Working Paper Number 66

Capabilities: the Concept and its Operationalisation

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Amartya Sen introduced the Capability approach in 1979 as a more appropriate theory of justice than existing theories in moral philosophy. The main features of the Capabilities approach and its operationalisation in the context of poverty analysis are discussed in this paper. The three broad approaches to operationalisation i.e. evaluation in the functionings space, in the functionings space combined with the income space, or the income space supplemented by functionings information, are outlined. The paper restricts itself to the functionings space and therefore concentrates on the first of these. Issues pertaining to the assessment of capabilities as well as assessment restricted to the chosen functioning vector, selection of capabilities/functionings to be assessed, and possible procedures that may be used for inter-personal comparisons are discussed. Concentrating on operationalisation in developing countries, lists of 'basic' capabilities developed by different researchers, using differing methodologies are compared. The comparison indicates that capabilities related to health, nutrition and education consistently appear in all the lists, despite the different criteria for inclusion, reflecting their importance for any capabilities based investigation of poverty.

February 2001

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Acknowledgements

This paper has been written for the project 'Alternative realities? An empirical investigation into alternative concepts of poverty', funded by a grant from the Department for International Development, U.K. Thanks are due to Professor Frances Stewart, Professor Barbara Harriss-White, Caterina Ruggeri Laderchi and Susana Franco for comments and discussions, which contributed immensely to the improvement of the paper. Sabina Alkire and Mozaffar Qizilbash have been most helpful and their input as well as that of other participants at the workshop held at Queen Elizabeth House, University of Oxford (October 27-28, 2000), has been very valuable.

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1. Introduction

Amartya Sen first introduced the Capability approach in the essay 'Equality of What?' delivered as The Tanner Lecture on Human Values in 1979. At the time, the two popular theories offered by Moral Philosophy with regard to equality (be it social, economic, or political) were Utilitarianism and the Rawlsian theory of justice. Sen (1980), proposed the thesis that the space of 'capabilities' is more appropriate to an evaluation of inequality than the space of utilities or that of primary goods as suggested by Bentham and Rawl's respectively[1].

Sen's arguments (and the approach) were developed further in subsequent publications (Sen, 1985; 1987; 1988; 1992; 1997; and 2000a amongst others). This paper traces the adaptation of the Capabilities approach specifically to the context of poverty analysis. Core features of the approach, extracted from Sen's writings are outlined followed by a discussion of issues that arise when trying to operationalise it particularly with regard to developing countries.

1.1 Origins

In Sen's original exposition (1980), the Capabilities approach was proposed as a broad ethical theory with greater thrust than the existing moral theories of justice, with regard to achieving equality or impartial treatment of individuals. Sen argues for the space of 'capabilites' – rather than that of income, utility, liberty, or primary goods – as being the appropriate space in which equality should be assessed. Sen's criticisms of Rawl's theory of Justice (and particularly the commodities-based approach in the context of poverty) and utilitarianism (and particularly, the utility based approach in the poverty context), are briefly reproduced below followed by an elaboration of his 'Capabilities' thesis

Discussing Rawl's theory, Sen suggests that it concentrates on obtaining equality in the space of 'primary social goods' which are 'things that every rational man is presumed to want'. These include 'rights, liberties and opportunities, income and wealth, and the social bases of self-respect' with basic liberty being considered to have priority over other primary goods (Sen 80 and 1982 p365). Sen's criticism of this approach is directed towards the emphasis on the goods and their equal distribution – 'commodity fetishism', rather than the relationship between goods and persons. Sen suggests that the possession of commodities may not necessarily translate into well-being. Further, he considers the approach problematic when used for inter-personal comparisons in poverty analysis. This is because it does not take into account the large interpersonal variations of personal characteristics or the disparities in the natural/social environment that affect the 'conversion' of commodities to particular ends. A common example is that of fulfilling the nutritional demands of an individual with some intestinal parasitic infestation. Other things being equal, such an individual would require higher quantities of the commodity food, than that of someone without such an infestation. Similarly differences in environmental factors like pollution or

[1] Other ethical theories dealing with the question of inequality in spaces other than utility and commodities too exist, e.g. Nozick's 'entitlement theory' and Dworkin's 'liberal conception of equality'.

prevalence of epidemics would result in differences in the amount of food or medicines required by individuals to escape under-nourishment or illness. A further limitation of the approach is the use of market purchase data to assess well-being. Not all commodities that contribute to well-being, may however be bought and sold, e.g. fresh air, absence of crime etc (Sen, 1985). Besides, market purchase data are usually obtained for the 'consumption unit' i.e. the household. Relating these to individuals within the household, requires a number of assumptions to be made regarding distribution which may or may not hold.

The above criticisms of Sen have been seen as being directed towards the Basic Needs approach, as well. This approach has been interpreted by some as concentrating on goods and services[2]. Proponents of the approach (Streeten *et al*, 1981; Stewart, 1985 and 1995) however do emphasise that commodities are just seen as means to an end, means and ends being related *via* a metaproduction function. The end being a 'minimally decent life' defined in terms of particular levels of health, nutrition and education. Further, given the emphasis of the approach on the quality of life, many empirical studies do in fact concentrate on indicators of fulfilment of needs (e.g. life expectancy in Hicks, 1982 and Stewart 1985). The criticism that individual variations and external influences are not accounted for in the approach, thus does not always strongly hold. In fact, as concluded by Stewart, 1995 and discussed in later sections of this paper, operationalisation of the capabilities approach in the context of developing countries shows a great overlap with the basic needs approach.

As with a commodity basis of poverty analysis, Sen also finds Utilitarianism, which has greatly influenced Welfare Economics quite problematic. Utilitarianism, as an ethical theory, tracing its origins in the late 18th century to Jeremy Bentham, proposes an action as being right if it tends to promote happiness and as wrong if it tends to promote the reverse of happiness. Actions being judged by the extent to which they promote the "greatest happiness of the greatest number" (Encyclopædia Britannica, 1994-2000). With regard to equality, the utilitarian objective is the maximisation of sum total of the utility (requiring the equality of the marginal utility of everyone) irrespective of the manner of distribution. Sen (1973, 1997) suggests that this particularly raises problems if some individuals are better 'utility producers' than others. The approach would in fact discriminate against individuals who are handicapped in the conversion of resources into utility (e.g. a crippled individual). This is because such individuals would be considered inefficient in terms of utility generating ability and instead more resources would be given to more efficient producers so as to increase the sum total utility. This ignores the fact that in fact it is the low efficiency producer (here the cripple), who may be in greater need of a higher level of resources to achieve a given objective condition, such as health status. A distribution based on utilitarianism could thus be perverse, doubly compounding such a handicap. Sen finds the concept of utilitarianism applied to the poverty context particularly problematic. The fact that utility

[2] Although the basic needs approach has sometimes been associated with the opulence approach, the focus of the approach is not on commodities but rather on the basic goods and services required to fulfil basic needs. Its proponents do not explicitly mention drawing on Rawl's for theoretical underpinnings. Rather, it began as a practical issue with roots in the ILO's basic needs strategy for development in the 70's. It was developed during the subsequent World Bank program launched in 1978, to study operational implications of meeting basic needs (especially in education and health), of the whole population, by national development efforts, within a short period of possibly one generation (Streeten *et al*, 1981).

seen as satisfaction or happiness in classic utilitarianism or desire fulfilment in modern utilitarianism, is completely grounded in the mental attitude of the person and ignores the extent to which an individual may value one kind of life over another, are considered serious drawbacks. The former drawback is referred to 'physical condition neglect' and the latter 'valuation neglect' (Sen, 1985). For example, consider a woman who is poor and undernourished. Although she may value a life that is more comfortable, she may resign herself to her state, be happy with small comforts, desire only what seems 'realistic' or attempt not to desire at all. Judged by the metric of happiness or desire fulfilment therefore, she may appear to be doing well although physically living in quite a deprived condition (i.e. physical condition neglect). The reflective activity of her valuing a particular kind of life more than another, is also neglected (i.e. valuation neglect). Similar issues arise when performing interpersonal comparisons. Using utility as the guide, an individual who is mentally in a 'happier' state having reconciled herself to her lot, although malnourished and uneducated may well be ranked higher than one who is well nourished and educated but is unhappy and aspires for more.

