals this week?" The answer was scored as 0 if meals exceeded x and 1 if not. But the norm was not explained in any precise terms. Second, some of the questions were narrowly focused, which allowed the investigator to impose his or her own preferences -- e.g., "Have you had a *cooked breakfast*?" Last, the responses were aggregated giving equal weight to all questions.

Desai and Shah subsequently proposed a procedure that overcomes these objections. They abstract from goods and concentrate on consumption *events*. They then define a person's (household's) deprivation in terms of the difference between the frequency with which a household enjoys the event and the modal frequency of the event. Thus the norm is defined by the modal frequency. Last, they propose that the distance in terms of the various events should be aggregated not with equal weight but with weights proportional to the overall incidence of deprivation in the sample. Thus if 98 percent of the sample have a television but 2 percent do not, the weight should be 50 ($1/(1-0,$

98). But if 1 percent have caviar for breakfast and I do not, the weight is $1/(1-0, 1) = 1.2$. Thus the subjective feeling of deprivation as isolation from the community is captured.²⁰

The Desai-Shah procedure is limited to events where frequency can be quantified and so may not work with yes/no type of questions -- e.g., "Is there running water in the house?" They also do not say anything about what events are necessary for inclusion since their weighting scheme guards against frivolous questions. This is a question that one can direct to Townsend's list of questions and tackle the answer in terms of Sen's capabilities idea. It is by combining the ideas in Sen, Townsend, and Desai-Shah that we can advance to the next stage in poverty measurement.

As far as the measurement of poverty is concerned, we are interested in guaranteeing that people have certain capabilities guaranteed -- that is, that they have the resources required to function in any of the several alternative ways possible. What they do -- their actual functioning -- is, I would like to argue, irrelevant for our purpose. Thus to use the example that Sen uses, people should have enough to eat, that is, to guarantee capabilities (1) and (3). Whether they actually choose to fast to death or not is not our concern. We merely wish to guarantee that they do not starve to death.

There is a deeper sense in which actual outcome should be kept out of our calculations. As is well known, people's expectations and desires are conditioned by their actual resources. But in some cases even their physical requirements adjust to lack of resources. People adjust their activities to the food they get and subsist at much lower levels of nutritional intake than is thought possible. But this does not mean that it costs less to keep the poor alive than

18 Townsend, *op cit.*

19 See M. Desai and A. Shah, "An Economic Approach to the Measurement of Poverty" (Oxford Economic Papers, October 1988) and references therein, especially Piachaud 1981.

20 Desai and Shah, *ibid.*

the rich but that the poor function at a lower level since they lack the capability to stay alive indulging in a level of activity that the nonpoor can afford.

Capabilities thus afford the freedom to function in a variety of ways. Actual functioning is what people do. It is precisely because we wish to avoid the bias caused by adjustment to the felt lack of resources that we avoid looking at actual outcomes to compute the poverty line.

In the actual measurement of poverty, the insistence on ignoring actual outcomes takes the form of referring to modal behavior or social norm as a way of determining what the poverty level is. I have said above that in measuring poverty one must keep referring to the nonpoor. In practical terms, therefore, the connection between goods and commodities is taken from social practice. It is what it costs "everyone" to have the capability for healthy living that needs to be measured. Personal characteristics of the individual -- e.g., physical disability or age or gender -- may put the cost above or below average, but the commodity requirements should be computed using the social norms. Thus the Desai-Shah improvement to the Townsend approach can be adopted.

7. A Capabilities Interpretation of the Poverty Line

Let me now briefly adopt the PL approach to derive a measure of poverty that relates to capabilities. The PL approach, of course, misses out on public goods as well as publicly provided goods, and it neglects social dimensions of living. But these questions can be dealt with later in this paper. At this stage I merely wish to show how a capabilities approach would modify or at least reinterpret the poverty line.

Let us begin by using elements of the PL approach as adopted in ECLAC studies. We have five capabilities indicated by $K_1, K_2 \dots K_5$. Let Z_1 be the protein and Z_2 be the calorie. Now suppose Z_{11} is the protein required for staying alive; that is, guaran-

teeing K_1 and in general Z_{ij} is the i th characteristic (nutritional component) required to guarantee the j th capability. Now the nutrition case is linear, and we can sum the Z_{ij} to Z_i . To keep matters general, however, let us keep the functional form implicit. Finally, let X be the personal characteristics of a household's members.