With regard to utility as seen in modern economic literature as the representation of choice, Sen (1985) points out that this neglects the motivations that underlie choice. Choice cannot be assumed to reflect the person's ordering of own well-being as other considerations e.g. obligations may actually guide the choice. Sen also considers this approach a non-starter for interpersonal comparisons of well-being since people don't actually face the choice of being someone else or living at some other age or time.

Further, at the data level, like the commodities approach, the utility view of assessing well-being generally relies on income or consumption expenditure i.e. market-purchase data (based on the assumption that these reflect levels of utility) [3]. Sen (1985) sees two main problems with this. First, even if commodities can be considered as providing the basis of utility, this depends on how the commodities are utilised by the person (taking into account interpersonal variations is thus crucial). Second, as mentioned earlier, not everything that serves as the basis for utility can be purchased or sold in the market.

As an alternative to the commodities-based and utility-based approaches, Sen proposes the Capabilities approach. Here it is not the possession of the commodity or the utility that it provides that proxies for well-being, but rather what the person actually succeeds in doing with the commodity given its characteristics and his or her own personal characteristics and external circumstances. This achievement is referred to as the 'functioning'. In the Capability approach as expressed by Sen, the space of evaluation (the 'functionings') is thus different both from 1) that of commodities (and the corresponding characteristics), to which it is posterior, and 2) that of utility (in the form of happiness resulting from that functioning), to which it is, prior.

It is not the purpose of this paper to arbitrate and choose between Rawls, Bentham and Sen. The emphasis is on issues pertaining to the operationalisation of the Capabilities

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[3] It could be argued as by Ruggeri Laderchi (2000), that the popularity of the use of income as an indicator of poverty has its roots in the work of Booth and Rowntree and their concerns with the social conditions of the poor in 19th century England, rather than utilitarianism *per se*. While this may be so, it need not necessarily preclude the influence of utilitarianism as an underpinning philosophy.

approach, in the context of developing countries and it is this discussion that is pursued in the sections that follow.

2. Description of the approach

Presented below, at the risk of oversimplification, are the essential features of the Capabilities approach, as formulated by Sen. This is followed by a discussion on the methodology for rendering the approach operational. [4]

2.1 Main features

The list of terms presented below draws on Sen's initial formulation (1980) of the approach as well as his subsequent work. A caricatured example is used for the purpose of illustration, rather than of reflecting real situations.

1. **Commodity vector.** This is the list of commodities possessed by a person. For example, a person may have the commodity vector: *[sack of rice, bicycle]*.
2. **Commodity characteristic vector**. Following the approach pioneered by Gorman and by Lancaster, commodities are conceptualised in terms of their characteristics ('the various desirable properties of the commodities in question' Sen, p6, 1985.). The commodity characteristic vector is the list of 'characteristics' of the commodities possessed by the person. Thus, for the commodity vector above*: [nutrition, transport]*. Each commodity could have more than one characteristic e.g. rice also has a social characteristic – in that people may meet to eat. Just one characteristic for each commodity is however given to keep the example simple.
3. **Functioning.** Functionings are what a person succeeds in doing with the commodities (and their characteristics), in his possession, given his personal characteristics as well as the existing external circumstances (including factors like physical environment, cultural factors, public goods provision and others that may impact the conversion of the commodity to the functioning).

   A functioning is thus an achievement of the person. Thus for the commodity *(sack of rice)* with its characteristic *(nutrition),* some individual may achieve the functioning: *(moderately nourished).* Some other individual, utilising the same quantity of rice, but having a parasitic infection, may achieve the functioning *(poorly nourished).* Thus, while the characteristics of commodities (here the characteristic *nutrition* of the commodity *rice),* do not alter depending on the person possessing it and the external circumstances, the functionings do.
4. **Capability.** A capability is the *ability* to do or be something. Given the commodity *rice* and his personal characteristics and external circumstances, the individual thus has the *capability to be moderately nourished*, although he may choose not to be. While a

[4]This paper is concerned with issues related to the operationalisation of the capabilities approach. For issues related to its conceptualisation, see Muellbauer, 1987; Kanbur, 1987; and Williams, 1987; Crocker, 1992 and 1995; Cohen, 1993; and Qizilbash, 1998 amongst others.

functioning (here *moderately nourished*) therefore is an actual achievement, and directly related to living conditions, capability is a notion of freedom in the positive sense[5].

5. **Functioning vector.** This is a list of functionings. It gives a snapshot of a person's 'state of being', given their utilisation of their commodity characteristic vector. For example, an utilisation of the vector in 2 above, by an individual, could result in the functioning vector: *[moderately-nourished, transported]*. Other utilisations by the same person (for example, choosing not to use the bicycle and therefore not expending this additional energy, but at the same time not having any other means of transportation) might result in different functioning vectors like*: [well-nourished, stationary].*[6] Each functioning vector thus gives a possible 'state of being'.

6. **Capability set.** This is the set of all possible functioning vectors that a person can achieve. The person's access to commodity vectors and the utilisations feasible govern this. The person may have access to several alternate commodity vectors from which one will have to be chosen and may also be able to choose between a number of different utilisations. For simplicity, in the running example, access by the person is restricted to just the one commodity vector shown. Again although a number of alternative utilisations may be possible, if in this example the person was only able to choose between the two utilisations mentioned earlier in 5, the capability set is:

   {*[moderately-nourished, transported*], *[well-nourished, stationary]}.*

   The capability set is thus obtained by applying all feasible utilisations to all possible choices of commodity characteristic vectors. The person can then select a preferred functioning vector from this set to lead his/her life. This is thus the person's 'chosen state of being'[7]. Thus, "just as the so-called 'budget set' in the commodity space represents a person's freedom to buy commodity bundles, the 'capability set' in the functioning space reflects the person's freedom to choose from possible livings" (Sen 1992, p 40). A capability set, defined in the space of functionings, is thus a set of various alternative combinations of functioning vectors, any one of which a person can choose.

7. **Achievement** Sen (1985) distinguishes two ways of looking at a person's interests and their fulfilment *viz.* well-being achievement and advantage. The former is "concerned with a person's achievement" (Sen 1985, p3). Depending on the evaluation of each functioning vector, the person will choose one of the vectors. He or she thus has a

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[5] In the context of the capabilities approach, Balestrino (1991) differentiates between the notions of positive and negative freedoms. The former is described as 'the active capacity to do or be' as opposed to the latter which is described as 'the absence of constraints by others or by the State' (p337).