Then

$$Z_{iaj} = Z_i(K_j; X_a) \quad (2)$$

is the a th household's requirement for protein to meet the j th (I have not put in a separate subscript for individual members of a household for obvious reasons) capability. We can sum Z over all j to obtain the household requirements of portions. As personal characteristics change -- e.g., health status, Z_{ij} will change. But

$$Z_{ia} = \sum Z_{aj} \quad (3)$$

is then the household's protein requirements at time t . Now the PL method translates characteristics into commodities by using information on modal social practice. This is equivalent to using a "technology matrix": connecting goods to characteristics and then a social norm for selecting among the feasible set of goods to arrive at an expenditure function. We can point to a "technology matrix" in a simple way as

$$Q = AZ$$

where Q is a vector of commodities and A some (rectangular) matrix.

Let E be the n th household's expenditure of food. Then

$$E = E(P_f, Z_1(K_1, X_a), Z_2(K_1, X_a)) \quad (4)$$

Here P_f are the prices of the typical commodity bundle (Q_f) chosen from a study of social practice, and Z_i are the nutritional requirements. Applying the Engel coefficient to E_{fa} one would arrive at a poverty line specific to the a th household.

The PL method can thus be used to illustrate how we can go from capabilities to characteristics via commodities to expenditure. The step going from characteristics to commodities involves social norms, but in view of the sort of consideration Adam Smith was worried about, this may be too physically oriented a concern. The point then is to ask if food requirements also relate to the other capabilities. Townsend was trying to find implicit connections between food and social reciprocity. The importance of meals during the school day for young children is well known, and hence we get a connection across all capabilities. Our equation (2) is perfectly general in a formal sense, but in empirical investigation the details of the connections between food and all the capabilities have to be pursued as fully as possible. That is, we must not stop at specifying food, the nutritional requirements for survival alone. (The social dimensions of food are as important as its physiological dimensions. This also has been brought out by the many studies of intra-household gender discrimination in feeding. Thus X_2 will have to be separately specified by each member's characteristics.)

On the other hand, the point is that food is not the only requirement for staying alive or for ensuring physical reproduction. Other commodities (characteristics) will also be required for ensuring these capabilities. It is the task of poverty research to specify by empirical investigation the commodity requirements to satisfy the capabilities. Thus the housing needs listed by DBN are related to capabilities K_1 , K_3 , and K_4 , and perhaps K_2 as well.

Thus, in general, there is no one connection between capabilities and commodities. Many commodities may be required to generate a capability, and one commodity may be relevant to many capabilities. Thus food is relevant for K_1 to K_4 , and literacy may be relevant to all five. Therefore, we need a more determined way to proceed to the next stage, where we can operationally implement the capabilities notion.

The poverty line example has given a few pointers. In the ECLAC method the connection between the first capability and nutrition and food was seemingly straightforward. Even when a commodity served across capabilities, the calorie level was the relevant characteristic and it was additive. But in general we will not have such additivity. But more than that, the "mapping" from K to Z is not straightforward. The principal reason is that the notion of capabilities is at once much more basic and much more general than the notion of subsistence or even of needs. It is in a sense too vague. This is an advantage in as much as a small set of capabilities can span a large set of functionings. (The analogy with matrix theory is deliberate here.) But at the same time a capability does not readily yield a "shopping kit" of characteristics, much less a list of commodities.

In fact it may be helpful to introduce the notion of needs here as intermediary between capabilities and characteristics. My *capability* to lead a long life (K_1) or even a healthy one (K_2) generates a need for satisfying hunger, a need for nourishment, for energy-giving intake. But the same capability generates other needs -- for parental care (when I am young), for shelter, for companionship (when I am elderly). These are not just basic needs; basic needs somehow convey a strict one-to-one relationship forward with characteristics/commodities and backward with capabilities.

Needs are varied. Indeed, as we saw above in relation to Marx's views of needs, it is of the essence that capabilities proliferate. One way in which capabilities get satisfied at higher and higher levels as a society gets richer is by the number of needs to guarantee a capability increasing as well. But more important, we can attach a number of needs to a capability and then go from needs to characteristics. Needs are much more "concrete" and detailed than capabilities; needs can proliferate without harming their usefulness as an organizing concept. The same is not true of capabilities; they should be few and not infinitely multipliable.

Figure IV has been drawn up to illustrate this idea. For ease of exposition, I have taken Pigou's minimal list plus Adam Smith's "sense of shame" and put them, suitably modified, in the needs column. Although Pigou does not mention food (taking it for granted in Edwardian England), I have added it among needs. The need to avoid hunger and thirst or the need for food and drink is relevant to capability (1) but also to (2) and (3). The same is true of the need for shelter and for medical care. Convenience -- as qualified to (sanitary) convenience by Pigou, but even more generally -- is not only relevant to health but also to social interaction. Leisure is necessary for K₃, K₄, and K₅.