[6] For simplicity, in the example used here, the commodity vector has only two commodities, each with only one characteristic. The commodity vector for any individual would however, include all the commodities in the set the person has access to. The corresponding commodity characteristic vector would be quite large and would include all the characteristics of each of these commodities. The corresponding set of functioning vectors that are possible based on the different utilisations, of the commodity characteristic vector, would also, in reality therefore be correspondingly large, rather than comprising of just two functionings as shown in the example.

[7] Two individuals with the same capability set, could end up choosing different functioning vectors. On the other hand, two individuals with different capability sets could also choose the same functioning vector.

particular level of well-being in this 'chosen state of being'. This could also be referred to as 'well-being achievement' (or 'living standard achievement' or 'agency achievement' as the case may be).[8]

7. **Advantage** While well-being achievement, thus tells us something about the person's chosen functioning vector, 'advantage', involves the evaluation of a set of potential achievements (i.e. the capability set). It 'refers to the real opportunities that the person has, especially compared with others' (Sen, 1985 p3) rather than in the limited way in which they are often defined. The difference is best illustrated by his e.g. of the opportunity available to an individual in terms of the doors of a school being formally open to him as opposed to the real opportunity, in terms of whether he actually has sufficient money to afford going through the doors.

   It might be conceivable that a person may have more real opportunities than another, but might not use it well or might not use the advantage to attain a high level of well-being, and sacrifice one's well being – for some other goal. Sen therefore sees the *freedom* to achieve well-being as being "closer to the notion of advantage than well-being itself" (p3). Advantage could therefore also be referred to as 'well-being freedom' (or 'living standard freedom' or 'agency freedom' as the case may be).

2.2 Operationalisation

It is worth clarifying at the onset, the evaluation space of most interest to this paper. Evaluation within the capabilities approach may a) be restricted to the 'functionings' space (Section 2.2.1); b) combine information in the 'functionings' and the 'income' spaces

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[8] In later work, Sen distinguishes between the terms well-being, living standard and agency, each of which may be used with reference to either what has been achieved (i.e. chosen functioning vector as described in 7) or all that may be potentially possible (i.e. capability set as described in 8) as shown in Table A:

Table A

	Achievement	Advantage/Freedom
Living standard		
Well-being		
Agency		

As Sen defines it, living standard is a narrow notion, taken to relate to the individual while well-being is broader including 'sympathy' for other individuals. E.g. it may be possible for somebody to feel sorry for another individual, and thus reduce one's well being, without in any way reducing one's living standard. The notion of agency is even wider, taking into account social commitments. E.g. it may be possible that a person may go to war for his country, although this would affect and reduce his wellbeing and living standard (Sen, 1987). An assessment of agency would thus require information related more than to one's own personal well-being thus suggesting that the functionings space may be too narrow for its assessment.

As the issue of concern in this paper is to do with assessments within the functionings space, the discussion restricts itself to well-being and living standard. Since the living standard, is a sub-set of well-being, the word well-being is used and the discussion in the paper can be considered as referring to both, unless specified otherwise.

(Section 2.2.2); or c) take place within the 'income' space but using the concept of 'adjusted income' (Section 2.2.3). This paper is restricted to a discussion of the 'functionings' space. The focus therefore is on the first of these, but the latter two will be discussed briefly as well.

2.2.1 Evaluation within the functionings space

Ideally interpersonal comparisons, within the functionings space, ought to involve evaluation and comparison of the capability sets. Practical considerations however usually restrict comparisons to those of the chosen functioning vector. Further, depending on the context, assessment and comparison is usually restricted to a sub-set of the most relevant capabilities/functionings. Interpersonal comparisons at each of these levels (capability set, chosen functioning vector and sub-set of most relevant capabilities/functionings) are discussed in the sub-sections below.

2.2.1.1 Evaluation of the capability set

An evaluation of the capability set may involve either an assessment of just one element that is considered to represent the set i.e. elementary evaluation or an assessment of the entire capability set i.e. advantage. Considering these in turn

a) elementary evaluation

The value of the capability set is equated with that of a single element of the set, i.e. the maximally valued element within the capability set. The first problem that arises here is that of identifying such an element as it may not be possible to have a complete ordering of all the elements (i.e. the functioning vectors), to allow identification of the maximally valued element[9]. It would however still be possible to perform comparisons between say two capability sets, by checking if there is an element in the one set which is better than every element in the other.

The second problem that arises is that, just looking at the maximal element may ignore the extent of choice that is available. Thus if a particular persons capability set shrinks, but the best element remains, this shrinking will be of no consequence if assessment is performed just in terms of the maximal element.

b) Assessment of advantage

Here, the person's freedom to choose and the extent of choice are taken into account. One possible way to compare capability sets proposed by Sen (1985) is that of ranking dominance in terms of pair-wise comparison of elements (i.e. functioning vectors) of the two sets. Thus a set may be ordered as being at least as good as another, if every element of a

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[9] The ordering is complete if for all elements within a set (here functioning vectors within a capability set), it is possible to say if the value of that element is higher, lower or equal than others. E.g. in a given capability set, well-being of the functioning vector *[well-nourished, stationary]* being considered by all as being higher than that of the vector *[ill-nourished, transported]* but lower than that of the vector *[well-nourished, transported]*. It may sometimes, however not be easy to decide on such a ordering, e.g. between the vectors *[well-nourished, being stationary]* and *[moderately-nourished, transported]*. When some of the elements cannot therefore be graded, in relation to others, this results in a partial ordering. This issue of complete versus partial ordering is discussed in greater detail in Section 2.2.1.4.

subset of the first is at least as good as the corresponding element of the second. This however allows only for partial ordering. A complete ordering can be obtained by taking into account the maximal element in the capability set, as well as the number of elements in the set. Although this takes into account the number of elements to reflect the extent of choice, the quality of elements is ignored, constituting a serious problem. Brandolini and D'Alessio, 1998 give the example of the possibility of well-being being considered higher if "the alternative to being a central-bank economist is represented by being an artist rather than an academic economist". (p13). Ideally, therefore, an evaluation and interpersonal comparisons of capabilities sets should also account for what Brandolini and D'Allesio term the *distance* between the functioning vectors, with "relatively closer vectors implying a lower well-being than more faraway vectors" [10].

In the case of either a) or b) above, an assessment of the maximal element of the capability set or the entire capability set requires a large amount of information. Beginning from the present 'state of being ' of the person, obtaining counter factual information as to what a person might have been or done, as an assessment of the capability set requires, is quite difficult. One possibility is to collect information about hypothetical choices. This however would be expected to be less reliable than that of actual choices (Brandolini and D'Alessio, 1998). People are being asked to imagine and place themselves in scenarios and this is quite a difficult task. The other possibility is to try and construct or estimate the capability set from observed achievements (Ysander, 1993). This however requires an *a priori* behavioural model, which spells out the probability that a particular capability or capability set will manifest itself in certain observable achievements. Ysander, gives the example of a certain degree of political capability indicating a certain probability that an individual would get politically organised, or make speeches or write to newspapers. The reliability of the results however would require i) the construction of *a priori* models that incorporate joint probabilities to account for the interdependence of individual's choices in different areas (e.g. whether or not an individual uses their options for political action, could be dependent on their capabilities in other areas like education) and ii*)* an *a priori model* that takes into account the current social and institutional setting (e.g. although the functionings may remain the same, options may shrink dramatically in situations of political regulation or social sanctions).

2.2.1.2 Evaluation of chosen functioning vector

Given the extensive information required to perform interpersonal comparisons of capability sets, empirical work is usually restricted to inter-personal comparisons of the chosen functioning vector. Under the assumption of maximising behaviour, this would coincide with the maximally valued element of the capability set. It is however important to remember that this assumption may not hold. The motive for a particular choice may not necessarily be that of maximising one's own well-being. A person's choice may be guided by other considerations or requirements (Sen, 1985 gives the example of one's obligation to others), in which case a functioning vector which does not give the highest well-being value may be chosen.

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[10] The issue of evaluation and comparison of different capability sets, in terms of freedom is discussed by Arrow (1995). Technical issues related to evaluation of freedom are also discussed by Sen, 2000b.

Further, as with elementary evaluation, an evaluation of just the 'chosen functioning vector' can be criticised as disregarding the options the person had and the freedom to choose from these. Having the functioning x when one has no other alternative would surely be viewed differently to choosing x when other substantial alternatives did exist (Sen, 1997). While the 'well-being' assessed in this manner, remains the same for each situation (e.g. well-being for a well fed, well clothed prisoner compared to a free person), the 'advantage' or the value of the capability set of the free person would certainly rank higher than that of the imprisoned person.

Yet due to data constraints, comparisons of the chosen functioning vector may be all that is practically possible. Some notion of the freedom to choose can however still be obtained under the following interpretations of the chosen functionings: i) by looking at the chosen functioning vector, we are in some way 'assessing the options a person had, *through* judging the option-collection by the alternative the person actually chose to use (what was the most choosable functioning combination that the person had the opportunity to choose?)' (Sen, 1994, *p* 340). The nature of the chosen vector thus reflects indirectly the capability set, the person could choose from; Or ii) Choosing itself can be considered a valuable functioning incorporated 'among the doings and beings in the functioning vector' (Sen, 1985 p44) [11]. The problem of characterising and evaluating the 'choosing' remains and Sen suggests that it need not be detailed, but can just be a broad notion which assesses whether substantial alternatives were available to choose from. iii) in Sen's later work this is taken further to refining elements within the functioning vector itself. This is the notion of refined functionings, which takes note of the alternatives available with regard to each functioning. Thus, "Choosing to do x when one could have chosen any member of a set S", is defined to be a "refined functioning" (Sen, 1988, p18). In the example in Section 2.1 if the person was fasting and therefore under-nourished despite having access to the commodity rice and the conversion ability to achieve adequate nourishment, the functioning under-nourished, would be considered a refined functioning (Sen, 1987). In case of refined functionings therefore, alternative opportunities figure in the characterisation of the functionings themselves. A possible way of taking such freedom of choice into account may be to incorporate questions in surveys that ask individuals whether a shortfall in or lack of a particular functioning is perceived by them as a privation or enquire if they had any alternatives. In a study conducted in Belgium by Schokkaert and Van Ootegem (1990) information for 46 'refined functioning's' was obtained using such a questionnaire.

2.2.1.3 Selection of functionings/capabilities

Irrespective of whether the assessment of well-being is done at the level of the capability set or the chosen functioning vector, assessment and interpersonal comparison of well-being would involve considering an extremely large number of capabilities/functionings, related to every aspect of the individual's life[12]. If the main concern however, is interpersonal

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[11] Note that if choosing itself is regarded as a valuable functioning, then choice becomes *one* of a number of valuable functionings while if one looks at capabilties choice is a more fundamental element.

[12] Sen does not however provide any list or guidelines to developing such a list of capabilities. Alkire (1998) argues that the lack of specification was deliberate on Sen's part, so as to ensure the relevance of the approach to different persons and cultures. She draws on Sen's own work and statements to support the 'incompleteness' of the capabilities approach.

comparisons with regard to poverty, a subset of capabilities/functionings may be adequate. Their selection would depend on the context of the particular investigation.

Within the position that there is an 'absolute' core to poverty, at least with regard to the functionings space, 'basic capabilities' i.e. "the ability to satisfy certain crucially important functionings up to certain minimally adequate levels", (Sen, 1993, p41) would be important in any analysis of poverty. In an industrialised country however, it would be expected that capabilities/functionings concerned with basic nutrition, basic health, primary and secondary school education would not show much variation between individuals. Other functionings e.g. involving literary, cultural and intellectual pursuits, vacationing and travelling, related to the ability to entertain friends and such, would however vary considerably between individuals, and being sensitive as indicators of poverty, may form the focus of poverty investigations (Sen, 1985). In a developing country however, even 'basic capabilities' may not be possessed by all individuals and their assessment could reveal much inter-individual variation. Since this paper is concerned mainly with operationalisation of the Capabilities approach with regard to developing countries, such an assessment is discussed in some detail.

Operationalising an assessment of 'basic capabilities' first involves developing a list of what these 'basic capabilities' and the consequent 'basic functionings' include. Sen (1985) gives examples of some basic functionings like being adequately nourished, being healthy, avoiding escapable morbidity etc. Guidelines to developing a specific list of 'basic capabilities' are however not provided by Sen, and for this we have to look at other work. Fundamental discussions of basic values, needs etc have taken place in a range of disciplines. Most theses however, were neither explicitly formulated nor purposefully applied by their authors to issues related to basic capabilities/functionings and are not discussed here, e.g.. the work of Maslow, Max-Neef and Finnis amongst others.[13] The discussion in this paper is restricted to research that has evolved in consonance with and has during the last two decades been linked explicitly with the capabilities approach and includes the following[14]:

- **Nussbaum's 'basic human functional capabilities'.** Nussbaum, (1995) argues for a 'universalist' and 'essentialist' position, which sees some capabilities as being more important and at the core of human life, than others. Nussbaum's idea is that there is an overlapping consensus, between different societies of a general outline of the conception of the human being and she proceeds hoping to develop a theory that is not 'the mere projection of local preferences, but is fully international and a basis for cross-cultural attunement' (p74). She tries to develop a list of certain capabilities, with a threshold below which a life will be so impoverished as not to be human at all. The second threshold is defined with respect to a list of 'basic human functional capabilities', below which a life may be considered a human one, but not a good human life. Nussbaum suggests public policy should not just aim to bring its citizens to this bare minimum, but

[13] Alkire (1998) does provide an extensive discussion of such work.