No doubt the list of needs could be further elaborated; some may prune it down to basic needs and secondary needs. For my purpose it suffices that needs play a role in concretizing capabilities -- the connections between needs and characteristics of food, housing, and of medical facilities. For the last capability, the need is for education and information; the characteristics (among many) are diversity, openness, and freedom, but also reliability.

The characteristics/commodities inter-relationship has been dealt with extensively in the literature. It is here that different societies may have different "technologies," with richer societies proliferating commodities specializing in providing a certain characteristic, while commodities are put to versatile uses in poorer societies. The relativism of poverty measures impinges in this dimension, although it may also appear in the capabilities/needs mapping.

The list of commodities is also designed to bring out the fact that public and publicly provided goods are important constituents of the "poverty line." Too much attention has been paid in the past to consumer expenditure estimates. Public and publicly provided goods are either not included or are typically undercounted. The actual importance of public expenditure in guaranteeing capabilities is therefore understated if not ignored. It is easy then to think of cutting public expenditure

"to ease the burden" and the effect of such measures on poverty is not taken on board if only private expenditure defines the poverty line.

Thus private expenditure to meet relevant needs has to be modeled in the context of public goods provision. Our expenditure function has to reflect this. But there is another crucial aspect of this. Public goods are jointly consumed; their availability is a benefit to me even if I do not consume them but others do. Good street lighting is an externality.

But the same logic should be extended much further. To have people not in poverty is a gain to the nonpoor as well as to the poor. Want breeds waste and inefficiency if not crime and violence. No one is safe in the knowledge that some have to steal, rob, or mug to feed themselves. Even with the best provision of policing, street safety is guaranteed more by a well-fed population than anything else. Thus it is possible to regard the guaranteeing of other people's capabilities itself as a public good which enters my expenditure function. While not a part of Sen's text, this is surely in the spirit of his theory.

Thus, take an individual *a* with personal characteristics (gender, age, health, status, etc.) *S_a*. Let needs be generically labeled *N*, and *N(K)* being relevant needs so we have:

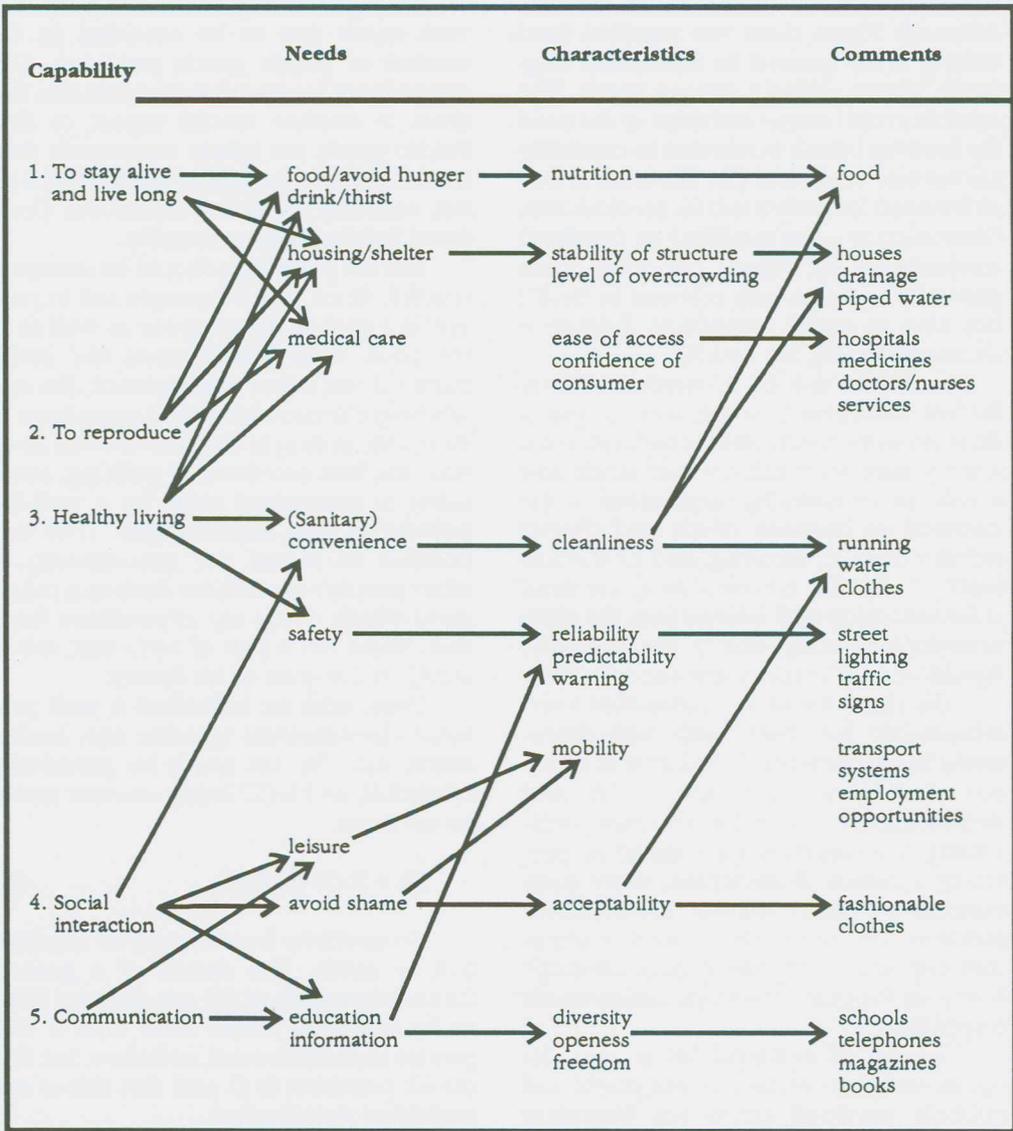
$$Z_a = Z(N(K, S_a)) \quad (5)$$

No additivity is assumed over capabilities or needs. The details of a general formulation such as (5) can only be filled in by empirical work. Now take it that private expenditure is *E*, as before, but that public provision is *G* and that this is not individual specification.

$$E_a = E[Z_a, G(N(K))] \quad (6)$$

E_a is the amount required to meet *a*'s capabilities. The expenditure function includes the public goods expenditure *G*. Now (6) is still very much the required expenditure for the isolated individual. Other people's living levels will have influ-

FIGURE IV



ence on a's requirements. To express this, let Za' be everyone else's requirements. We expect (6) then to include Za' in the argument:

$$Ea = E(Za, G(N(K), Za')) \quad (7)$$

In (7), I have put Za' , other people's needs, inside the public provision expenditure. This is not necessary but realistic. The individual may still have to incur private expenditure (security locks on his/her car to prevent theft) if the public provision is not enough. But in general s/he will expect the public provision to be adequate to ensure that Ea is minimal to meet Za without further unnecessary expenditure.

Of course there is an Ea for every a in the society. So there has to be a joint equilibrium defined of all the Ea . That set of equations is trivial to write, but it is a nontrivial task to prove that an equilibrium will exist within the resource constraint.

Ea is deliberately made to look as much like a poverty line calculation as possible. But there is a much more explicit a priori foundation for it. We have a small number of capabilities. If anything, we should ask whether this is small enough. But once we have accepted this list, the difficult task is to implement empirically the $Z[N(K, Sa)]$ and $Ea[Za, G(\cdot)]$ functions.

What our algebraic exercise does among other things is to address the question of valuation which comes up in the course of the discussion of Sen's lecture. Sen recognizes the "inescapable need for different valuation exercises for adequately pursuing the capabilities approach to the living standard."²¹

But the space of capabilities is not one where valuations can be carried out. To do so would require ranking them and regarding some as more important than others. Our small number of capabilities comprises a set of co-realizable entities. They stand or fall together. One must take the

view that if one of them is not realized, no meaning can be attached to the living standard no matter how far the rest of them are fulfilled. It is not good to be well fed and healthy in prison nor long lived if you are serving a life sentence. There is no freedom to choose in that situation. It is also precisely why slaves do not enjoy standards of living though they may eat a lot and live long.

The valuation in the economic sense is of course carried out in the space of commodities. Once we are assured that capabilities are guaranteed, then different commodity bundles may be offered at different stages of society. This is the sense in which the same capabilities may be fulfilled better, and living standards may go up over time. It is only conditional on meeting the capabilities of everyone at some minimal level that the economic valuation of commodities -- say, relative prices -- has any moral validity.

The consequence of this way of approaching the problem of valuation is obvious for a poverty study. If we find that, by a society's standards (with all that implies), if some people's capabilities are not guaranteed because of inadequacy of their resources, then *these people have no standard of living*. If, to quote Sen again, "The value of the living standard lies in the living," then these deprived people are not living in any but a biological, animal sense. This is the point at which the relevance of Marx's notion of needs distinguishing human beings from animals, precisely in their nature of being unbounded, becomes clear.

8. Conclusions

We have so far only scratched the surface. My main purpose in this paper was to show one way in which we can implement a measure of poverty starting from a capabilities approach. If this was accepted as a starting point, then one would need to

21 Sen 1987, op. cit., p. 107.

obtain more details via data gathering by methods of household surveys and other sources mainly in the public expenditure side. Such issues cannot be discussed in

the abstract. I hope that this approach arouses sufficient interest to begin this second stage of the measurement of poverty.