[14] Inclusion does not necessarily suggest an agreement with the research. A critical assessment of the included work is beyond the scope of this paper.

ought to be committed to at least bringing all individuals above this threshold[15]. Further her argument is that capability (and not actual functioning) should be the goal of public policy – thus e.g. government needs to ensure that people have enough to eat, though they may still choose to starve. Nussbaum's (2000) list of these 'basic human capabilities', which has progressively evolved during the course of her research, includes the following:

a) Life. Being able to live to the end of a normal life of normal length.

b) Bodily health. Being able to have good health, adequate nourishment and shelter.

c) Bodily integrity. Being able to move from place to place; being able to secure one's body against assault; having opportunities for sexual satisfaction and choice in matters of reproduction.

d) Senses, Imagination and thought. Being able to use the senses – to imagine, to think, to reason and to do these in a way that is informed and cultivated by adequate education - requiring not just education as formally understood, but also, legal guarantees of freedom of expression and of religious exercise. Being able to avoid unnecessary and non-beneficial pain as far as possible and able to have pleasurable experiences

e) Emotions. Being able to have attachments to things and to persons who are outside ourselves – an ability which would require certain crucial forms of human association to be supported

f) Practical Reason. Being able to form one's conception of what is good and be able to engage in critical reflection about planning one's life – e.g. ability to seek employment and participate in human life; entailing protection for the liberty of conscience

g) Affiliation. (i) Being able to live for others and engage in various forms of social interaction – an ability which would require the protection of certain institutions that people affiliate to, and protection of freedoms of assembly and political speech. (ii) having social bases of self-respect and non-humiliation, entailing at a minimum, protections against discrimination on the basis of race, sex, religion, caste ethnicity or national origin.

h) Other species. Being able to live with concern for not just human-beings but also animals, plants and nature.

i) Play. Being able to laugh, play and enjoy recreational activities

j) Control over one's Environment. (i) Political - Being able to participate effectively in political choices governing one's life (ii) Material – being able to hold property in terms of real opportunity; having property rights and rights to seek employment on an equal basis with others; having freedom from unwarranted search and seizure. With regard to work, exercising practical reason and entering into mutual relationships.

Nussbaum, emphasises that all the capabilities listed above are of central importance and trade-offs may not be permitted. Further, the list is deliberately general to leave room for further negotiations.

- **Basic needs:** A capabilities approach restricted to 'basic capabilities' and especially to just assessing the 'chosen functionings vector' can be seen as sharing much in common with the 'basic need's approach, which however has a different intellectual history. The end point of both can be seen as being a 'minimally decent life' as defined in the basic needs approach, in terms of particular levels of health, nutrition, education, sanitation,

[15]It may be possible that above that threshold inequalities may well exist – while this could be considered as a capability failure, a less exacting assessment may accept that an independent theory of equality is required to supplement the capability view.

water supply and housing. The preliminary, tentative list of core *indicators* covering these areas which would be useful to assess basic needs, suggested by Streeten *et al*, 1981 may also be of value in the selection of 'basic functionings'. The list (taken from Streeten *et al*, 1981 p 93) is as shown in Table I

Table I Basic needs and their Indicators

Basic need	Indicator
Health	Life expectancy at birth
Education	Literacy Primary school enrolment as a percentage of the population aged five to fourteen
Food	Calorie supply per head or calorie supply as a percentage of requirements
Water supply	Infant mortality per thousand deaths Percentage of population with access to potable water
Sanitation	Infant mortality per thousand births Percentage of population with access to sanitation facilities

The indicators in this list allow an assessment of the satisfaction of the basic needs of a group of individuals or a population within particular geographically defined areas. If the indicators identify a shortfall, this would indicate the necessity of concentrating on the provision of goods and services, to satisfy the basic needs. Since 'functionings' pertain to individuals however, indicators in the above list that relate to groups will have to be replaced with indicators that can be assessed with respect to individuals, e.g. an indicator of individual education like 'level of education of individual' rather than 'Primary school enrolment as a percentage of the population aged five to fourteen'. Besides, indicators like that for food suggested for use in the basic needs approach (calorie supply) are input indicators, rather than 'output' indicators as an assessment of functionings would strictly require (e.g. for food – anthropometric measurements like, height, weight and/or mid arm circumference would be considered more appropriate for the assessment of functionings as these take into account the role of personal characteristics). This neglect of interpersonal variations in the conversion of commodities into functionings has been identified as one of the major differences between the functionings and the basic needs approach. Another major difference is the absence of the notion of choice or freedom in the basic needs approach as compared to the Capability approach (Balestrino, 1991 and 1994).[16] Thus although the parameters identified in the basic needs, may be useful as guidelines, to defining the basic functionings to be assessed, freedom to choose, may have to be included as an additional functioning or the functionings 'refined' to take this into account.

- **Doyal and Gough's theory of Human Need**: Doyal and Gough (1991), argue that basic needs are linked to the avoidance of serious harm, are objective and universal and do not alter based on cultural differences. In trying to identify such basic needs, these authors define serious harm as 'dramatically impaired participation in a form of life' (p55). They identify physical survival and personal autonomy as constituting the most

[16] Sen (1994), however suggests that the basic needs approach may be seen as incorporating some notion of freedom since the person is left free to decide what to do with the opportunity provided by the possession of the basic goods and services.

basic human needs – "those which must be satisfied to some degree before actors can effectively participate in their form of life to achieve any other valued goals" (p54). They go on to specify that it is physical health rather than mere survival which is a basic need which, together with autonomy, would be given priority for people to satisfy before addressing any other needs. Physical health is defined negatively, i.e. linked to the absence of biological disease and illness. Autonomy, it is argued is determined by three key variables, viz. understanding, psychological capacity and opportunities. The first refers to the level of understanding a person has about themselves, their culture and expectations from them within it; the second psychological capacity refers to the individual's mental health, which is defined as the obverse of mental illness and therefore as 'practical rationality and responsibility' (p62) – the authors however agree that it is difficult to define precisely the minimum levels of rationality and responsibility required to call an individual autonomous. The third variable affecting autonomy is the range of opportunities open to the person, "for new and significant action" (p66). They emphasise that although the basic needs of physical health and autonomy are considered universal, the basic goods and services that are needed to satisfy these needs ('satisfiers' as Doyal and Gough label them), may differ between different cultures. They introduce the concept of characteristics of these satisfiers and suggest that there may in fact be certain 'universal satisfier characteristics' (or intermediate needs) which are "*those properties of goods, services, activities and relationships which enhance physical health and human autonomy in all cultures*"(158). While the nutrition property of food would thus be universal, the specific types of foods that provide this may be culturally specific. They draw up the following list of such intermediate needs and propose to measure need-satisfaction by concentrating on these.

Nutritional food and clean water
Protective housing
A non-hazardous work environment
A non-hazardous physical environment
Appropriate health care
Security in childhood
Significant primary relationships
Physical security
Economic security
Appropriate education
Safe birth control and child-bearing

The qualification for inclusion is that the satisfier characteristics universally and positively contribute to physical health and autonomy. Evidence on what is universally necessary to achieving physical health and autonomy is derived from technical as well as anthropological knowledge. The indicators to assess need (basic and intermediate) satisfaction proposed by them do not pertain to individuals but rather to allowing comparisons between countries, or groups. These could however be suitably modified for use at the level of the individual.

- **Alkire's criteria for basic capabilities**: Generalising from Sen's arguments in defence of life expectancy measures as capability indictors, Alkire (1998 suggests six criteria that achieved functionings must satisfy to be considered possible indicators of basic capabilities. These (p 191) are the following:

i The functioning belongs to the capability set (is itself valuable) OR the functioning is directly associated with the capability set (highly correlated, etc).

ii The functioning pertains to a basic human need, i.e. that without which one's life may be blighted (Alkire, draws on the work of David Wiggins to guide the classification of a need as basic)

iii The functioning is not significantly dependent on any non-basic prior functioning

iv The functioning is not dependent on the presence of uncommon ability or interest

v A level of achieved functioning which is widely recognised to be 'basic' can be specified and empirically observed

vi Provision of the functioning does not necessarily compromise freedom to pursue other significant functionings in the long term.

Although a list is not provided, the guidelines may be used to decide whether a functioning does or does not qualify as an indicator of a basic capability.

- **Qizilbash's prudential values for development:** The problem as Qizilbash (1998) presents it, is not just with that of the notion of "basic" (need, value, capability, etc) but that of specifying the precise level at which it is considered basic. Although this requires a sensitivity to cultural, social and historical contexts, Qizilbash also, however argues for the absolute view of poverty in that "there is some notion of a distinctively *human* life, which crosses culture and time, and this must guide us in formulating the precise standards for what is basic to any human flourishing" (Qizilbash, p12). He draws on the work of James Griffin on prudential values to suggest a list of "basic prudential values" which are instrumental values and necessary requirements for the pursuit of any good human life. These include (A) Minimal levels of health, nutrition, shelter, security, sanitation, rest and (B) (i) certain basic mental and physical capacities and (ii) literacy and (C) some minimal level of aspiration and self-respect. He clarifies that these things are removed from commodities and the approach cannot thus be accused of commodity fetishism. They are rather values that commodities can help to realise. With regard to a comparison with the Capability approach, certain minimal intellectual and physical capacities are included which Qizilbash considers capacities necessary for the pursuit of any good life, but instrumentally rather than intrinsically valuable.

- **Desai's capabilties**

  Desai's (1995) list of capabilities is not divided into separate basic or non-basic capabilities. The propositions guiding the capabilities included in the list are a) capabilities should be few and common to all individuals; b) they must be co-realisable i.e. that it is essential for all capabilities to be realised irrespective of the extent to which some are fulfilled; c) the *level* at which the capability can be guaranteed is expressed in terms of the commodities/resources required to obtain that capability. While capabilities are therefore absolute, the *level* expressed in this manner can be different for different societies; and d) while the number of capabilities may be limited, these allow for a large number of functionings. Achievement of the functionings would however, be dependant on the actual resources the person has. The capabilities listed by Desai (1995, p193) are as follows:

  1. capability to stay alive/enjoy prolonged life
  2. capability to ensure (biological) reproduction

3. capability for health living
4. capability for social interaction
5. capability to have knowledge and freedom of expression and thought

Operationalisation involves assessing the minimum resource requirement to guarantee these capabilities. The actual functioning achieved is however not taken into consideration.

- **Empirical studies**

In empirical work in developing countries, the functionings approach has almost largely been operationalised in the restricted sense of assessing the chosen functioning vector and certain basic functionings within it. The assumption being that at the level of 'basic functionings' one can reasonably assume that people who show a short-fall did not have any alternative choice. The number of people who could afford to eat but were fasting (or on a hunger-strike) and thus functionally under-nourished is likely to constitute an insignificant minority.[17] The functionings assessed are further restricted by data availability, which is not an unimportant consideration. In effect therefore most empirical work concentrates on indicators similar to those used in studies related to the basic needs school. The similarity is further increased, because the assessment of these functionings is usually restricted to that of the 'living standard' rather than that of 'well-being'. Recall that living standard is a narrow notion, taken to relate to the individual, while well-being is broader including 'sympathy' for other individuals (Sen, 1987)[18].

Examples of empirical work include the following. Sen (1985), presents inter-country comparisons performed at the level of functionings, like education and health. In the same book, comparing data for Bombay and West Bengal in India, Sen looks at indicators of the functionings of health and nutrition to investigate the issue of gender bias. Dreze and Sen's monograph on India (1995) proposes to analyse economic development in India in terms of the expansion of basic capabilities. As detailed by Alkire, 1998 however, the sustained attention given in the analysis to inequalities in health and education (using indicators like literacy rates, life expectancy, infant mortality and fertility) results in a narrowing of the focus, as with the other studies, to specific basic functionings,.

Other studies, compare the monetary approach to poverty analysis with the Capability approach e.g. Ruggeri Laderchi, using data for Peru (1999) and for Chile (1997). The data used for the Capability approach includes indicators on functionings related to nutrition, health and education. Similarly the indicators used in the Human Poverty Index introduced in the 1997 Human Development Report relate to achieved functionings. The index was designed to focus on deprivation in three essential

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[17] Qizilbash, 1998, would consider a person who in order to achieve some moral or political goal may have starved, as being poor – having chosen to be poor. In the Capability approach however, since this person chose to starve, he is not necessarily considered poor.

[18] In empirical work, assessment of well-being would be more difficult than that of the living standard. It could involve psychological assessments. Besides, in the policy-oriented context, it gives rise to additional risks of paternalism and increased difficulty in reaching a consensus on the pertinent functionings (Brandolini and D'Alessio, 1998).

dimensions of human life - longevity (or 'being healthy') represented by the percentage of people expected to die before age 40; knowledge (or 'being educated') measured by the percentage of adults who are illiterate; and access to resources to enable a decent living standard measured using a composite of three variables – the percentage of people with access to health services and safe water, and the percentage of malnourished children under five.[19]

Most operational work in developed countries has also been done at the level of functionings rather than capabilities (Erikson, 1993; Razavi, 1996; and Brandolini and D'Alessio 1998). Schokkaert and Van Ootegem (1990), in a study on data for Belgium, do however, try to capture the notion of freedom to choose, by the inclusion of refined functionings. The notion of refined functionings, with regard to developing countries, does not however appear to have been explored. As suggested earlier, a possible reason for this may be that in countries where under-nutrition and ill-health are rife, it would be unrealistic to hypothesise that these functionings were chosen, despite alternative options being available.

An attempt is made in Table II below, to compare what can be considered lists of 'basic capabilities' that have been the outcome of the different methodologies and criteria discussed above.

[19] Details of the Human Poverty Index can be obtained from technical notes 1 and 2 in the UNDP's Human Development Report for 1997 (UNDP, 1997).

Table II 'Basic Capabilities' as identified using differing criteria

Nussbaum	**Basic Needs**	**Doyal & Gough[20]**	**Qizilbash**		**Empirical studies**
Life				Stay alive	
Bodily health	Health[21]	Physical survival – i.e. physical health (BN), Appropriate health care (IN)	Health, basic physical capacity	Healthy living	Health (Sen, 1985 and 1995; Ruggeri Laderchi 1997 and 1999; Human Poverty Index, UNDP 1997)
Bodily health (Nourish- ment)	Food	Food (IN)	Nutrition		Nutrition (Sen, 1985; Ruggeri Laderchi 1997 and 1999; Human Poverty Index, UNDP, 1997)
Bodily health (Shelter)		Protective housing (IN)	Shelter		
	Water supply	Water (IN)			Water (Human Poverty Index, UNDP 1997)
	Sanitation		Sanitation		
Bodily integrity – free movement, security against assault; opportunities for sexual satisfaction and choice in matters of reproduction. -		Non-hazardous work environment (IN) Non hazardous physical environment (IN) Safe birth control and child bearing (IN)		Ensure (biological) reproduction	

[20] Doyal and Gough classify needs into basic needs and intermediate needs. The latter are considered necessary to achieve the former. Thus intermediate needs have also been included.

[21] Although many approaches, mention the capability health, the indicators that are used are often indicators of 'life' e.g. life expectancy and mortality rates

Senses, imagination, thought	Education (including freedom of expression and religion)	Appropriate education (IN)	Education	Knowledge, freedom of expression and thought	Education (Sen, 1985 and Sen 1995; Ruggeri Laderchi 1997 and 1999; Human Poverty Index, UNDP, 1997)
Emotions		Security in childhood (IN) Significant primary relationships (IN)		Social interaction	
Practical reason		Mental Health (BN)	Basic mental capacity		
Affiliation		Understanding (BN)	Basic level of aspiration and self-respect		
Other species					
Play			Rest		
Control over environment: political and material		Physical security (IN) Economic security (IN)	Security		
		Having opportunities (BN)			

BN = Basic Needs; IN = Intermediate Needs

Some of the terms used by different approaches, may not correspond completely to those used by others. Terms have however been placed in Table II, alongside those with which they overlap the most. An examination of Table II indicates that the capabilities that are common to all lists are those related to health, nutrition and education. These also satisfy the criteria suggested by Alkire (1998) for classifying capabilities as 'basic'. This is not to state that it is only the capabilities related to health, nutrition and education that should be considered 'basic'. It is worth noting however, that different authors, approaching the issue of identifying 'basic capabilities' from different perspectives and criteria, should identify these three in common with each other.

2.2.1.4 Inter-personal comparisons of well-being

Irrespective of the finite dimensions that are selected, whether basic or otherwise, the issue of performing comparisons between different individuals for this finite list of capabilities/functionings remains. Comparisons that involve single functionings are fairly straightforward. E.g. a comparison between the values for the functioning 'being educated'. If the chosen indicator is the extent of education, the comparison between individuals would be between different levels of achieved education, like education until class five, until class ten or university education. Values for each of the selected functionings are thus compared one by one between individuals, without trying to develop any overall measure of well-being.

An interpersonal comparison of the overall combination of functionings, (i.e. the chosen functioning vector or the capability set), is however more difficult. Recall that depending on their evaluation the person will choose one of the vectors out of the capability set. He or she thus has a particular level of well-being in this 'chosen state of being'. Since the process of evaluation varies from person to person, it would appear to confound any straightforward comparisons of well-being – what one person may consider the highest well-being may not be considered so by another. E.g. An individual A with functionings vector [*educated, comfortably housed*] may be considered by some as having a higher well being than individual B with functionings vector [*uneducated, luxuriously housed*], while others may insist that Person B has a higher level of well-being than Person A. Nevertheless, as pointed out by Sen (1985), it may be possible to agree on some minimal constraints on the different states of well-being. This is particularly the case when dealing with basic functionings. For example, all personal evaluations might agree (thus allowing 'complete' ordering) that the well-being of a person with a functioning vector *[ill-nourished, transported]* will be less than one with the vector *[well-nourished, stationary]*. A personal evaluation may be 'partial' in the sense that it is unable to pass any judgement on the ordering between some vectors, for example *[well-nourished, being stationary]* and *[moderately-nourished, transported]*. This 'partial' nature also extends to the minimal constraints that are agreed upon by a group.

Some procedures that allow a partial or under some conditions, a complete ordering of interpersonal comparisons are as follows:

1) **Partial Ordering.** Two possible procedures are recommended here:

a) dominance partial ordering - Here an individual may be considered better than another, if the value for one of the functionings in the functioning vector, is higher than that of the other, provided the value of none of the remaining functionings is lower (similar to a Pareto criterion). Although this method does not rank all individuals in relation to each other, it can be useful to some extent and is recommended by Sen as a plausible approach for limited interpersonal comparisons. E.g. see Table III

TABLE III Dominance Partial Ordering

	Functioning		
	'Being healthy'	**'Being educated'**	**`Being nourished'**
Individuals	days well previous year (maximum: 365)	level of education (maximum: 12)	mid-arm circumference (maximum: 8)
A	360	8	4
B	330	6	4
C	365	7	5

Assessed on the basis of dominance ordering, A ranks higher than B and C ranks higher than B; but A and C cannot be ranked against each other. That is, all we can say is that the

well being of A is higher than that of B and that of C is higher than that of B; no conclusions are made on the comparative well-beings of A and C.

b) sequential dominance - This analysis technique has been used by Atkinson and Bourguignon (1987) and Jenkins and Lambert (1993) for the comparison of income distributions when family needs differ. Although, these empirical applications have focussed on the space including income and needs, Brandolini and D'Alessio (1998) suggest that the technique might also be used to obtain partial orderings within the capabilities framework.

2) Complete ordering

If a complete ordering is required, some decision will have to be taken on the extent to which each functioning is important[22]. Conflicts can arise while subjectively deciding on weights. While being nourished may be considered most important (and therefore worthy of a higher weight) by some individual, being housed may be regarded as more essential by another. Listed below are some methods suggested by Martinetti, 1994, Chakraborty, 1996 and Brandolini and D'Alessio, 1998, as being useful to decide on weights to be allotted:

- The choice is made by the investigator or decision maker and reflects his/her preference system.
- A weighting system that reflects the value system prevailing in the society under consideration is used. Since different individuals are likely to attach different weights, Chakraborty (1996), proposes a methodology for aggregating (by averaging) the relative weights attached by different individuals in society. In a small enough group, participatory techniques too could possibly be of use to arrive at a consensus.
- Data-driven methods are used, which are independent of any value judgement. Possibilities may be the use of standard statistical techniques like Principal Component Analysis or factor analysis to derive the relative weights. E.g. Ram (1982) uses Principal Components Analysis to obtain a single composite index, from a range of variables indicative of basic needs fulfillment. The technique allows for the parsimonous representation of a large number of variables. The first new variable or principal component that is obtained can be used as the composite index. It represents the linear combination of the original variables that captures or explains the largest proportion of variance of the original variables. The equation for this new variable or composite index, includes all the underlying variables and indicates the 'optimal' weights of each of these that contribute to capturing the largest fraction of the variance. Such a composite index was obtained by Ram to replace the three variables of life expectancy, infant mortality and adult literacy. The weights of these component variables implicit in the composite index obtained were 0.275, 0.324 and 0.401 respectively. Ram (1982) contrasts these weights against the equal weights (of 0.33 each), used when the same three components were combined to obtain the Physical Quality of Life Index (PQLI). Ram suggests that

[22] An implicit valuation has already been done in some sense when certain functionings are selected over others, for investigation.

weights obtained from the data using the Principal Components Analysis procedure, may be less arbitrary[23].

Alternatively, a weighting system that is based on observations of the data is used, so that the weights are decided based on the relative frequencies of the attributes in the data. Martinetti (1994) gives the example of an individual lacking a widely available facility like a lavatory as opposed to a television set, which many people may not have. Lacking a toilet would then be given a higher weight than not owning a television set.

- An equal weighting system is used where the same weight is attached to each functioning. This can be viewed as being adapted to reduce interference at the minimum, or when there is no consensus view. (Brandolini and D'Alessio, 1998).

If we take the weights as given (i.e. any one of the methods suggested above is used to decide on the weights), methods suggested in the literature for interpersonal comparisons between individuals for the overall well-being, are the following:

a) Borda rule ranking: The Borda rule uses ordinal information, in the form of rank order positions (for an application to international comparisons of poverty, see Qizilbash, 1998). Thus each of the N individuals to be compared are ranked with regard to the values for each individual functioning, such that the alternative with least-well being scores 1 and the one with most well-being scores N. For each individual, the rank order positions for each functioning are added to give the Borda score. The individuals are then ranked according to the score with the lowest scoring 1 and highest N. If two individuals tie they are given the same number, and the rank given to the next score is one higher to account for the replication. The advantage this has over the dominance ranking is that it can give a complete ordering, although it only allows for ordinal comparisons.[24]

   Considering the same example as in Table III, values for three functionings, considered to be of equal weight, for each of three individuals are given below.

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[23] Factor analysis is another statistical procedure that is largely similar to the Prinicpal Components Analysis. A detailed explanation of these procedures, can be found in Statsoft, electronic Textbook, (1984-2001) as also other major statistical text books.

[24] Further, it is of use only when there is a consensus on the weights to be used for the individual components. If it is not possible to achieve a consensus on the weights to be applied to the different components, Qizilbash, 1998, proposes the use of a method which combines the 'Borda' score and the 'dominance ranking' which he refers to as the 'intersection Borda ranking'. Although this would give an incomplete ordering, it would help arriving at a judgement in some cases where dominance ordering is silent. The intersection Borda ranking, as well as the Borda score however violate the condition of independence of irrelevant alternatives.

This condition requires that the final ranking between two alternatives x and y be dependent only on their ranking for the individual functionings. The final ranking may however change although rankings of individual functionings do not if the component ranking of some other alternative changes such that the total score obtained causes it to be positioned in the final ranking somewhere between x and y.

Table IV Borda Rank

Individuals	'Being healthy' Rank	'Being educated' Rank	`Being nourished' Rank	Total Rank Value	Borda Rank
A	2	3	1	6	2
B	1	1	1	3	1
C	3	2	3	8	3

According to the Borda rank, the well being of C is highest followed A and finally B. However we cannot determine whether the difference in well-beings of C and A is the same as that between A and B.

b) Composite index: The values for the different functionings are combined to give a scalar measure, which is then used to make the interpersonal comparisons. The advantage this has over the Borda ranking method, which only allows ordinal comparisons to be made, is that it also gives an indication of the extent by which an individual's well-being is higher or lower than another.

When indicators of different dimensions are combined together to develop a scalar measure, the different measurement units have first got to be standardised. The possible solutions as detailed in Brandolini and D'Alessio, 1998 include (a) conversion of the quantitative data to ordinal – e.g. classifying units depending on the quartiles they belong to – this however, poses similar problem as that for other ordinal rankings i.e. not telling us about the extent of difference between ranks; (b) conversion of values to binary classifications of the either/or type. Thus a threshold is defined with regard to each variable and individual units are classified as being 'poor' if below the norm[25]; (c) a more refined assessment would involve taking into account the distance of the value for the particular attribute from the defined threshold (following Desai and Shah, 1988); (d) The fuzzy set methodology has been recently suggested as a possibility within which composite indices may be obtained (Martinetti, 1994; Cheli and Lemmi, 1995 Cerioli and Zani, 1990). The value for each functioning for an individual is converted to a value on a scale between 0 and 1. A combining function is then defined, by which the values across the different functionings are combined to give a scalar measure.

The same e.g. used in Tables III and IV is used in Table V to perform interpersonal comparisons of well-being using a composite index[26]

[25] An additional issue which arises, is that of identifying the threshold, at which this dichotomy takes place. An extensive literature on this exists, specifically directed to indicators of particular functionings (e.g. threshold to identify individuals as undernourished). Such a discussion is outside the scope of this paper. See Saith and Harriss-White (1999) and references therein for this.

[26] Change in country rankings based on the UNDP's composite capabilities-based poverty index when the Dominance ranking, Borda rank or intersection Borda rankings are used instead, is discussed by Qizilbash, 1998

TABLE V Composite Index

Individuals	'Being healthy' (normalised value)	'Being educated' (normalised value)	`Being nourished' (normalised value)	Composite Index (arithmetic mean)
A	0.99	0.67	0.50	0.72
B	0.90	0.50	0.50	0.63
C	1.00	0.58	0.62	0.73

The three functionings are assumed to be of equal weight for each of the three individuals. The entries here are 'normalised' versions of those in Table III (denoting the fraction of the maximum value attained). The composite index – here simply the arithmetic mean – assigns the highest well-being to C, followed by A and then B. Unlike the Borda rank, it is evident that the difference between C and A is much smaller between A and B.

Comparisons that are made using scalar measures of well-being have been criticised for concealing more than they reveal. A simple example would be that of an individual considered the best with regard to his or her overall well-being. It may however be possible that the individual may perform very poorly on one of the functionings and this information would be disregarded (in the example here, this would correspond to the variance in the normalised entries). Whenever an interpersonal comparison of overall well-being is done therefore, it is important to present information about the component functionings as well.

2.2.2 Functionings information combined with income

Alternative ways of implementing the Capabilities approach have been tried. One of these involves, supplementing traditionally used measures of poverty in the income space with a) information on functionings themselves or b) variables which may be considered instrumental in the determination of the capability set. This could be seen as a way of enriching the overall understanding of the prevailing poverty or inequality.

The measures developed by the UNDP in its Human Development Report, particularly the Human Development Index, can be seen as an operationalisation of such a suggestion. The indicator per capita income adjusted for purchasing power parity (as a measure of access to resources to enable a decent living standard) is combined with the indicator life expectancy at birth (to measure the functioning 'being healthy') and the indicators adult literacy and average primary, secondary and tertiary enrolment (to measure the functioning 'being educated').[27] Normalised values for indicators are obtained and averaged to give the Human Development Index..

In a different context, Balestrino and Petretto (1994) incorporate non-welfarist concerns, in terms of certain basic functionings, within a welfarist analytical framework. They try to develop guidelines for pricing certain commodities that are important 'inputs' for the production of functioning's like health and education – trying to devise optimal taxation rules,

[27] Details of the calculation of the Human Development Index can be obtained form technical Note 2 in the UNDP's Human Development Report for 1997 (UNDP, 1997).

in terms of whether these commodities should be taxed, subsidised or provided free of charge, to ensure that individuals enjoy a socially acceptable minimum level of these functionings.

2.2.3 Adjusted incomes

Another suggestion on operationalisation of the capabilities approach, involves evaluation in the income space itself. Individual specific income lines are however obtained, taking into account each individual's respective conversion ability.

Sen (1993) suggests that different amounts of income may be required for different individuals (or communities) to reach the same levels of capabilities, given differences in their social and personal characteristics. Income lines may therefore be adjusted taking these differences in conversion ability into account. Sen (1997) gives the example of adjusting the income level of a family downwards by illiteracy and upwards by high levels of education so that they become 'equivalent' in terms of capability achievement. When operationalising such an implementation however, problems arise with regard to identifying the differences in conversion abilities. Ballestrino, 1991 has made some beginnings towards developing a methodology for obtaining societal poverty lines. Desai, 1995 also suggests an empirical implementation where the emphasis is on resources required to guarantee some minimal list of capabilities, rather than on the functionings achieved.

3. Conclusion

The main features of the Capabilities approach and its operationalisation in the context of poverty analysis have been discussed in this paper. Review of the literature on operationalisation in the functionings space, suggests that practical considerations usually restrict evaluation to the 'functionings' that have been achieved, rather than covering the capabliity set. This is especially the case for poverty analyses in developing countries, where the notion of 'refined functionings' or 'freedom to choose' would not be a very meaningful exercise, in the context of the assessment of basic capabilities.

A comparison of lists of 'basic' capabilities developed by different researchers, using differing methodologies indicates that capabilities related to health, nutrition and education, consistently appear in all the lists, despite the different criteria for inclusion, reflecting their importance for any investigation of poverty.

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